

# THE LARGEST UNETHICAL MEDICAL EXPERIMENT IN HUMAN HISTORY

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## KEYWORDS

Unethical Research; Electromagnetic Fields; Wireless Radiation; Radiofrequency Radiation; RF; Non-Ionizing Radiation; Mobile Networking Technology; 5G; Adverse Health Effects

## ABSTRACT

This monograph describes the largest unethical medical experiment in human history: the implementation and operation of non-ionizing non-visible EMF radiation (hereafter called wireless radiation) infrastructure for communications, surveillance, weaponry, and other applications. It is unethical because it violates the key ethical medical experiment requirement for “informed consent” by the overwhelming majority of the participants.

The monograph provides background on unethical medical research/experimentation, and frames the implementation of wireless radiation within that context. The monograph then identifies a wide spectrum of adverse effects of wireless radiation as reported in the premier biomedical literature for over seven decades. Even though many of these reported adverse effects are extremely severe, the *true extent of their severity has been grossly underestimated*.

Most of the reported laboratory experiments that produced these effects are not reflective of the real-life environment in which wireless radiation operates. Many experiments do not include pulsing and modulation of the carrier signal, and most do not account for synergistic effects of other toxic stimuli acting in concert with the wireless radiation. These two additions *greatly exacerbate the severity of the adverse effects from wireless radiation*, and their neglect in current (and past) experimentation results in substantial under-estimation of the breadth and severity of adverse effects to be expected in a real-life situation. This lack of credible safety testing, combined with depriving the public of the opportunity to provide informed consent, contextualizes the wireless radiation infrastructure operation as an unethical medical experiment.

Addition of the nascent fifth generation of mobile networking technology (5G) globally to the existing mobile technology network will contribute further to the largest unethical medical experiment in human history!

This monograph consists of four chapters and eight appendices. Chapter 1 focuses on unethical research, showing how wireless radiation infrastructure implementation fits into the

framework of unethical medical experimentation, and providing many examples of other types of unethical medical experimentation.

Chapter 2 is the main technical chapter, focusing on adverse health effects of wireless radiation. It describes:

- adverse effects from past research, and what additional adverse effects can be expected when 5G is implemented fully
- lack of full consensus among key stakeholders on adverse effects from wireless radiation, and the role played by conflicts-of-interest in this lack of consensus
- the main reason that this unethical medical experiment was allowed to take place:

The Federal government that **promotes** accelerated implementation of wireless radiation technology also 1) **sponsors** research examining the technology's potential adverse effects and 2) **regulates** the technology's potentially adverse impacts on the public. This unethical promotion-sponsorship-regulation conflict-of-interest lays the groundwork for unethical medical experimentation!

Chapter 3 contains the references for the main text, and Chapter 4 contains the eight appendices.

Appendix 1 presents more details about unethical medical experiments, including examples and many references for further study.

Appendix 2 contains a manual taxonomy of a representative adverse EMF effects database; Appendix 3 contains a factor analysis taxonomy of the same database; and, Appendix 4 contains a text clustering taxonomy of the same database. All three taxonomies contain links between the categories in the summary tables and the titles of papers associated with each category.

Appendix 5 shows the *potential contribution of wireless radiation to the opioid crisis* and *potential contribution of wireless radiation to exacerbation of the coronavirus pandemic*.

Appendix 6 shows the *link between funding source and research outcomes*, and presents many references on the topic of funding source-driven bias.

Appendix 7 describes the under-recognized adverse effects of wireless radiation related to *medical implants* (pacemakers, defibrillators, cochlear implants, dental implants, bone pins, etc) and metal appendages (metal jewelry, etc), and potential *micro/nano*-implant analogues.

Appendix 8 shows *adverse effects of wireless radiation on automotive vehicle occupants* (and bystanders), and the under-advertised on-board and external sources of this radiation.

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## PREFACE

Humanity is racing along two parallel paths to self-destruction: 1) accelerating irreversible climate change, and 2) rapidly increasing exposure to health and life-threatening mixtures of toxic stimuli. The most ubiquitous constituent of these toxic mixtures is wireless radiation, which is proceeding to blanket humanity and its ecological life support chain.

A small fraction of the population has given informed consent to wireless radiation exposure, gambling (like users of cigarettes, cocaine, fentanyl) that they can escape the severe adverse consequences of exposure. Another small fraction of the population has not given informed consent, but receives harmful second-hand exposure because of the broad-scale transmission of wireless radiation from terrestrial and satellite sources. The vast majority of the population has given Mis-informed Consent to this exposure. This mis-information is supplied by the telecommunications industry, its lobbyists, its government partners, its political enablers, its marketing arm (the mainstream media), and even some academic enablers.

While research over the past seventy+ years has shown hard evidence of severe adverse effects from wireless radiation, the full extent of the damage from existing wireless radiation infrastructure is not known, much less the damage expected from 4G/5G infrastructure being implemented rapidly today. Attempting to identify the full extent of these adverse effects is the global medical experiment being conducted today. The fact that this experiment is being conducted with mis-informed consent makes it an unethical medical experiment. Because of the magnitude of this experiment, it is the *largest unethical medical experiment in human history!*

Chapter 1 of this monograph presents the case for wireless radiation infrastructure implementation without credible safety testing being not only an unethical medical experiment, but the largest in human history. It presents wireless radiation infrastructure implementation in the context of other recent examples of unethical medical experiments, and shows how these others pale in comparison to the projected suffering and lethality from wireless radiation exposure based on even the incomplete biomedical data gathered to date.

Chapter 2 is the main technical chapter in this monograph. It covers a broad scope of adverse health and life-supporting ecological effects from wireless radiation, mainly at communications frequencies. Some of these adverse effects are not well-known to the general public, but they are important nevertheless. While the majority of the chapter is technical, its initial section provides the context for evaluating the biomedical literature results. In particular, it emphasizes the conflicts-of-interest operable in all aspects of the wireless radiation biomedical research process, ranging from the initial health-effects research sponsorship to the final research results dissemination in the premier technical literature and other forums. As Chapter 2 shows, we have known about the adverse health and ecological effects of wireless radiation exposure for seventy+ years, but decision-makers of all stripes have nevertheless chosen to impose this health and life-threatening toxic stimulus on an unsuspecting global populace.

Additionally, there are eight appendices. The copious material contained in the appendices supports the statements made in the main text (Chapters 1 and 2). Three sub-appendices, while grounded in hard evidence, are somewhat more hypothetical than the rest. They include 1) linkages between wireless radiation exposure and exacerbation of the opioid crisis and the coronavirus pandemic, and 2) potentially enhanced heating and temperature increases to thermally-damaging levels from short RF pulses and tissue-imbedded nanoparticles. My purpose in presenting these three more hypothetical sub-appendices is to stimulate more discussion, and especially more research, on the nature and validity of these linkages.

Finally, it is my hope that this monograph receives the widest distribution, especially among those who have 1) been the targets of this decades-long mis-information campaign and 2) given their consent to wireless radiation exposure based upon mis-information. It is this segment of the public whose informed actions could reverse the increasing implementation of wireless radiation infrastructure, and prevent the infliction of even more damage, since the other stakeholders involved in the promotion of wireless radiation infrastructure have shown little desire to protect the public against the known and projected ravages of wireless radiation.

Ronald N. Kostoff, Gainesville, VA, 15 February 2020

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## EXECUTIVE SUMMARY

### ES-1. Overview

We are in the midst of the largest unethical medical experiment in human history. This experiment is the implementation and operation of a global wireless network for communications, surveillance, and other purposes. It is a *medical experiment* because we do not know the full extent of the adverse health effects that will result from this wireless network implementation and operation. It is an *unethical* medical experiment because it violates the key ethical medical experiment requirement of 'informed consent' from the participants.

Even though the adverse health effects of wireless radiation reported over the past seventy+ years span the range of severity from discomfort to lethality, we do not know the full extent of adverse health effects from this technology because:

Most laboratory experiments aimed at identifying wireless radiation health effects bear no relation to real-life exposures, and are performed under the most benign conditions of

- single stressors (wireless radiation only)
- no pulsing and modulation of the carrier signal
- no synergistic effects of other toxic stimuli acting in concert with the wireless radiation

These experimental deficiencies are compounded by

- lack of access to the global classified literature on adverse health effects from wireless radiation
- lack of knowledge of proprietary basic and advanced studies on adverse health effects from wireless radiation.

The adverse wireless radiation health effects that have been identified already from the incomplete literature openly available are massive in scope and magnitude. They support the conclusion that *wireless radiation as already implemented is extremely dangerous to human health*. It acts as both a *promoter/accelerator* and *initiator* of adverse health effects. Addition of the missing elements described above and more wireless radiation infrastructure will exacerbate further the adverse effects from wireless radiation on

- human health directly through contribution to chronic disease and
- human health indirectly through degradation of the food chain ecosystem.

ES-2. Adverse Impacts of Wireless Radiation on the Most Vulnerable Members of Society

In the spirit of the ‘unethical’ medical experiments described in this monograph,

***it is the poor and dispossessed who will suffer the most from wireless radiation exposure.***

This is because wireless radiation plays a dual role of *initiator* and *promoter/accelerator* of serious disease. In its *promoter/accelerator* role, it can accelerate the progression of existing serious diseases such as cancer, and/or, through synergy, can produce serious adverse health effects when combined with other toxic stimuli that neither constituent of the combination could produce in isolation.

Many toxic stimuli, such as harsh chemicals, biotoxins, ionizing radiation sources, vibrating machinery, prolonged sitting doing repetitive tasks, high air pollution, etc, are used/experienced by the poorest members of society in their occupations, and many toxic stimuli, such as air pollutants, toxic wastes, etc, are very prevalent in their residential environments. Thus, people who spray pesticides in farm labor or household applications, people who do cleaning with harsh chemicals, people who dispose of hazardous materials, basically, *people who do the dirty work in our society and live in dirty environments*, are already leading candidates for higher risk of serious diseases. Adding a wireless radiation *promoter/accelerator* to their residential and occupational environments will radically increase their chances for developing serious diseases. Closing the ‘digital divide’ for them will translate to increased suffering and reduced longevity!

### ES-3. Role of Conflicts-of-Interest in the Sponsorship, Conduct, and Dissemination of Wireless Radiation Research

***The results shown in the literature cannot be separated from the context in which this research has been sponsored, conducted, and disseminated!***

In the USA (and in most, if not all, countries), the two major sponsors of wireless radiation health and safety research are the Federal government and the wireless radiation industry, in that order. Both of these organizations have a strong intrinsic conflict-of-interest with respect to wireless radiation.

The Federal government is a strong promoter of wireless radiation infrastructure development and rapid expansion, most recently supporting accelerated implementation of 5G infrastructure.

The Federal government that ***promotes*** accelerated implementation of wireless radiation technology also 1) ***sponsors*** research examining the technology's potential adverse effects and 2) ***regulates*** the technology's potentially adverse impacts on the public. The fact that these development, regulation, and safety functions may be assigned to different Executive Agencies within the Federal government is irrelevant from an independence perspective.

***The separate Executive Agencies in the Federal government are like the tentacles of an Octopus; they operate synchronously under one central command.***

The wireless promoters' main objectives of developing and implementing the technology rapidly are enabled by suppressing knowledge (to the public) of potential adverse effects from the technology's operation. These fundamental conflicts impact the objectivity of the health and safety R&D sponsors and performers. Any ***Federal research sponsor*** of wireless radiation technology safety would be highly conflicted between 1) a desire to satisfy Executive and Legislative objectives of accelerating expansion of wireless radiation technology and implementation and 2) sponsoring objective research focused on identifying and reporting adverse effects of wireless radiation expected under real-life conditions.

Likewise, any ***sponsored research performer*** addressing wireless radiation technology safety would be highly conflicted between 1) reporting the actual adverse effects expected under real-life conditions and 2) the desire to satisfy wireless radiation promotional objectives of the research sponsors in order to maintain long-range funding.

ES-4. Adverse Health Effects from Wireless Radiation Exposure.

In aggregate, for the high frequency (radiofrequency-RF) part of the spectrum, expert reviews show that RF radiation below the FCC (Federal Communications Commission) exposure guidelines can result in:

- carcinogenicity (brain tumors/glioma, breast cancer, acoustic neuromas, leukemia, parotid gland tumors),
- genotoxicity (DNA damage, DNA repair inhibition, chromatin structure),
- mutagenicity, teratogenicity,
- neurodegenerative diseases (Alzheimer's Disease, Amyotrophic Lateral Sclerosis),
- neurobehavioral problems, autism,
- reproductive problems, pregnancy outcomes,
- oxidative stress, inflammation, apoptosis, blood-brain barrier disruption,
- pineal gland/melatonin production, sleep disturbance, headache,
- irritability, fatigue, concentration difficulties, depression, dizziness, tinnitus,
- burning and flushed skin, digestive disturbance, tremor, cardiac irregularities, and can
- adversely impact the neural, circulatory, immune, endocrine, and skeletal systems.

The effects range from myriad feelings of discomfort to life-threatening diseases. From this perspective, RF exposure is a highly pervasive cause of disease!

ES-5. Adverse Impacts of Wireless Radiation on the Food Chain

The struggle for survival of human life on Earth is dependent on the logistical food supply chain. At the foundation of this supply chain (before the farmers become involved in harvesting its bounty) are the insects, seeds, flora, trees, etc, that enable the bountiful growth of the myriad potential foods. If the integrity of this foundational logistical supply chain is threatened in any way, then both the animals and plant products we consume become unavailable.

There is a substantial literature on the adverse impacts of wireless radiation on this foundational logistical supply chain. These adverse effects are from the pre-5G wireless radiation exposures, and would include enhanced coupling from the higher frequency harmonics of the RF signal. Many of these supply chain elements (e.g., insects, seeds, larvae, etc) are very small, and we could expect enhanced resonance/energy coupling with the shorter-wavelength 5G radiation when implemented. This indirect impact of wireless radiation may turn out to be at least as (if not more) important as the direct impact of wireless radiation on human survival!

From a broader perspective, most of the laboratory experiment component of the wireless radiation adverse effects literature can be viewed as related to the foundational food supply chain. Much of this research is focused on mice, rats, insects, small birds, small fish, etc. These species tend to be prey of larger animals/fowl/fish, and eventually make their way to the human food table. Any environmental factor that affects the health of these species adversely will eventually impact the humans who are at the end of that chain. In reality, we have accumulated a massive literature describing the adverse impacts of wireless radiation on myriad contributing components to our food supply, and the results do not bode well for our future ability to feed the growing world's population!

#### ES-6. Adverse Impacts of Wireless Radiation on Medical and Non-Medical Implants

There were two major types of medical implants covered by the database articles showing adverse effects: active implants that produced electrical signals mainly for controlling heart irregularities (e.g., pacemakers, defibrillators) and hearing deficiencies (e.g., cochlear implants), and passive metallic implants for structural support (e.g., dental implants, bone pins, plates, etc). Additionally, there are articles addressing adverse effects from wireless radiation in the vicinity of metallic appendages (e.g., metallic eyeglasses, metallic jewelry, etc).

The external EMF (electromagnetic fields) from microwaves (and other sources) could 1) impact the electrical operation of the active medical implants adversely, 2) increase the Specific Absorption Rate (SAR) values of tissue in the vicinity of the passive implants substantially because of resonance effects, and 3) increase the flow and acidity of saliva in the vicinity of dental structures. While the EMF effects on the cochlear implants could adversely affect auditory capability, EMF effects on the heart-related implants could potentially be life-threatening. The increased SAR values around the passive metal implants could result in increased tissue temperatures, and could adversely impact integration and longevity of the passive metallic implants.

In the mouth, the combination of 1) increased tissue temperatures in proximity to the implant or other orthodontic structures and 2) increased flow rate and acidity of saliva could lead to 3) increased leaching of heavy metals (a known contributor to serious diseases). This also raises the question: what other adverse health effects from the exposure of both the active and passive implants to increasing levels of wireless radiation have not been identified or addressed?

There is a third class of structures whose interaction physics with RF are related to those of the passive implants. These are termed implant analogues, and include myriad exogenous particles (mainly nanoparticles) that penetrate, and imbed in, the skin. The resultant nanoparticle-imbedded tissues have the potential for increased energy absorption from the incoming RF signal, thereby resulting in potentially increased thermal damage over and above the thermal damage resulting from the pulsed high-peak-to-average power of the RF signal. Additionally, more research needs to be done to ascertain the magnitudes of these thermal transients and associated stresses, in order to estimate the levels of enhanced potential damage from RF radiation.

### ES-7. Studies in the USSR on Wireless Radiation Health Effects

Much research examining potential adverse effects from wireless radiation, especially in the athermal parameter range, was performed in the USSR as far back as seventy+ years ago. Their results confirm the wide scope of adverse effects reported in recent years and summarized in the present monograph. Unfortunately, their results appear to have had little effect in influencing wireless radiation safety standards in the USA and many other countries.

### ES-8. Adverse Effects Expected from Addition of 5G to Existing Communications Networks

The potential 5G adverse health effects derive from the intrinsic nature of the radiation, and how this radiation interacts with tissue and other target structures. 4G networking technology was associated mainly with carrier frequencies in the range of ~1-2.5 GHz (cell phones, WiFi). The wavelength of 1 GHz radiation is 30 cm, and the penetration depth in human tissue is a few centimeters. The highest performance 5G networking technology (millimeter wave) is mainly associated with carrier frequencies at least an order of magnitude above the 4G frequencies, although, as stated in Chapter 2, “ELFs (0–3000Hz) are always present in all telecommunication EMFs in the form of pulsing and modulation”. Penetration depths for the high-performance carrier frequency component of 5G radiation (aka high-band) will be on the order of a few millimeters.

For much of the early implementation of 5G, and perhaps later, 5G will be integrated with 4G. Some vendors will start out/have started out with ‘low-band’ 5G (~600-900 MHz); some will start out with ‘mid-band’ 5G (~2.5 GHz-4.2 GHz); and some will start out with ‘high band’ 5G (~24-47 GHz). All these modes are associated with potentially severe adverse health effects, and none have been tested for safety in any credible manner.

At the millimeter carrier wavelengths characteristic of high-band high-performance 5G, one can expect resonance phenomena with small-scale human structures, as well as resonances with insects/insect components, seeds, etc.

The common ‘wisdom’ being presented in the literature and the broader media is that, if there are adverse impacts resulting from millimeter-wave 5G, the main impacts will be focused on near-surface phenomena, such as skin cancer, cataracts, and other skin conditions, because of shallow RF penetration depths. However, there is evidence that biological responses to millimeter-wave irradiation can be initiated within the skin, and the subsequent systemic signaling in the skin can result in physiological effects on the nervous system, heart, and immune system. There is additional evidence that adverse effects from millimeter-wave radiation can occur in organs and tissue well below the skin surface. This should not be surprising, since there are myriad signaling conduits connecting the skin to deeper structures in the body.

ES-9. Lack of Full Consensus on Wireless Radiation Adverse Effects

Not all studies of wireless radiation have shown adverse effects on health. There are many possibilities to explain this.

- 1) There could be ‘windows’ in parameter space where adverse effects occur, and the studies/experiments were conducted outside these ‘windows’. Operation outside these windows could show
  - no effects or
  - hormetic effects or
  - therapeutic effects.

The single stressor studies that constitute most of wireless radiation laboratory health research, and indeed constitute most of the laboratory medical research literature, essentially yield very narrow windows. Adverse effects are identified over very limited parameter ranges, and adverse effects shown by many combinations of stressors are not revealed when these stressors are tested in isolation over the same parametric ranges.

One could conclude that, whether by design or accident, *the real-world impact of single stressor studies is to conceal, rather than reveal, many of the more serious adverse health effects of wireless radiation.*

The stressor variables to be used for health studies should not be limited to single stressors in isolation, but should include to the extent possible combinations of toxic stimuli stressors, since these combinations reflect more accurately real-life exposures.

- 2) Research quality could be poor, and adverse effects were overlooked.
- 3) Or, the research team could have had a preconceived agenda

*where finding no adverse effects from wireless radiation was the main objective of the research!*



#### ES-10. Potential Links of Wireless Radiation to Enhancement of Opioid Crisis

The previous findings reported in this Executive Summary are based on hard evidence and have been validated in numerous studies. The present section is based on hard evidence as well, but the link of wireless radiation to the opioid crisis is not as far along in the validation process. It should be viewed as a hypothesis at this point, and serve as a basis for discussion and further research.

It has been shown many times that one impact of wireless radiation (at myriad frequencies) is release of endogenous opioids. This release of endogenous opioids can enable analgesic effects by itself, or can enhance the analgesic effects of exogenous analgesics. This has been demonstrated at pulsed millimeter-wave frequencies, WiFi frequencies, mobile phone frequencies, radiofrequencies, and extremely low frequencies. Additionally, as has been demonstrated by the results of the current monograph, wireless radiation at all the above frequencies has resulted in serious mid-term and especially long-term adverse health effects.

Therefore, wireless radiation exposure, especially at cell phone, WiFi, and millimeter-wave pulsed and modulated frequencies, generates **1) analgesic and pleasurable short-term effects and 2) serious adverse mid- and long-term effects**. There would be some exceptions for the short-term, such as electrohypersensitivity (EHS) sufferers, who are immediately affected adversely and strongly by wireless radiation exposure.

***For most people, the enhanced analgesic short-term effects of the wireless radiation would in effect mask the long-term damage from this radiation.***

As time proceeds, the increasing discomfort from the adverse mid-and long-term effects of wireless radiation requires increasingly stronger analgesics to suppress, and the increasing use of exogenous analgesics becomes necessary. This potentially enhanced use of exogenous analgesics could lead to opioid and/or other analgesic addictions.

### ES-11. Potential Links of Wireless Radiation to Current Coronavirus Pandemic

The previous findings reported in this Executive Summary are based on hard evidence and have been validated in numerous studies. The present section is based on hard evidence as well, but the link of wireless radiation to the coronavirus pandemic is not as far along in the validation process. It should be viewed as a hypothesis at this point, and serve as a basis for discussion and further research.

There are on the order of 300,000 viruses, many/most of which have zoonotic potential. To develop vaccines for all of these viruses (before an epidemic or pandemic strikes) is unreasonable (based on present technology) because of the sheer numbers involved. To develop vaccines for any specific virus during an epidemic or pandemic (which was the mainstream approach taken for the coronavirus during the SARS pandemic of 2002-2003) is completely unrealistic, because of the lead times required for vaccine development, efficacy testing, credible mid-and long-term safety testing, and implementation.

Those who succumbed during the SARS pandemic had 1) myriad co-morbidities and 2) weakened immune systems unable to neutralize the SARS coronavirus. ***Having a strong immune system that allowed a smooth transition from innate immune system operation to adaptive immune system operation was the one intrinsic defense that worked!*** The SARS experience showed that the best and most realistic approach for defense against any potential viral attack is ***reversing immune-degrading lifestyles*** well before any pandemic or epidemic outbreaks. In that case, the immune system would be sufficiently strong to be able to handle viral exposure on its own without the emergence of serious symptoms, as was the case with those exposed to the SARS coronavirus (with coronavirus antibodies in their serum) who exhibited no (or minimal) symptoms.

This gets to the link between wireless radiation exposure and the latest coronavirus pandemic. To the degree that non-ionizing radiation exposure, superimposed on the myriad toxic stimuli to which many people are exposed by choice or imposition, degrades the operation of the innate and adaptive immune systems, it would increase the likelihood that the immune system could not counteract the exposure to the coronavirus (or any virus) as nature intended. Thus, ***it would contribute to the exacerbation of adverse effects from coronavirus exposure.*** The bottom line is that exposures to essentially ALL the exogenous immune-damaging toxic stimuli (including, but not limited to, wireless radiation) need to be removed before resistance to viral exposures of any type can be improved substantially.

## ES-12. Adverse Effects of Wireless Radiation in Automotive Sector

The modern automobile is a powerful source of wireless radiation at myriad frequencies, and is subject to external wireless radiation at myriad frequencies as well. The trend has not been to reduce these sources, but rather to add equipment both to the vehicle and to the external environment that will substantially increase the wireless radiation flux associated with the vehicle. The numbers and types of sources are not well-known, even among those experts and laymen concerned about adverse effects from wireless radiation.

An interesting diagram (and narrative) showing radars and other wireless sensors in modern cars can be found at the following link: (<http://www.radiation dangers.com/automotive-radiation/automotive-radiation/>). I would recommend the reader study that diagram in detail, to better appreciate how ubiquitous are these sources of wireless radiation. Not all the wireless radiation enters the cabin, since some/much is outward-directed, but some/much of it will enter the cabins of other cars on the road.

However, that diagram tells only part of the story. Assume there is a car pool commuting to work from the suburbs of a major city. It is not uncommon (in today's world) for a one-way trip to take from one-two hours, or more. Even in a regular car, or mid-size SUV, there might be four or so passengers. They may be using cell phones, WiFi, or both, thereby adding to the radiation from the automotive-based sensors/transmitters.

There will be cell towers lining the sides of a major highway, thereby increasing the radiation to the occupants substantially. Depending on conditions, there may be substantial air pollution to which the occupants are exposed. Additionally, the prolonged sitting is very dangerous, and is a contributing factor to many serious diseases. If the vehicle is new, there may be substantial out-gassing of toxic chemicals from the interior materials. Combined exposure to the wireless radiation, air pollution and other toxic substances, coupled with prolonged sitting and continual impacts from the car's motions, produces a synergistic effect that substantially exacerbates adverse impacts from any of the constituent components.

## Chapter 1 – Unethical Research

### 1A. Monograph Overview

We are in the midst of the largest unethical medical experiment in human history. This experiment is the implementation and operation of a global wireless network for communications, surveillance, and other purposes. It is a *medical experiment* because we do not know the full extent of the adverse health effects that will result from this wireless network implementation and operation. It is an *unethical* medical experiment because it violates the key ethical medical experiment requirement of *'informed consent'* from the participants.

The current chapter provides 1) some background on the requirements for ethical medical research/experimentation and 2) examples of how those requirements have been violated in the past century. It places wireless radiation implementation and operation in the context of these other examples of unethical medical experiments.

[Chapter 2](#) presents a detailed description of some of the adverse health effects of wireless radiation as reported in the unclassified open literature. Even though the adverse health effects of wireless radiation reported over the past seventy+ years span the range of severity from discomfort to lethality, we do not know the full extent of adverse health effects from this technology because:

Most laboratory experiments aimed at identifying wireless radiation health effects bear no relation to real-life exposures, and are performed under the most benign conditions of

- single stressors (wireless radiation only)
- no pulsing and modulation of the carrier signal
- no synergistic effects of other toxic stimuli acting in concert with the wireless radiation

These experimental deficiencies are compounded by

- lack of access to the global classified literature on adverse health effects from wireless radiation
- lack of knowledge of proprietary basic and advanced studies on adverse health effects from wireless radiation.

As [Chapter 2](#) shows, the adverse wireless radiation health effects that have been identified already from the incomplete literature openly available are massive in scope and magnitude. They support the conclusion that *wireless radiation as already implemented is extremely dangerous to human health*. It acts as both a *promoter/accelerator* and *initiator* of adverse health effects. Addition of the missing elements described above and more wireless radiation infrastructure will exacerbate further the adverse effects from wireless radiation on

- human health directly through contribution to chronic disease and
- human health indirectly through degradation of the food chain ecosystem.

[Chapter 3](#) contains the references for the main text.

[Chapter 4](#) contains eight Appendices:

- [Appendix 1](#) contains examples of unethical medical experiments conducted in the last century, mainly (not entirely) in the USA or under USA auspices;
- [Appendix 2](#) contains a manual taxonomy of the adverse health and biomedical effects component of a representative wireless radiation literature, and is derived in part from the taxonomies in Appendices 3 and 4;
- [Appendix 3](#) contains a taxonomy based on factor analysis of the same representative wireless radiation literature;
- [Appendix 4](#) contains a taxonomy based on text clustering of the same representative wireless radiation literature;
- [Appendix 5](#) shows *potential links between wireless radiation exposure and 1) expansion of the opioid crisis and 2) exacerbation of coronavirus pandemic*;
- [Appendix 6](#) lists references showing *effects of industry funding on research outcomes* for myriad (mainly biomedical) research disciplines;
- [Appendix 7](#) overviews the oft-neglected topics of wireless radiation adverse effects on regions containing *medical implants* (e.g., pacemakers, defibrillators, cochlear implants, dental implants, bone pins, plates, etc) and appendages (e.g., metal eyeglasses, earrings, metal jewelry, etc), as well as other *micro/nano* exogenous implant analogues;
- [Appendix 8](#) describes *adverse effects of automotive-based wireless radiation*.

## 1B. Unethical Research

### 1B1. Broad Definition

There are myriad definitions for 'unethical' research (e.g., <http://icahn.mssm.edu/about-us/services-and-resources/faculty-resources/handbooks-and-policies/faculty-handbook/research-environment/research-integrity>; <https://oprs.usc.edu/training/booklets/>; [https://history.nih.gov/about/timelines\\_laws\\_human.html](https://history.nih.gov/about/timelines_laws_human.html)).

These definitions of 'unethical' research encompass a broad spectrum of actions. Much reporting of 'unethical' medical research in myriad media tends to focus on one aspect only: biomedical experiments performed on subjects who did not give 'informed consent'. The classic example reflects the experiments performed on concentration camp inmates by the Nazi-regime doctors during WWII, and the lesser-known experiments performed by their Japanese counterparts during WWII. These experiments were certainly horrific, but not unique. The test subjects in these experiments were neither *informed* about the nature and consequences of these experiments, nor did they give *consent*.

### 1B2. Informed Consent

A comprehensive discussion of the importance of 'informed consent' in medical experimentation was presented in a journal Special Issue [Goodwin, 2016]. An excellent overview and rationale for informed consent in human experiments is shown in the following box (obtained from a booklet titled Informed Consent in Human Subjects Research), prepared by the Office for Protection of Research Subjects, University of Southern California (<https://oprs.usc.edu/training/booklets/>).

Informed Consent is a voluntary agreement to participate in research. It is not merely a form that is signed but is a process, in which the subject has an understanding of the research and its risks. Informed consent is essential before enrolling a participant and ongoing once enrolled. Informed Consent must be obtained for all types of human subjects' research including; diagnostic, therapeutic, interventional, social and behavioral studies, and for research conducted domestically or abroad. Obtaining consent involves informing the subject about his or her rights, the purpose of the study, the procedures to be undergone, and the potential risks and benefits of participation. Subjects in the study must participate willingly. Vulnerable populations (i.e. prisoners, children, pregnant women, etc.) must receive extra protections. The legal rights of subjects may not be waived and subjects may not be asked to release or appear to release the investigator, the sponsor, the institution or its agents from liability for negligence.

There are three important concepts in this definition: research, informed, and consent.

### Research

What is a research experiment? According to myriad Web sources, an experiment is a set of actions undertaken to

- make a discovery or
- test a hypothesis or
- demonstrate a known fact.

The first two of these can be classified as **research** experiments, and the third is a **demonstration** experiment. A further breakdown would be informative. There are *proactive* experiments, where established rules and procedures (the scientific approach) are used to plan, conduct, and report the experiment. There are *reactive* experiments, where the experiment is secondary to higher priority actions, and consequently is conducted and reported under more constrained conditions. The proactive experiments can be viewed generally as explicit or ‘a priori’, and the reactive experiments can be viewed generally as implicit or ‘a posteriori’.

Where does wireless technology implementation and operation fit in this research experiment categorization? Wireless technology implementation has two major characteristics: development and operation of a technology to achieve targeted technical goals (*explicit*), and conduct of an experiment that may result in serious adverse health impacts (*implicit*). Of interest in the current document is the experiment (*implicit*) component.

Identification of wireless radiation health effects will result from both proactive and reactive experiments. The proactive experiments are (mainly) the thousands of laboratory-based studies (performed to estimate wireless radiation health impacts) that have been reported in the biomedical literature. The reactive experiments are (mainly) those studies that have been done after the previous generations of mobile networking technologies have been implemented (usually epidemiology), and those studies that will be done after 5G is implemented.

Thus, 5G implementation can be viewed mainly as an implicit reactive **research** experiment with respect to identifying myriad adverse health effects on the exposed population. It will also have a **demonstration** component, confirming thousands of pre-5G research studies that have shown adverse health effects from wireless radiation in 5G and non-5G frequency ranges. Because these studies tend to under-estimate real-life effects of wireless radiation, the full scope of adverse health effects from 5G operation under real-life conditions are currently unknown. Ascertainment of these adverse health effects will require ‘a posteriori’ reactive research experiments after 5G implementation, under today’s 5G implementation scenario. A major concern, especially in the current environment of accelerating 5G implementation, is that serious longer-term latent health effects will be discovered **only after 5G has been fully implemented.**

**Informed**

There is much information available in the open literature detailing the adverse health effects of wireless radiation. These adverse effects reflect the role of wireless radiation both as a ***promotor/accelerator and/or initiator*** of myriad biomedical abnormalities and serious diseases. However, the vast public is not informed (or is misinformed) of these adverse health effects by the:

- developers of wireless radiation systems,
- vendors of these systems,
- mainstream media
- government regulators of these systems, and
- Federal, State, and Local politicians who pass laws that accelerate implementation of these systems.

These stakeholders 1) **do not inform** the public of the demonstrated adverse effects of wireless radiation and, in many cases, 2) **misinform** the public that wireless radiation is safe from a health perspective.

**Consent**

Many segments of the public **do provide** consent to be exposed to wireless radiation, because of its perceived benefits to them. A small amount of this consent may be informed, and the providers of this consent may be gambling that they can escape the adverse health effects. Most of the consent is probably not informed, since most people will not do the independent research required to gather in the relevant information on adverse health effects, but will rely on the government's and mainstream media's misleading assurances that wireless radiation is safe.

However, other segments of the public **do not provide** consent to be exposed to wireless radiation from these implemented technologies. Unlike other forms of toxic stimuli (e.g., cigarettes, cocaine, alcohol, etc), where exposures may be individual or very local, wireless radiation exposure is very large in extent. With the advent of the latest generation of wireless radiation (5G), there may be 1) small cell towers erected outside of every few houses, with the consequent radiation blanketing the environment, and 2) thousands of satellites blanketing the Earth's surface with wireless radiation. There are Federal laws that essentially prevent opposition to construction and operation of these small cell towers, and prevent opposition to the launching and operation of these satellites. Forcing exposure to this harmful wireless radiation on members of the public who do not provide consent is the cornerstone of wireless radiation implementation and operation being labeled unethical medical experimentation.

Its context differs from some other technologies with serious adverse effects, such as automotive technology and cigarette smoking. For the most part, users of these other technologies have been informed about potential serious consequences, and non-users are impacted minimally (at least today). Those users are able to make a more informed choice.



### 1B3. Examples of Unethical Medical Experimentation

Many books and articles have been written concerning horrific medical experiments (that were performed in the USA over the past century) without obtaining 'informed consent' from the test subjects. These books describe a wide spectrum of experiments. Individual readers could have different opinions on whether any of the individual experiments reported are more or less 'unethical' than those in the Nazi concentration camps, or whether they are 'unethical' at all.

[Appendix 1](#) contains references to books and journal articles that describe some of these experiments (mainly, but not entirely, conducted in the USA or under USA auspices), based on Medline searches and Web sources. Like most research of this type, the conduct of the experiments and the experimental results are not advertised widely. I was not aware of most of these experiments prior to conducting the analysis on under-reporting of adverse events in my 2015 eBook "Pervasive Causes of Disease" [Kostoff, 2015].

The experiments reported in [Appendix 1](#) cover the full spectrum of toxic stimuli, including biological, chemical, and nuclear. These are the three types of toxic stimuli that constitute the core of Weapons of Mass Destruction (WMD). Interestingly, with all of the USA's concern about potential WMD attacks from Russia, China, Iran, and North Korea, we have completely overlooked the ongoing and exponentially increasing WMD attack on the Homeland that has been occurring for at least two decades: 24/7 spewing of harmful wireless radiation in almost every corner of the USA, with far more to come if 5G is implemented!

The copious references identified in [Appendix 1](#) are not the result of an exhaustive search; they were obtained after a very brief survey. There are undoubtedly many other examples (of 'unethical' medical experiments) published already that were missed by the survey. Given the odious nature of these experiments, there are probably far more experiments whose disclosure has not yet seen the light of day. As shown in the tobacco and asbestos examples in section 9C of Kostoff [2015], most of this information comes to light either from 1) whistleblowers or 2) 'discovery' resulting from lawsuits. In addition, some investigators may stumble across evidence of this type of 'unethical' research while doing relatively unrelated types of investigations.

Documentation of many types of 'unethical' medical experiments may:

- not have been done, or
- have been done and destroyed, or
- have been done but distorted to protect the miscreants.

This is why retrospective analysis of this type of 'research', which in many cases relies heavily on the printed word as 'proof', may be highly under-reflective of the full spectrum of what was actually done in these experiments (e.g., Stephen Kinzer's description of the records destroyed by the Head of the CIA's MK-Ultra program <https://www.c-span.org/video/?464648-1/poisoner-chief>).

While there are many stages of the medical research process that could be subjected to 'unethical' practices (e.g., those outlined in Chapter 9 of Kostoff [2015], including selection of the most important research problems for funding, conducting the research, disseminating the results of the research, etc), conducting the medical research experiments 'unethically' has received the most attention by far. The references in [Appendix 1](#), and additional books and journal and magazine articles on unethical medical research experiments, are testimony to this imbalance.

Books and articles only tell part of the larger story. A more representative reporting on the damage from any type of 'unethical' medical research would reflect the pain, suffering, and premature mortality resulting from the medical research experimentation. A simple estimate of the experiment's damage could be obtained by integrating the number of people affected by the 'unethical' medical experimentation and the degree of damage experienced by each person. This could be viewed as a 'weighted' impact of the adverse effects of the unethical medical experimentation.

In the most widely reported examples of 'unethical' medical research (the medical experiments performed in the Nazi concentration camps during WWII), perhaps a few thousand prisoners were involved; it is difficult to find accurate information for actual numbers of prisoners involved. Further, it is difficult to separate out the 1) many thousands of German citizens subjected to forced sterilization procedures starting in 1933 and 2) many deliberately exterminated in the concentration camps, from 3) those who suffered from the medical experiments in the camps and died as a result of the experiments alone.

In the references in [Appendix 1](#)

- some of the 'unethical' medical experiments described involved under a hundred test subjects,
- many of the 'unethical' medical experiments described tended to involve on the order of hundreds of test subjects (who did not provide 'informed consent'), and
- in some rarer cases, perhaps thousands of test subjects were involved.

Many of these experiments, in parallel with the spirit of the Nazi concentration camp experiments, involved people confined in large institutions who were (usually) not told the full story of the nature of the experiments, or, if they were told, either did not 1) understand it or 2) give 'informed consent'. These people were confined in prisons, the military service, mental institutions, children's institutions, etc.

***How do the above odious procedures in these references differ conceptually from the recent trend toward government effectively promoting/mandating implementation of wireless radiation infrastructure whose safety has not been demonstrated, but (a fraction of) whose adverse health effects have been widely demonstrated?***

Based on what has been reported in the experiments referenced in [Appendix 1](#) (which could in fact be the tip of a much larger unreported iceberg), perhaps on the order of 10,000-30,000 people may have been subjected to ‘unethical’ medical experiments in the past century (excluding those who unwittingly participated in clinical trials that were “off-shored” to (typically) developing countries with knowingly less stringent test subject protections [Kostoff, 2015, section 9D3]). A few thousand of these test subjects would have died prematurely, and most would have suffered unnecessarily. These, of course, are horrific numbers. Unfortunately, they pale in comparison to what can be expected if wireless radiation infrastructure is expanded domestically and globally to satisfy the requirements of 5G. The following box shows one estimate of potential adverse effects from wireless radiation.

One of the many adverse health effects of wireless radiation is cancer of the brain, especially gliomas. What approximate increases in glioma incidence can be expected from widespread expansion of wireless radiation?

There are different estimates of glioma incidence and trends in glioma incidence. For an approximate estimate, Rasmussen et al [2017] estimates the glioma incidence in the Danish population at about 7/100,000, a figure in line with other national and global estimates. Additionally, Phillips et al [2018] presents evidence of a 100% increase in Glioblastoma Multiforme from 1995-2015, a major component of glioma. Some of this increase may have been due to wireless radiation exposure, since that time period was associated with a major expansion of cell phone and other wireless device use. For approximate estimation purposes, assume the wireless-free glioma incidence to be about 5/100,000.

Hardell et al [2011] showed, in a case-controlled study, that glioma incidence doubled for those who starting using cell phones as adults (>20 years old), were ‘heavy’ users (>30 minutes per day), and used cell phones for more than ten years. Hardell also showed glioma incidence quadrupled for those who started using cell phones younger than twenty years old, were heavy users, and used cell phones for more than ten years.

If we apply Hardell’s conservative doubling estimate to all potential users, then we can expect an increased glioma incidence per year of about 5/100,000. By the time 5G is rolled out, the global population will be at least eight billion. If we assume  $\frac{3}{4}$  of the global population will be cell phone users and/or exposed to cell towers and other sources of wireless radiation, then about six billion people would be the pool for potential glioma victims from wireless radiation. Multiplying 5/100,000 by 6,000,000,000 yields 300,000 new cases of glioma/year.

**In one year, the deaths from glioma alone attributed to wireless radiation will swamp all the deaths from all the horrific unethical medical experiments of the twentieth century referenced in Appendix 1!**

This number was obtained using the most conservative estimates of Hardell and the incidence data, and it didn't take into account the increase in glioma incidence that would be expected as latency times increase. For smoking, the average latency period between initiation of smoking and lung cancer is between twenty and thirty years, depending on which database was examined. The fact that glioma incidence shows measurable increases after only a ten-year latency period should be most disturbing, and does not bode well for glioma incidences after a twenty, thirty, or forty-year latency!

Again, glioma is but one of the large numbers of adverse health effects potentially resulting from exposure to wireless radiation. Integrating over all the adverse health effects potentially resulting from the wireless radiation experiment would yield numbers of *experiment-based* premature deaths and enhanced suffering unparalleled in human history!

Given the magnitude of 5G projected global implementation, the numbers of people that will be exposed to this radiation, the numbers of people expected to suffer myriad adverse effects from this technology, and the lack of credible 'informed consent' from the vast majority of these people, we are well justified in calling global implementation of mobile networking technology **The Largest Unethical Medical Experiment in Human History!**

Finally, in the spirit of the 'unethical' medical experiments referenced in [Appendix 1](#),

***it is the poor and dispossessed who will suffer the most from wireless radiation exposure.***

This is because wireless radiation plays a dual role of *initiator* and *promoter/accelerator* of serious disease, as will be shown in the next chapter. In its *promoter/accelerator* role, it can accelerate the progression of existing serious diseases such as cancer, and/or, through synergy, can produce serious adverse health effects when combined with other toxic stimuli that neither constituent of the combination could produce in isolation.

Many toxic stimuli, such as harsh chemicals, biotoxins, ionizing radiation sources, vibrating machinery, prolonged sitting doing repetitive tasks, high air pollution, etc, are used/experienced by the poorest members of society in their occupations, and many toxic stimuli, such as air pollutants, toxic wastes, etc, are very prevalent in their residential environments. Thus, people who spray pesticides in farm labor or household applications, people who do cleaning with harsh chemicals, people who dispose of hazardous materials, basically, ***people who do the dirty work in our society and live in dirty environments***, are already leading candidates for higher risk of serious diseases. Adding a wireless radiation *promoter/accelerator* to their residential and occupational environments will radically increase their chances for developing serious diseases. Closing the 'digital divide' for them will translate to increased suffering and reduced longevity!

## Chapter 2 – Adverse Impacts of Wireless Radiation

### 2A. Overview

Wireless communications have been expanding globally at an exponential rate. The latest imbedded version of mobile networking technology is called 4G (fourth generation), and the next generation (5G) is in the early implementation stage. Neither 4G nor 5G have been tested for safety in any credible real-life scenarios. The current chapter assesses the medical and biological studies that have been performed and then published in the biomedical literature, and shows why they are deficient relative to identifying adverse health and safety effects.

However, even in the absence of the missing real-life components (which tend to exacerbate the adverse effects of the wireless radiation shown in the biomedical literature), the published literature shows there is much valid reason for concern about potential adverse health effects from both 4G and 5G technology. The studies reported in the literature should be viewed as extremely conservative, underestimating the adverse impacts substantially.

#### 2A1. The Context of Wireless Radiation Health and Safety Research

Before addressing the technical and biological details of wireless radiation health and safety research shown in the published literature, the context in which this literature has been generated will be discussed.

***The results shown in the literature cannot be separated from the context in which this research has been sponsored, conducted, and disseminated!***

In the USA (and in most, if not all, countries), the two major sponsors of wireless radiation health and safety research are the Federal government and the wireless radiation industry, in that order. Both of these organizations have a strong intrinsic conflict-of-interest with respect to wireless radiation.

#### 2A1a. Intrinsic Federal government wireless radiation conflict-of-interest

The Federal government is a strong **promoter** of wireless radiation infrastructure development and rapid expansion, most recently supporting accelerated implementation of 5G infrastructure. Every

- Congressional evaluation of 5G I have heard (or read),
- Congressperson's statement on 5G I have heard (or read),
- Presidential proclamation on 5G I have heard (or read), and
- FCC proclamation on 5G I have heard (or read),

has unabashedly supported the **most accelerated implementation of 5G infrastructure.**

The Federal government that ***promotes*** accelerated implementation of wireless radiation technology also 1) ***sponsors*** research examining the technology's potential adverse effects and 2) ***regulates*** the technology's potentially adverse impacts on the public. The fact that these development, regulation, and safety functions may be assigned to different Executive Agencies within the Federal government is irrelevant from an independence perspective.

***The separate Executive Agencies in the Federal government are like the tentacles of an Octopus; they operate synchronously under one central command.***

The wireless promoters' main objectives of developing and implementing the technology rapidly are enabled by suppressing knowledge (to the public) of potential adverse effects from the technology's operation. These fundamental conflicts impact the objectivity of the health and safety R&D sponsors and performers. Any ***Federal research sponsor*** of wireless radiation technology safety would be highly conflicted between 1) a desire to satisfy Executive and Legislative objectives of accelerating expansion of wireless radiation technology and implementation and 2) sponsoring objective research focused on identifying and reporting adverse effects of wireless radiation expected under real-life conditions.

Likewise, any ***sponsored research performer*** addressing wireless radiation technology safety would be highly conflicted between 1) reporting the actual adverse effects expected under real-life conditions and 2) the desire to satisfy wireless radiation promotional objectives of the research sponsors in order to maintain long-range funding.

#### 2A1b. Intrinsic wireless radiation industry conflict-of-interest

The wireless radiation industry is obviously a strong promoter of accelerated development and implementation of wireless radiation devices and infrastructure, and is a sponsor of wireless radiation and safety research. ***Trillions of dollars in revenues are potentially at stake in successful promotion and adoption of wireless radiation infrastructure and technology!*** The industry's conflicts with respect to promotion and safety research are similar to those of the Federal government listed above.

The wireless industry's role in suppressing information about the adverse impacts of wireless radiation was described eloquently in a 2018 Nation article (<https://www.thenation.com/article/how-big-wireless-made-us-think-that-cell-phones-are-safe-a-special-investigation/>). As this exposé shows, studies on health effects were commissioned by the wireless radiation industry in the 1990s under the management of Dr. George Carlo. The adverse effects shown were downgraded and suppressed, in the spirit of similar suppression by the tobacco and fossil energy industries, as stated in the Nation article:

“Carlo’s story underscores the need for caution, however, particularly since it evokes eerie parallels with two of the most notorious cases of corporate deception on record: the campaigns by the tobacco and fossil-fuel industries to obscure the dangers of smoking and climate change, respectively. Just as tobacco executives were privately told by their own scientists (in the 1960s) that smoking was deadly, and fossil-fuel executives were privately told by their own scientists (in the 1980s) that burning oil, gas, and coal would cause a “catastrophic” temperature rise, so Carlo’s testimony reveals that wireless executives were privately told by their own scientists (in the 1990s) that cell phones could cause cancer and genetic damage.....Like their tobacco and fossil-fuel brethren, wireless executives have chosen not to publicize what their own scientists have said about the risks of their products. On the contrary, the industry—in America, Europe, and Asia—has spent untold millions of dollars in the past 25 years proclaiming that science is on its side, that the critics are quacks, and that consumers have nothing to fear. This, even as the industry has worked behind the scenes—again like its Big Tobacco counterpart—to deliberately addict its customers. Just as cigarette companies added nicotine to hook smokers, so have wireless companies designed cell phones to deliver a jolt of dopamine with each swipe of the screen.”

While the wireless radiation industry doesn’t play a formal role in regulating the safety aspects of wireless radiation, it plays a strong de facto role. In addition to its lobbying efforts to minimize regulations on wireless radiation exposure levels, it plays a revolving-door role with respect to regulation.

The previous FCC Chairman had been President of the National Cable & Telecommunications Association (NCTA) and CEO of the Cellular Telecommunications & Internet Association (CTIA) before assuming his FCC Chairmanship. In recognition of his work in promoting the wireless industry, he was inducted into the Wireless Hall of Fame in 2003 and in 2009 ([https://en.wikipedia.org/wiki/Tom\\_Wheeler](https://en.wikipedia.org/wiki/Tom_Wheeler)). The present FCC Chairman served as Associate General Counsel at Verizon Communications Inc., where he handled competition matters, regulatory issues, and counseling of business units on broadband initiatives ([https://en.wikipedia.org/wiki/Ajit\\_Pai#cite\\_note-Bio-2](https://en.wikipedia.org/wiki/Ajit_Pai#cite_note-Bio-2)). As is the case with so many other Federal regulatory agencies [Kostoff, 2015-Chapter 9; 2016], the FCC is essentially an agency captured by industry [Alster, 2015]!

So, in the two most recent Administrations, under two supposedly very different Presidents, the FCC Chairmen had been, in different ways, lobbyists for the wireless radiation technology industry. Both were (and are) extremely ardent promoters of the most rapid acceleration of implementation of 5G infrastructure and associated devices and technologies.



## 2A1c. Relation of wireless radiation health and safety research to sponsors' and performers' conflicts-of-interest

The incentives for sponsors of wireless radiation health and safety research to fund studies that will help promote accelerated expansion of wireless radiation devices and infrastructure are many and the disincentives are essentially non-existent. Likewise, incentives for performers of wireless radiation health and safety research to conduct studies that will help promote accelerated expansion of wireless radiation devices and infrastructure are many and the disincentives are few. Because of this unfortunate reality,

**EVERY wireless radiation health and safety study/experiment whose results support the wireless radiation promotion objectives of the organization(s) that sponsor these studies must receive the highest level of scrutiny.**

There is not a credibility symmetry between studies whose results 1) support the promotional objectives of their sponsors or 2) do not support the promotional objectives of their sponsors. For studies/experiments of equally high research/scientific quality, those studies that do not support the promotional objectives of their sponsors should be assigned relatively higher credibility priority than those that do support the promotional objectives of their sponsors. This should not be interpreted as a lack of absolute credibility for studies that support the promotional objectives of their sponsors. Many may very well be credible, as discussed further in section [2F](#).

However, research findings opposing the promotional objectives of the sponsors may result in termination of further funding for the project, and adverse career and financial consequences for the performer(s). Conversely, research findings supporting the promotional objectives of the sponsors will most likely lead to continued and enhanced funding for the project, and very positive career and financial impacts for the performer(s). Therefore, high quality research studies whose results could impose serious career and financial risks for their performers should rank higher in the credibility chain.

These conflicts-of-interest of researchers who accept funding from wireless radiation promoters extend well beyond the papers and studies they publish. This category of wireless radiation researchers tends to populate the Advisory Committees that help set the exposure safety studies imposed by government regulatory agencies. Hardell has done a comprehensive evaluation of some of the more influential Advisory Committees [Hardell, 2017], especially ICNIRP and WHO, and has shown clearly the inter-locking linkages among these proxies of the wireless radiation promoters.



Operationally, the wireless radiation regulatory commissions, their advisory committees, their health and safety research sponsors, and some of the researchers sponsored by the wireless radiation promoters, along with the mainstream media, serve as ***the de facto marketing arm of the wireless radiation promoters***, in their attempts to mislead the public into believing wireless radiation under present day exposure limits is safe!

#### 2A1d. Relation of wireless radiation health and safety research to publishers' conflicts-of-interest

Some journal publishers of articles concerning health and safety effects of wireless radiation have similar conflicts of interest. Many journals are not independent from government or industry sponsorship, in whole or in part, directly or indirectly. This conflict-of-interest is addressed further in section [2E](#). These journals control the review process by which articles are selected for publication, and it is extremely easy for a journal to select articles for publication that will align strongly with the promotional interests of the organizations or people that contribute to their revenue stream. These direct or indirect journal sponsors include:

- Promotional organizations that contribute directly to the journals;
- Promotional organizations that contribute directly to professional societies that sponsor many of the 'leading' journals;
- Individuals who receive funding from industrial or governmental organizations promoting wireless radiation technology and who
  - contribute directly to the journals and/or
  - contribute to professional societies that sponsor many of the 'leading' journals

Anyone who has read thousands of wireless radiation journal article abstracts on health and safety would have little problem in identifying those journals that rarely publish results opposing the promotional objectives of government and industry (see Slesin [2006] for ***allegations*** of possible bias in one journal's publication patterns of microwave-induced genotoxic results). Equally, they would have little problem in identifying those authors or author institutions that even more rarely publish results opposing the promotional objectives of government and industry. If we take into account the credibility asymmetry between studies whose results 1) support the promotional objectives of their sponsors or 2) do not support the promotional objectives of their sponsors, then a much different picture of the wireless radiation health and safety research literature emerges. Many of the so-called conflicting results disappear when credibility weightings are applied, and the true serious adverse effects resulting from this harmful technology are shown in detail. The reader should keep this credibility asymmetry in mind when evaluating the myriad adverse health effects shown in sections [2D](#) and [2E](#).

## **2B. Wireless Radiation/Electromagnetic Spectrum**

This section overviews the electromagnetic spectrum, and delineates the parts of the spectrum on which this monograph will focus. The electromagnetic spectrum encompasses the entire span of electromagnetic radiation. The spectrum includes: ionizing radiation (gamma rays, x-rays, and the extreme ultraviolet, with wavelengths below  $\sim 10^{-7}$  m and frequencies above  $\sim 3 \times 10^{15}$  Hz); non-ionizing visible radiation (wavelengths from  $\sim 4 \times 10^{-7}$  m to  $\sim 7 \times 10^{-7}$  m and frequencies between  $\sim 4.2 \times 10^{14}$  Hz and  $\sim 7.7 \times 10^{14}$  Hz); non-ionizing non-visible radiation (short wavelength radio waves and microwaves, with wavelengths between  $\sim 10^{-3}$  m and  $\sim 10^5$  m and frequencies between  $\sim 3 \times 10^{11}$  to  $\sim 3 \times 10^3$  Hz; long wavelengths, ranging between  $\sim 10^5$  m and  $\sim 10^8$  m and frequencies ranging between  $3 \times 10^3$  and 3 Hz).

The low frequencies (3 Hz–300 KHz) are used for electrical power line transmission (60 Hz in the U.S.) as well as maritime and submarine navigation and communications. Medium frequencies (300 KHz–900 MHz) are used for AM/FM/TV broadcasts in North America. Lower microwave frequencies (900 MHz–5 GHz) are used for telecommunications such as microwave devices/communications, radio astronomy, mobile/cell phones, and wireless LANs. Higher microwave frequencies (5 GHz–300 GHz) are used for radar and proposed for microwave WiFi, and will be used for ‘high-band’ 5G communications. Terahertz frequencies (300 GHz–3000 GHz) are used increasingly for imaging to supplement X-rays in some medical and security scanning applications [Kostoff and Lau, 2017; Kostoff, 2019a; Kostoff et al, 2020].

In the study of non-ionizing EMF radiation health effects reported in this monograph, the frequency spectrum ranging from 3 Hz to 300 GHz is covered, with particular emphasis on the high frequency communications component ranging from  $\sim 1$  GHz to  $\sim 300$  GHz. A previous review found that pulsed electromagnetic fields applied for relatively short periods of time could sometimes be used for therapeutic purposes, whereas chronic exposure to electromagnetic fields in the power frequency range ( $\sim 60$  Hz) and microwave frequency range ( $\sim 1$  GHz–tens GHz) tended to result in detrimental health effects [Kostoff and Lau, 2013, 2017]. Because of present concerns about the rapid expansion of new communications systems without adequate safety testing, more emphasis will be placed on the communications frequencies in this monograph.

## **2C. Modern Non-Ionizing EMF Radiation Exposures**

In ancient times, sunlight and its lunar reflections provided the bulk of the visible spectrum for human beings (with fire a distant second and lightning a more distant third). Now, many varieties of artificial light (incandescent, fluorescent, and light emitting diode) have replaced the sun as the main supplier of visible radiation during waking hours. Additionally, EMF radiation from other parts of the non-ionizing spectrum has become ubiquitous in daily life, such as from wireless computing and telecommunications. In the last two or three decades, the explosive growth in the cellular telephone industry has placed many residences in metropolitan areas within less than a mile of a cell tower. Future implementation of the next generation of mobile networking technology, 5G, will increase the cell tower geographical densities by an

order of magnitude. Health concerns have been raised about non-ionizing EMF radiation from (1) mobile communication devices, (2) occupational exposure, (3) residential exposure, (4) wireless networks in homes, businesses, and schools, and (5) other non-ionizing EMF radiation sources such as ‘smart meters’ and ‘Internet of Things’.

## 2D. Demonstrated Biological and Health Effects from Prior Generations of Wireless Networking Technology

### 2D1. Limitations of Previous Wireless Radiation Health Effects Studies

There have been two major types of studies performed to ascertain biological and health effects of non-ionizing radiation: laboratory and epidemiology. The laboratory tests provide the best scientific understanding of the effects of wireless radiation, but do not reflect the real-life operating environment in which wireless radiation is embedded. There are three main reasons that laboratory tests do not reflect real-life exposure conditions for human beings.

First, the laboratory tests have been performed mainly on animals, especially rats and mice. Because of physiological differences, there have been continual concerns about extrapolating small animal results to human beings. Additionally, while inhaled or ingested substances can be scaled from small animals to human beings relatively straight-forwardly, radiation may be more problematical. For non-ionizing radiation, penetration depth is a function of frequency, tissue, and other parameters, and radiation of a given wavelength could penetrate much deeper into the (small) animal’s interior than similar wavelength radiation in humans. Different organs and tissues would be affected, with different power densities.

Second, the typical incoming EMF signal for many/most laboratory tests performed in the past consisted of the single carrier wave frequency; the lower frequency superimposed signal containing the information was not always included. This omission may be important. As Panagopoulos states: “It is important to note that except for the RF/microwave carrier frequency, Extremely Low Frequencies – ELF’s (0–3000Hz) are always present in all telecommunication EMFs in the form of pulsing and modulation. There is significant evidence indicating that the effects of telecommunication EMFs on living organisms are mainly due to the included ELF’s.... While ~50% of the studies employing simulated exposures do not find any effects, studies employing real-life exposures from commercially available devices display an almost 100% consistency in showing adverse effects”. [Panogopoulos, 2019]. These effects may be exacerbated further with 5G: “with every new generation of telecommunication devices.....the amount of information transmitted each moment.....is increased, resulting in higher variability and complexity of the signals with the living cells/ organisms even more unable to adapt [Panogopoulos, 2019]”

Third, these laboratory tests typically involved one stressor (wireless radiation) and were performed under pristine conditions. This contradicts real-life exposures, where humans are exposed to multiple toxic stimuli, in parallel or over time. In perhaps five percent of the wireless radiation studies reported in the literature, a second stressor (mainly biological or chemical toxic stimuli) was added, to ascertain whether additive, synergistic, potentiative, or antagonistic effects were generated by the combination [Kostoff and Lau, 2013, 2017; Juutilainen et al, 2008; Juutilainen et al, 2006].

Combination experiments are extremely important because, when other toxic stimuli are considered in combination with non-ionizing EMF radiation, the synergies tend to enhance the adverse effects of each stimulus in isolation. In other words, combined exposure to 1) toxic stimuli and 2) non-ionizing EMF radiation translates into much lower levels of tolerance for each toxic stimulus in the combination relative to its exposure levels that produce adverse effects in isolation. So, the regulatory exposure limits for non-ionizing EMF radiation when examined in combination with other potentially toxic stimuli should be far lower for safety purposes than those derived from non-ionizing EMF radiation exposures in isolation [Kostoff et al, 2020].

Thus, almost all of the laboratory tests that have been performed are flawed with respect to demonstrating the full adverse impact of the wireless radiation. Either 1) non-inclusion of signal information or 2) using single stressors only 3) tends to underestimate the seriousness of the adverse effects from non-ionizing radiation. Excluding ***both*** of these phenomena from experiments, as was done in the vast majority of cases, tends to amplify this underestimation substantially. Therefore, the results (of adverse effects from wireless radiation exposure) reported in the biomedical literature should be viewed as 1) extremely conservative and 2) the very low ‘floor’ of the seriousness of the adverse effects, not the ‘ceiling’.

The epidemiology studies typically involved human beings who had been subjected to myriad known and unknown stressors prior to (and during) the study. The wireless radiation exposure levels from e.g. the cell tower studies reported in Kostoff and Lau [2017] associated with increased cancer incidence tended to be orders of magnitude lower than e.g. those exposure levels generated in the recent highly-funded NTP studies [Melnick, 2019] and other laboratory studies associated with increased cancer incidence. The inclusion of real-world effects in the cell tower studies most likely accounted for the orders of magnitude wireless radiation exposure level decreases that were associated with the initiation of increased cancer incidence.

Thus, the laboratory tests were conducted under very controlled conditions not reflective of the real-world, while the epidemiology studies were performed in the presence of many stressors, known and unknown, reflective of the real-world. The exposure levels of the epidemiology studies were, for the most part, uncontrolled.

## 2D2. Adverse Health Effects Identified in Major Review Studies

Many thousands of papers have been published over the past sixty+ years showing adverse effects from wireless radiation applied in isolation or as part of a combination with other toxic stimuli. Extensive reviews of these wireless radiation biological and health effects have been published, including [Belpomme et al, 2018; Desai et al, 2009; Di Ciaula, 2018; Doyon and Johansson, 2017; Havas, 2017; Kaplan et al, 2016; Kostoff and Lau, 2013, 2017; Kostoff et al, 2020; Lerchl et al, 2015; Levitt and Lai, 2010; Miller et al, 2019; Pall, 2016, 2018; Panagopoulos, 2019; Panagopoulos et al, 2015; Russell, 2018; Sage and Burgio, 2018; Van Rongen et al, 2009; Yakymenko et al, 2016; Bioinitiative, 2019].

In aggregate, for the high frequency (radiofrequency-RF) part of the spectrum, these reviews show that RF radiation below the FCC guidelines can result in:

- carcinogenicity (brain tumors/glioma, breast cancer, acoustic neuromas, leukemia, parotid gland tumors),
- genotoxicity (DNA damage, DNA repair inhibition, chromatin structure),
- mutagenicity, teratogenicity,
- neurodegenerative diseases (Alzheimer's Disease, Amyotrophic Lateral Sclerosis),
- neurobehavioral problems, autism,
- reproductive problems, pregnancy outcomes,
- oxidative stress, inflammation, apoptosis, blood-brain barrier disruption,
- pineal gland/melatonin production, sleep disturbance, headache,
- irritability, fatigue, concentration difficulties, depression, dizziness, tinnitus,
- burning and flushed skin, digestive disturbance, tremor, cardiac irregularities, and can
- adversely impact the neural, circulatory, immune, endocrine, and skeletal systems.

The effects range from myriad feelings of discomfort to life-threatening diseases. From this perspective, RF exposure is a highly pervasive cause of disease!

## 2D3. Adverse Health Effects from Open Literature Analysis

### 2D3a. Overview

To corroborate the findings from the major review studies of the previous section, an analysis of a representative sample of the wireless radiation adverse health effects literature was performed. A relatively simple query was used to retrieve records related to adverse health effects from wireless radiation. Some filtering was done to remove records that did not identify adverse health effects, but because of extensive use of titles (and sometimes abstracts) that discuss methodologies rather than results, some/many records were retrieved that did not demonstrate adverse health effects.

In all, 5311 records with abstracts were retrieved from Medline (Pubmed), and these records were categorized by three different methods: manual taxonomy; factor analysis taxonomy; text clustering taxonomy. The three methods and their results will be briefly summarized here, and the more detailed results, including category record titles, will be presented in Appendices 2-4.

### 2D3b. Manual taxonomy results

Based on the factor analysis (section 2D3c) and text clustering (2D3d) results, as well as reading thousands of abstracts from the full database, a manual taxonomy of adverse health effects from wireless radiation was constructed. [Appendix 2](#) presents this taxonomy ([Table A2-1](#)), and the titles of the records that were assigned to each category in the taxonomy. The record titles give a better appreciation for the contents of each category than the brief category heading.

This *manual taxonomy is the most relevant* (of the three taxonomies presented) to the main objective of identifying and categorizing specific adverse health effects from wireless technology, since it was not dependent on any algorithm to determine adverse effects categories and received a *higher level of title filtering* than the other two. [Table A2-1](#) (reproduced in the following) presents the categories in the taxonomy, and a strong condensation of the key phrases 1) used to define the category and 2) link to the record titles shown in [Appendix 2](#). A more detailed manual taxonomy, with orders-of-magnitude more phrases, is shown in [Appendix 2](#).

The adverse effects identified in the manual taxonomy cover those summarized in the comprehensive review analyses described previously, and go well beyond. While all the categories shown are problematical and harmful, the most researched categories with perhaps the most serious adverse effects are *cancer/tumors, neurodegenerative diseases, reproduction problems, and genotoxicity*. Thus, even confining these results to the non-classified open literature, many of which are based on single stressor experiments that tend to downplay greatly real-life adverse effects, there is more than enough hard evidence that wireless radiation 1) *can be extremely harmful in real-life environments*, and 2) *needs to be subjected to orders-of-magnitude harsher exposure limitations* than is the case today. In [Appendix 2](#), the categories in [Table A2-1](#) are hyperlinked to their respective record title sections.

**Table A2-1 – Manual Taxonomy**

<b>CATEGORY</b>	<b>KEY PHRASES</b>
<b>Cancer/Tumors</b>	cancer, leukemia, glioma, lymphoma, melanoma, Hodgkin's disease, tumor, acoustic neuroma, meningioma
<b>Neurodegenerative</b>	memory, central nervous system, learning, neurodegenerative, Alzheimer's disease, cognition, amyotrophic lateral sclerosis, dementia, epilepsy, multiple sclerosis, cognitive impairment, seizures, autism
<b>Reproduction</b>	pregnancy, reproductive, sperm, embryos, testicular, fertility, embryo, testosterone, infertility
<b>Genotoxicity</b>	DNA damage, genotoxic, micronuclei, mutagenic, strand breaks, chromatin, mutation, chromosome aberrations,
<b>Cardiovascular</b>	Cardiac, cardiovascular, pacemaker, implanted, Cardiovascular disease, arrhythmia, arterial blood pressure, ventricular fibrillation
<b>Immunity</b>	lymphocytes, immune system, immunity, leukocytes, antibodies, neutrophils, autoimmune, macrophage,
<b>Biomarkers</b>	apoptosis, oxidative stress, Malondialdehyde, reactive oxygen species, superoxide dismutase, lipid peroxidation, inflammation, oxidation, ornithine decarboxylase, barrier permeability, atrophy, C-reactive protein, oxidative damages
<b>Sensory Disorders</b>	auditory, acoustic, hypersensitivity, electromagnetic hypersensitivity, cataract, tinnitus, dermatitis, cataractogenic, pain sensitivity, pain threshold
<b>Discomfort Symptoms</b>	depression, anxiety, headache, dizziness, depressed, vertigo, nausea, low back pain
<b>Congenital Abnormalities</b>	malformations, teratogenic, congenital malformations, cleft palate,
<b>Circadian Rhythm and Melatonin</b>	melatonin, sleep, circadian, insomnia, pineal function
<b>Chronic Conditions</b>	metabolism, glucose, endocrine, cholesterol, Diabetes, calcium homeostasis, obesity

## 2D3b1. Adverse effects of wireless radiation on food chain

The above taxonomy (and its associated records) focuses on the direct linkage between wireless radiation exposure and biomarkers, symptoms, and diseases. As such, these effects can be viewed as direct effects. Equally important, but usually overlooked in any discussions of adverse effects of wireless radiation, are the indirect effects, especially those on the ecological infrastructure that supports human life.

An analogy to war and conflict may be instructive. When one examines the great wars and battles of human history, especially those that persisted for more than very short periods, the critical role of logistics in determining the outcome becomes obvious. Many wars/battles have been won or lost by the adequacy and timeliness of logistical supplies and support.

The struggle for survival of human life on Earth is similarly dependent on the logistical food supply chain. At the foundation of this supply chain (before the farmers become involved in harvesting its bounty) are the insects, seeds, flora, trees, etc, that enable the bountiful growth of the myriad potential foods. If the integrity of this foundational logistical supply chain is threatened in any way, then both the animals and plant products we consume become unavailable.

There is a substantial literature on the adverse impacts of wireless radiation on this foundational logistical supply chain. These adverse effects are from the pre-5G exposures, and would include enhanced coupling from the higher frequency harmonics. Many of these supply chain elements (e.g., insects, seeds, larvae, etc) are very small, and we could expect enhanced resonance/energy coupling from the shorter-wavelength 5G radiation when implemented. This indirect impact of wireless radiation may turn out to be at least as important (if not more important) as the direct impact of wireless radiation on human survival! At the [end of Chapter 3](#) are a few references showing the harmful effects of wireless radiation on the foundational food supply chain. They are the tip of the iceberg of a much larger literature on adverse effects of wireless radiation on the foundational food supply chain.

From a broader perspective, most of the laboratory experiment component of the wireless radiation adverse effects literature can be viewed as related to the foundational food supply chain. Much of this research is focused on mice, rats, insects, small birds, small fish, etc. These species tend to be prey of larger animals/fowl/fish, and eventually make their way to the human food table. Any environmental factor that affects the health of these species adversely will eventually impacts the humans who are at the end of that chain. In reality, we have accumulated a massive literature describing the adverse impacts of wireless radiation on myriad contributing components to our food supply, and the results do not bode well for our future ability to feed the existing world's population, much less the growing world's population!



## 2D3b2. Implants and Appendages

The adverse impacts of wireless radiation on myriad medical implants don't get much discussion in the literature, especially passive implants (defined below), and especially with regard to radiofrequency radiation. A number of articles in the database addressed non-organic implants, which are foreign bodies inserted into humans and animals for medical purposes. Non-organic implants addressed in the present database are typically not rejected by the immune system like organic foreign substances (although some adjuvants such as metal could induce autoimmune responses [Loyo et al, 2013]). Non-rejection does not mean they are safe, especially from exposure to wireless radiation.

There were two major types of implants covered by the database articles showing adverse effects: active implants that produced electrical signals mainly for controlling heart irregularities (e.g., pacemakers, defibrillators) and hearing deficiencies (e.g., cochlear implants), and passive metallic implants for structural support (e.g., dental implants, bone pins, plates, etc). Additionally, there are articles addressing adverse effects from wireless radiation in the vicinity of metallic appendages (e.g., metallic eyeglasses, metallic jewelry, etc).

The external EMF from microwaves (and other sources) could 1) impact the electrical operation of the active implants adversely, 2) increase the Specific Absorption Rate (SAR) values of tissue in the vicinity of the passive implants substantially because of resonance effects, and 3) increase the flow and acidity of saliva in the vicinity of dental structures. While the EMF effects on the cochlear implants could adversely affect auditory capability, EMF effects on the heart-related implants could potentially be life-threatening. The increased SAR values around the passive metal implants could result in increased tissue temperatures, and could adversely impact integration and longevity of the passive metallic implants.

In the mouth, the combination of 1) increased tissue temperatures in proximity to the implant or other orthodontic structures and 2) increased flow rate and acidity of saliva could lead to 3) increased leaching of heavy metals. Exposure to heavy metals is a major contributor to myriad chronic diseases [Kostoff, 2015]. The question then becomes: what other adverse health effects from the exposure of both the active and passive implants to increasing levels of wireless radiation have not been identified or addressed?

[Appendix 7](#) addresses this issue of wireless radiation adverse effects related to medical implants and appendages in more detail, and additionally addresses potential wireless radiation adverse effects on tissues imbedded (deliberately or inadvertently) with exogenous-based nanoparticles that effectively act as micro/nano-implants. These nanoparticle-imbedded tissues may have the potential for enhanced energy absorption from the incoming RF signal, and may exhibit potentially harmful thermal transients (over and above the potential thermal transients resulting from the pulsed high peak-to-average power of the RF signal) that would be camouflaged under the wide averaging time periods in the FCC Guidelines.

### 2D3c. Factor analysis taxonomy results

The 5,311 records in the retrieved and *partially* filtered adverse health effects database were imported into the VP software [VP, 2019], and a factor analysis was performed. Thousands of MeSH Headings extracted by the VP software were inspected visually, and those directly applicable to adverse health effects were selected. The software then used these selected MeSH Headings to generate a factor matrix, which identified the main adverse health effects themes of the database. [Appendix 3](#) presents this taxonomy ([Table A3-1](#)), and the titles of the records that were assigned to each category in the taxonomy. The titles give a better appreciation for the contents of each category than the brief category heading.

Table A3-1 (reproduced from Appendix 3) follows. It presents the factors/categories in the taxonomy, and the key MeSH Headings used to define the factor/category and link to the record titles shown in [Appendix 3](#). In [Appendix 3](#), the factors in [Table A3-1](#) are hyperlinked to their respective record titles.

**Table A3-1 - Factor Analysis Taxonomy**

<b>FACTOR THEME</b>	<b>MESH HEADINGS</b>
<b>1 Electromagnetic hypersensitivity and inflammation</b>	C-Reactive Protein, Liver Diseases, Thyroid Diseases, Inflammation, Tonsillitis, Hypersensitivity
<b>2 Coronary artery disease</b>	Plaque, Atherosclerotic, Coronary Artery Disease, Diabetes Mellitus, Carotid Artery Diseases, Inflammation, Hypertension
<b>3A Congenital abnormalities</b>	Cleft Lip, Cleft Palate, Calcification, Physiologic, Congenital Abnormalities
<b>3B Mammary tumors</b>	Fibroadenoma, Adenoma, Mammary Neoplasms, Animal, Mammary Neoplasms, Experimental, Adenocarcinoma
<b>4 Male infertility</b>	Sperm Count, Spermatozoa, Sperm Motility, Semen, Testis, Infertility, Male, Spermatogenesis, Testosterone, Fertility
<b>5 Brain neoplasms</b>	Meningioma, Glioma, Meningeal Neoplasms, Neuroma, Acoustic, Brain Neoplasms, Glioblastoma, Neoplasms, Radiation-Induced, Neuroma, Cranial Nerve Neoplasms, Parotid Neoplasms, Central Nervous System Neoplasms
<b>6 Sensory disorders</b>	Burning Mouth Syndrome, Taste Disorders, Skin Diseases, Mouth Diseases, Dizziness, Vision Disorders, Hypersensitivity, Delayed, Fatigue
<b>7 Breast neoplasms</b>	Carcinoma, Lobular, Carcinoma, Ductal, Breast, Breast Neoplasms, Male, Adenoma
<b>8 Oxidative stress</b>	Oxidative Stress, Malondialdehyde, Glutathione Peroxidase, Lipid Peroxidation, Reactive Oxygen Species, Apoptosis, DNA Damage, Nitric Oxide, Protein Carbonylation
<b>9 Neurodegenerative diseases</b>	Parkinson Disease, Neurodegenerative Diseases, Alzheimer Disease, Amyotrophic Lateral Sclerosis, Motor Neuron Disease, Occupational Diseases, Dementia, Brain Diseases, Dementia, Vascular
<b>10 Cerebrovascular disorders</b>	Cerebrovascular Disorders, Dementia, Migraine Disorders, Tinnitus, Headache, Sleep Wake Disorders, Carotid Artery Diseases, Alzheimer Disease, Dementia, Vascular

<b>11 Congenital abnormalities and glandular-based tumors</b>	Cleft Lip, Cleft Palate, Fibroadenoma, Adenoma, Calcification, Physiologic, Mammary Neoplasms, Animal, Mammary Neoplasms, Experimental, Adenocarcinoma
<b>12 Skin neoplasms</b>	Carcinoma, Basal Cell, Carcinoma, Squamous Cell, Skin Neoplasms, Cocarcinogenesis, Neoplasms, Experimental, Neoplasms, Radiation-Induced, Colonic Neoplasms
<b>13 Leukemia</b>	Leukemia, Myeloid, Acute, Leukemia, Lymphocytic, Chronic, B-Cell, Leukemia, Myelogenous, Chronic, BCR-ABL Positive, Leukemia, Myeloid, Leukemia, Multiple Myeloma, Lymphoma, Leukemia, Radiation-Induced, Acute Disease, Liver Neoplasms, Experimental, Central Nervous System Neoplasms
<b>14 Precancerous conditions</b>	Atrophy, Precancerous Conditions, Hyperplasia, Hypersensitivity, Delayed, Thymus Gland, Capillary Permeability, Lymphoma
<b>15 Circadian Rhythm</b>	Melatonin, Circadian Rhythm, Pineal Gland
<b>16 Eye diseases</b>	Eye Diseases, Cataract, Vision Disorders, Sensation Disorders, Neurotic Disorders, Lens, Crystalline, Corneal Diseases, Edema, Hematologic Diseases
<b>17 Electromagnetic interference in implanted electronic devices</b>	Tachycardia, Ventricular, Ventricular Fibrillation, Death, Sudden, Cardiac, Arrhythmias, Cardiac
<b>18 Liver Neoplasms</b>	Liver Neoplasms, Carcinoma, Hepatocellular, Neoplasm Recurrence, Local, Lymphatic Metastasis
<b>19 Symptoms of discomfort</b>	Headache, Dizziness, Fatigue, Depression, Anxiety, Tremor, Sleep Wake Disorders, Neurotic Disorders, Stress, Psychological, Anxiety Disorders, Nervous System Diseases
<b>20 Neoplasms</b>	Lung Neoplasms, Ovarian Neoplasms, Pituitary Neoplasms, Lymphoma, Prostatic Neoplasms, Colonic Neoplasms, Carcinoma, Breast Neoplasms, Hematologic Neoplasms, Neoplasms, Liver Neoplasms, Cell Transformation, Neoplastic, Nervous System Neoplasms

## 2D3d. Text clustering taxonomy results

The 5,311 records in the retrieved and *partially* filtered adverse health effects database were imported into the CLUTO software [CLUTO, 2019], and a text clustering was performed. Forty-eight lowest level clusters were selected, based on theme resolution desired (average ~100 records per lowest level category). [Appendix 4](#) presents this taxonomy ([Table A4-1](#), [Table A4-2](#)), and the titles of the records that were assigned to each lowest-level category in the taxonomy. The titles give a better appreciation for the contents of each category than the brief category theme shown.

Table A4-1 (reproduced from the Appendix) presents the high-level clusters in the taxonomy, and the cluster themes. In [Appendix 4](#), the fourth-level clusters in [Table A4-2](#) (repeated from the fourth level shown in Table A4-1) are hyperlinked to their respective record titles.

**Table A4-1 - CLUTO-Based Text Clustering Taxonomy – Top Levels**

SECOND LEVEL	FOURTH LEVEL
Cluster 92 (2561) – Adverse effects of wireless radiation at cellular level, including radiation absorption at different frequencies	Cluster 78 (912) - Adverse impacts of wireless radiation, especially on cataracts, cells, and cognitive functions
	Cluster 79 (428) - Microwave radiation absorption at different frequencies
	Cluster 82 (529) - Adverse effects of mobile phone radiation, especially oxidative stress
	Cluster 84 (692) - Genotoxic effects of radiofrequency radiation
Cluster 93 (2750) – Adverse health effects of EMF on humans, especially cancer and neurodegenerative diseases, and on implanted electronic devices	Cluster 81 (673) - Adverse impacts of power-line EMF
	Cluster 85 (540) - Adverse impacts of low-frequency EMF, emphasizing cancer and neurodegenerative diseases
	Cluster 83 (668) – Adverse effects of mobile phone use, especially brain tumors, and brain and neural function
	Cluster 89 (869) - Human health risks from electromagnetic radiation, including adverse effects on implanted electronic devices, and possible protections

Note: Numbers in parentheses reflect numbers of records in cluster

## 2D3e. Wireless radiation adverse health effects in closed literatures

It should be re-emphasized at this point that almost all of the wireless radiation findings reported above reflect what is published in the open literature. That tends to emphasize basic research, and tends to be produced by academia, with its strong incentives for publication.

There's a much larger world of effort centered around wireless radiation technology and engineering development (for surveillance, communications, and weaponry) performed in organizations that have 1) few incentives to publish and 2) many prohibitions against publication due to classification and/or proprietary issues. Publication of adverse effects of these wireless systems could have severe financial consequences for all the stakeholders involved, and could result in potential military operational constraints as well.

The Federal government and industry who sponsor and many times conduct these advanced wireless radiation technology studies and demonstrations have 1) strong incentives to classify and proprietarize any results detrimental to their promotional activities and 2) no incentives to release results showing serious adverse health effects from wireless radiation to the public!

Consider the example shown in [section 2D4](#) concerning the Zalyubovskaya [1977] reference, derived from Kostoff [2019a]. It shows some 1970s Soviet studies on EMF effects, including millimeter-wave effects, that were classified for 35 years until declassification in 2012. If relatively benign studies like those were classified for 35 years, one can only imagine the more serious studies that remain classified until this day. Or, Soviet studies that were not presented in an open forum because of their sensitivity. Or, USA studies that were performed decades ago (or recently), and remain classified to this day.

Also, consider the following example, which came to light relatively recently.

On 30 October 2019, an article was published suggesting the presence of cancer clusters among military pilots [<https://www.mcclatchydc.com/news/nation-world/national/national-security/article236413708.html>]. This may be the tip of the iceberg, since there are latency periods preceding the emergence of these cancers. It is unclear how well the health conditions of these pilots are tracked once they leave the service (according to the article), or, more specifically, ***how well the public is informed*** as to how well the health conditions of these pilots are tracked once they leave the service, and, if they are tracked, what the results of this tracking are. If there is tracking, who is funding the tracking, and what is its objectivity?

Severe recruiting consequences would result if it were shown that these serious diseases are in fact associated with exposures to on-board avionics and other stressors unique to the aircraft environment (EMF in combinations with other unique stressors [chemicals, psychological stress, high and low-G forces, etc] that performance aircraft crews face). It would be valuable to get EMF exposure data (***using an independent assessment***) under myriad flight conditions for many different military aircraft, with all the onboard avionics in full operation.

A similar article generated by the same organization addressing RF exposures of military pilots [<https://www.mcclatchydc.com/news/nation-world/national/national-security/article237797304.html>] complements the information contained in the above example, as shown in the following:

The largest Grumman measurement reported in the article translates to **300 million microwatts/square meter**! This is thirty times today's FCC general public exposure limit, which itself is three-four orders-of-magnitude above levels shown by the cell tower studies to increase cancer incidence substantially. In parallel, the pilots are also being exposed to myriad other toxic stimuli, including EMF of other frequencies, cosmic radiation, perhaps fuel odors, etc, increasing the possibility of adverse effect synergies.

These may be the tip of the iceberg of RF exposure measurements done in the aircraft cabin, and there is no evidence that these were the highest occurring exposures. These types of exposure measurements rarely, if ever, see the light of day in the open literature, and are not advertised (for obvious purposes) by government-industry.

Additionally, while the gold coating mentioned may have kept a substantial amount of external RF from entering the cabin, it also would have delayed RF (that was internally generated or entered the cabin through non-gold coated non-metallic avenues) from leaving the cockpit, mirroring a hohlraum effect.

This cockpit problem reflects a disturbing trend. The military services became network-centric decades ago. They are almost completely dependent on wireless communications and wireless detection/surveillance for all their operations. If they were to allow their labs and contractors to report the possible damage from the levels of exposures happening in the field and at their facilities, potentially resulting in much lower wireless radiation exposure limits, they would be forced to eliminate many decades of so-called advances in their weaponry and operations. It could also impact their recruitment efforts adversely. No different in kind from their civilian counterparts, although the military may be operating at higher exposure levels because of their ultra-high-performance requirements.

So, while the adverse health effects of wireless radiation listed above in the monograph are very serious in their own right, they may be just the tip of the iceberg of the totality of adverse health effects that have actually been demonstrated if the non-published or classified studies had been taken into account.

## 2D4. Adverse Wireless Radiation Health Effects from Former USSR Literature Analysis

### 2D4a. Overview

The Former Soviet Union/USSR was a major player in biomedical research on health effects of non-ionizing radiation (both adverse and therapeutic) since at least the 1950s, and perhaps well before. Some/much of the work was published in the Soviet open literature, and available in Russian. Some/much of it was translated by USA intelligence agencies, and later declassified. Some may still be classified. The major difference between the USA and Soviet research on adverse effects of wireless radiation appears to be emphasis on thermal (USA) vs athermal (Soviet) effects. This difference is reflected in the different wireless radiation exposure limits imposed by each government.

### 2D4b. Glaser and Dodge review of East European radiofrequency literature

Glaser and Dodge addressed this issue within a comprehensive review of East European radiofrequency and microwave radiation literature [Glaser and Dodge, 1976], as follows:

#### **THERMAL VS ATHERMAL EFFECTS – USA-USSR**

“The most significant difference between East and West relative to biological mechanisms of effects of microwaves concerns the question of thermogenic versus nonthermogenic (or athermal) effects.....The traditional Soviet and East European view from the earliest publications of bio-studies has been that microwave and radio frequency fields can functionally, and even morphologically in some cases, alter the organism at field flux or power densities below those which cause measureable heating in tissues or biological substrates. Thus, reversible changes in behavior, physiological function, and microstructures are frequently reported at power densities of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ), well below the Western world’s “safe” exposure level of 10 milliwatts per square centimeter ( $10 \text{ mW}/\text{cm}^2$ ).....In contrast, the prevailing Western view, particularly in the United States, is that the effects of microwave and radio frequency fields are attributable only to the heating mechanism of those fields which are generally encountered at power densities in excess of  $10 \text{ mW}/\text{cm}^2$ .....

The disparity between Eastern and Western views in this respect finds its most eloquent expression in daily occupational exposure standards for microwaves. In the Soviet Union and some East European countries, the standard for an occupational exposure day is  $0.01 \text{ mW}/\text{cm}^2$ .....In the United States and some Western European countries, the value for continuous exposure is  $10 \text{ mW}/\text{cm}^2$ .

Prior to 1953, it was believed that  $100 \text{ mW}/\text{cm}^2$  was the lowest level at which significant biological damage would occur.....Thus,  $10 \text{ mW}/\text{cm}^2$  is approximately one tenth the level calculated to cause significant heating in human tissues, and agrees with physiologic and metabolic calculations . Intermediate standards between these values are practiced by some European countries.....”



This conclusion, presented 43 years ago in print, is particularly disheartening. Despite all the evidence of adverse athermal effects of wireless radiation that was generated prior to 1976 (especially in the USSR, but in the USA as well), and the voluminous evidence (of adverse athermal effects of wireless radiation) that has been reported from global research since 1976, the USA government (along with many others) has refused to recognize the credibility of these athermal wireless radiation effects in the setting of regulatory exposure standards.

#### 2D4c. Glaser review of global radiofrequency literature circa 1972

What was the state of the open literature on adverse health effects of wireless radiation in the 1970s, including what was known about Soviet and East European research? One partial answer can be gleaned from a very comprehensive review of the global radiofrequency and microwave biomedical effects literature published as a DTIC report in 1972 [Glaser, 1972]. The abstract of this report states in part:

“More than 2300 references on the biological responses to radio frequency and microwave radiation, published up to April 1972, are included in this bibliography of the world literature. Particular attention has been paid to the effects on man on non-ionizing radiation at these frequencies. The citations are arranged alphabetically by author, and contain as much information as possible so as to assure effective retrieval of the original documents. ***Soviet and East European literature is included in detail.*** An outline of the effects which have been attributed to radio frequency and microwave radiation is included as Chapter 1.”

The effects mentioned in the last sentence have been converted to a more readable form by Dr. Magda Havas on her outstanding Web site (describing decades of global research on wireless radiation health effects) [Havas, 2019]. As stated on her Web site, Dr. Havas has obtained hard copies of Dr. Glaser’s references from Dr. Glaser, and is in the process of scanning them and making them available to a wider audience. Dr. Havas’ summary of the effects mentioned in the last sentence of the box above is repeated in the following table:

CATEGORY	ADVERSE EFFECTS
<b>A. Heating of Organs*</b> [Applications: <b>Diathermy,</b> <b>Electrosurgery,</b> <b>Electrocoagulation,</b> <b>Electrodesiccation,</b> <b>Electrotomy]</b>	This includes heating of the whole body or part of the body like the skin, bone and bone marrow, lens of the eye with cataracts and damage to the cornea; genitalia causing tubular degeneration of testicles; brains and sinuses; metal implants causing burns near hip pins etc. These effects are reversible except for damage to the eye.

<b>B. Changes in Physiologic Function</b>	This includes contraction of striated muscles; altered diameter of blood vessels (increased vascular elasticity), dilation; changes in oxidative processes in tissues and organs; liver enlargement; altered sensitivity to drugs; decreased spermatogenesis leading to decreased fertility and to sterility; altered sex ratio of births in favor of girls; altered menstrual activity; altered fetal development; decreased lactation in nursing mothers; reduction in diuresis resulting in sodium excretion via urine output; altered renal function; changes in conditioned reflexes; decreased electrical resistance of skin; changes in the structure of skin receptors; altered rate of blood flow; altered biocurrents in cerebral cortex in animals; changes in the rate of clearance of tagged ions from tissues; reversible structural changes in the cerebral cortex and diencephalon; changes in electrocardiographs; altered sensitivity to light, sound, and olfactory stimuli; functional and pathological changes in the eyes; myocardial necrosis; hemorrhage in lungs, liver, gut and brain and generalized degeneration of body tissue at fatal levels of radiation; loss of anatomical parts; death; dehydration; altered rate of tissue calcification.
<b>C. Central Nervous System Effects</b>	This includes headaches; insomnia; restlessness (daytime and during sleep); changes in brain wave activity (EEG); cranial nerve disorders; pyramidal tract lesions; disorders of conditioned reflexes; vagomimetic and sympathomimetic action of the heart; seizure and convulsions.
<b>D. Autonomic Nervous System Effects</b>	Altered heart rhythm; fatigue, structural alterations in synapses of the vagus nerve; stimulation of the parasympathetic nervous system leading to Bradycardia and inhibition of the sympathetic nervous system.
<b>E. Peripheral Nervous System Effects</b>	Effects on locomotor nerves.
<b>F. Psychological Disorders</b>	Symptoms include neurasthenia (general bad feeling); depression; impotence; anxiety; lack of concentration; hypochondria; dizziness; hallucinations; sleepiness or insomnia; irritability; decreased appetite; loss of memory; scalp sensations; fatigue; chest pain, tremors.
<b>G. Behavioral Changes in Animals Studies</b>	Effects include changes in reflexive, operant, avoidance and discrimination behaviors
<b>H. Blood Disorders</b>	Effects include changes in blood and bone marrow; increased phagocytic and bactericidal functions; increased rate of hemolysis (shorter lifespan of cells); increased blood sedimentation rate;

	decreased erythrocytes; increased blood glucose concentrations; altered blood histamine content; changes in lipids and cholesterol; changes in Gamma Globulin and total protein concentration; changes in number of eosinophils; decrease in albumin/globulin ratio; altered hemopoiesis (rate of blood corpuscles formation); leukopenia (increased number of white blood cells and leukocytosis; reticulocytosis (increase in immature red blood cells).
<b>I. Vascular Disorders</b>	This includes thrombosis and hypertension.
<b>J. Enzyme and Other Biochemical Changes (in vitro)</b>	Changes in the activity of cholinesterase (also in vivo); phosphatase; transaminase; amylase, carboxydismutase; denaturation of proteins; inactivation of fungi, viruses, and bacteria; killed tissue cultures; altered rate of cell division; increased concentration of RNA in lymphocytes and decreased concentration of RNA in brain, liver and spleen; changes in pyruvic acid, lactic acid and creatinine excretions; changes in concentration of glycogen in liver (hyperglycemia); altered concentrations of 17-ketosteroids in urine.
<b>K. Metabolic Disorders</b>	Effects include glycosuria (sugar in urine); increase in urinary phenols; altered processing of metabolic enzymes; altered carbohydrate metabolism.
<b>L. Gastro-Intestinal Disorders</b>	Effects include anorexia; epigastric pain; constipation; altered secretion of stomach digestive juices.
<b>M. Endocrine Gland Changes</b>	Effects include altered functioning of pituitary gland, thyroid gland (hyper-thyroidism and enlarged thyroid, increased uptake of radioactive iodine), and adrenal cortex; decreased corticosteroids in blood; decreased glucocorticoid activity; hypogonadism (with decreased production of testosterone).
<b>N. Histological Changes</b>	Changes in tubular epithelium of testicles and gross changes.
<b>O. Genetic and Chromosomal Changes</b>	Effects include chromosomal aberrations (shortening, pseudochiasm, diploid structures, amitotic divisions, bridging, "stickiness"; irregularities in chromosomal envelope); mutations; mongolism; somatic alterations (not involving nucleus or chromosomes); neoplastic diseases (tumors).
<b>P. Pearl Chain Effect</b>	This refers to intracellular orientation of subcellular particles and orientation of cellular and other (non-biologic particles, i.e. mini magnetics) affecting orientation of animals, birds, and fish in electromagnetic fields.
<b>Q. Miscellaneous Effects</b>	These include sparking between dental fillings; metallic taste in mouth; changes in optical activity of colloidal solutions; treatment for

	syphilis, poliomyelitis, skin diseases; loss and brittleness of hair; sensations of buzzing, vibrations, pulsations, and tickling about head and ears; copious perspiration, salivation, and protrusion of tongue; changes in the operation of implanted cardiac pacemakers; changes in circadian rhythms.
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Thus, much was known about the adverse health effects of both thermal and athermal high-frequency wireless radiation even in the early 1970s (Glaser's review did not address lower frequency radiation effects, although we now know these lower frequency effects could be equally damaging as those from high frequency), but this long-standing knowledge has not translated into adequate protections for the public from wireless radiation, both in the USA and the rest of the world.

#### 2D4d. Joint Publications Research Service translations of East European research

Another avenue of insight into Soviet and East European research in the 1970s era was provided by the Joint Publications Research Service (JPRS). A description of this organization follows [<https://guides.library.harvard.edu/jprs>]:

The United States Joint Publications Research Service is a government agency which translates foreign language books, newspapers, journals, unclassified foreign documents and research reports. Approximately 80% of the documents translated are serial publications. JPRS is the largest single producer of English language translations in the world. More than 80,000 reports have been issued since 1957, and currently JPRS produces over 300,000 pages of translations per year.

**In its early years JPRS concentrated heavily on scientific and technical material from communist countries. Gradually coverage has broadened to include more non-scientific materials.**

#### 2D4d1. Maritime occupational radiofrequency exposures in USSR

One of the Soviet technical books translated by the JPRS is listed on Dr. Havas' Web site [<https://magdahavas.com/pick-of-the-week-15-russian-translations-on-biological-effects-of-magnetic-fields-and-radio-frequency-radiation/>]. This book [Kulikovskaya, 1970] is important because it shows the levels of wireless radiation to which Soviets in some occupations were exposed fifty years ago, numbers that many wireless radiation proponent countries do not readily advertise. Whether these exposures are greater or less today is unclear; powers may be higher, but shielding may be better.

In the introductory section of Chapter IV (Biological Effect of Radio Waves – p.70), the following statement is made:

“Foreign researchers are giving basic attention to the effect of electromagnetic radio waves beginning with the thermal effect, that is, heating the animate organism by the field energy.

The research performed in our country, in contrast to foreign research, is based on a complex of dynamic studies of the reactions of the organism to the effect of low irradiation intensities, and, especially, in the superhighfrequency range, recognition of the cumulative biological effect in the case of chronic exposure to low power flux densities.”

This quoted statement confirms the statement of Glaser and Dodge in section 2D4b above. Since the bulk of the references in Kulikovskaya’s book are from the 1950s and 1960s, one can surmise that a decision was made by the Western powers (especially the USA, who led the Western powers at that time) seventy years ago to downplay the adverse effects of athermal wireless radiation, and promote the false concept that only the thermal effects of wireless radiation are responsible for biomedical damage. The decision-makers from the Western powers recognized seventy years ago that *wide-ranging wireless communications and surveillance were not possible if biologically protective exposure limits were promulgated.* Through countless Administrations and Legislatures since the days of President Eisenhower, all USA (and most foreign) decision-makers have presented a consistent and unified front promoting increased exposure to wireless radiation at the expense of the health of the nation’s citizens!

The following table shows examples (from Kulikovskaya [1970]) of maximum levels of exposure to wireless radiation for Soviet citizens working in the marine environment. The maximum electric field exposure levels exceed the Soviet regulatory limits at that time (which were up to an order-of-magnitude lower than the USA regulatory limits) by up to two orders-of-magnitude!

To place these numbers in perspective, the Building Biologists’ recommendations for safe long-term exposure limits in these frequency ranges is less than one volt per meter (<https://mdsafetech.org/conversion-and-exposure-limits-emr-emf/>). Thus, the reported exposures exceed safe levels by two-three orders of magnitude.

The research was performed at the Laboratory of Physical Factors of the State Scientific Research Institute of Labor Hygiene and Professional Diseases. The exposure levels reported are what the Soviet government was willing to release to the public. Whether they were the most severe exposures experienced by members of the civilian and military fleets remains unknown. In terms of personnel recruitment for these jobs, it was/is not in the government’s (Soviet or otherwise, including USA) best interests to release to the public exposure levels that would show these jobs to be highly dangerous to health. The book attempts to make the point that most exposures experienced by maritime personnel are much lower than the maximum, probably to assuage the public. The results are disturbing nevertheless, and should be viewed as the ‘floor’ of exposures to be expected relative to measurements made by an 1) ***independent objective group*** 2) ***on location during operations*** 3) ***without having given advanced notice!***

REGION	FREQ RANGE MHz	MAX EXPOS V/m	EXP LIMIT V/m
<b>Electromagnetic Fields Near Tube Generators for High-Frequency Heating of Metals (P.23)</b>	.06-.8	1,000+	20
<b>Electromagnetic Waves Near Tube Generators for High-Frequency Heating of Dielectrics (P.26)</b>	10-30	500+	20
<b>Electromagnetic Fields in the Radio Rooms of Ships (P. 29)</b>	.3-23		
Passenger Ships (P. 32)	.4-.8	2,000	20
Ships of the Tanker Fleet (P. 36)	.4-.8	2,000	20
Dry Cargo Ships (P. 37)	.4-.8	1,600	20
Ships of the Auxiliary Fleet (P. 40)	.4-.8	420	20
<b>Electromagnetic Fields of Radio Communications Antennas on the Decks and Superstructures of Ships (P. 44)</b>	.3-3	880	20
“In conclusion, it can be stated that the highest intensity of an electric field up to hundreds and sometimes <i>thousands and more volts per meter</i> occurs near the antenna drops and metal masses on the top bridges and decks during operation of a medium wave radio. Here, the magnetic component of the field can reach <i>ten and even fifteen amps/meter.</i> ” P. 52)			
<b>Superhigh Frequency Electromagnetic Fields of Radar Antennas on the Decks of Ships (P. 52)</b>	3,000-15,000		
“Studies of the conditions of irradiation of the deck crew with superhigh-frequency fields performed on ships for various purposes show that when the radar antennas are installed on columns 1.2-2.5 meters above the deck of the top bridge, the power flux density can be hundreds and sometimes <i>thousands of microwatts per square centimeter.</i> ” (P. 54)			
<b>Some Adverse Health Effects of Marine Radio Operators (P. 80)</b>			
“The conditions of labor of marine radio operators are least favorable..... a relatively large number of people with various diseases appear among radio operators. Thus, out of 215 radio operators, 50 had chronic diseases (23.2 percent).....The primary disruption of the state of health of ship radio operators is damage to the organs of sight.....Among the diseases of the cardiovascular system occurring in ship radio operators, hypertonic disease. myocardial distrophy and disruption of the blood circulation in the brain play the leading role. All radio operators suffering from diseases of the cardiovascular system are young (from 30 to 35 years old) with five to 10 years of service. Among the diseases of the nervous system encountered in them, functional disorders of the central nervous system, vegetative neurosis, and neurasthenic syndrome are noted.....Thus, it is possible to consider it established that the largest number of people with health impairments occur among ship radio operators as compared to other marine professions.”			

## 2D4d2. Biomedical effects of millimeter-wave exposures in some USSR research

Additionally, consider the following USSR reference [Zalyubovskaya, 1977] translated by the JPRS and published as a classified document in 1977.

**SYSTEMIC ADVERSE EFFECTS FROM MILLIMETER-WAVE RADIATION**

This is one of many translations of articles produced in the Former Soviet Union on wireless radiation (also, see reviews of Soviet research on this topic by McRee [1979, 1980], Glazer and Dodge [1976], Kositsky et al [2001]). On p. 57 of the pdf link, the article by Zalyubovskaya addresses biological effects of millimeter radiowaves. Zalyubovskaya ran experiments using power fluxes of 10,000,000 microwatts/square meter (the FCC guideline limit for the general public today), and frequencies on the order of 60 GHz. Not only was skin impacted adversely, but also heart, liver, kidney, spleen tissue as well, and blood and bone marrow properties. These results reinforce the conclusion of Russell (see section [2E](#)) that systemic results may occur from millimeter-wave radiation. And, to re-emphasize, for Zalyubovskaya's experiments, the incoming signal was unmodulated carrier frequency only, and the experiment was single stressor only. Thus, the expected real-world results (when human beings are impacted, the signals are pulsed and modulated, and there is exposure to many toxic stimuli) would be far more serious and would be initiated at lower (perhaps much lower) power fluxes.

The Zalyubovskaya paper was published in 1977. What national security concerns caused it (and the other papers in the linked pdf reference) to be classified in the first place, and then kept classified for 35 years until declassification in 2012? What other papers on this topic with similar findings were published in the USSR (and the USA) at that time, or even earlier, and how many such papers never saw the light of day in the USSR (and the USA) at that time? It appears that we have known about the potentially damaging effects of millimeter-wave radiation on the skin (and other major systems in the body) for well over forty years, yet the discourse today only revolves around the possibility of modest potential effects on the skin and perhaps cataracts from millimeter-wave radiation.

2D4d3. Health effects from millimeter-wave exposures in Russian and Ukrainian literature

The review by Kositsky referenced in section 2D4d2 [Kositsky et al, 2001] appears to be based on 1) open literature publication of 2) wireless radiation biological effects 3) by Russian and Ukrainian researchers, covering the publication time period of 1968-2000. It appears to be quite comprehensive, and addresses both wireless radiation 1) adverse health effects and 2) therapeutics. It covers millimeter-wave frequencies almost exclusively. Some important takeaways from the Kositsky review are shown in the following box.

**BIOLOGICAL EFFECTS FROM MILLIMETER-WAVE RADIATION**

“there is a large probability of harmful effects from incidental generalized exposure, as confirmed in experiments on animals”

“Since living organisms have evolved under conditions of low natural background EHF EMR, they lack a ready-made mechanism of evolutionary adaptation to heightened levels of radiation resulting from technogenic factors”

“The results of clinical research showed that prolonged contact with EMF in the SHF band can lead to development of diseases, the clinical profile of which is determined above all by changes in the functional condition of the nervous and cardiovascular systems”

“Under EFD of 60  $\mu\text{W}/\text{cm}^2$ , disturbance of female cycles; reduction in fertility, number and weight of offspring; increase in postnatal deaths of the rat pups by a factor of 2.5; and dystrophic changes in the reproductive organs of the animals were noted”

“The results obtained give evidence that a single exposure to low-intensity EHF EMR without modulation, and with modulation at low frequencies of 5-10 Hz, induce opposite effects in red bone marrow (RBM). In the former case, we have pronounced stimulation of proliferative processes in the RBM, which are reversible. In the latter case—progressive depression of the process of blood production, right down to the formation of hypo- and aplastic conditions in the RBM on the sixth day of observation.”

“biological effects of millimeter waves (BEF MMW):...They do not depend on the intensity of EMR, starting from the threshold to noticeable heating of tissue.....Irreversible BEF occur only during prolonged or cyclical exposure.....During amplitude or frequency modulation of MMW, bioeffects are maintained or strengthened as the power of exposure is significantly reduced.....The body “remembers” the effect of EMR for a relatively long time.....In some cases, EMR influences sensitivity to other factors (chemicals, ionizing radiation, etc.), and the effects may persist through time.”

“In epidemiological studies of the population of Ukraine, a connection was established between leukemia in children and cancer in adults, and exposure to EMF at industrial frequencies.”

“Specific injuries under radiowave exposure are development of cataracts, instability in leukocyte make-up of peripheral blood, and vegeto-vascular disorder”

“the likelihood of cancer was three times greater under SHF exposure”



“It can be proposed that the current increase in electromagnetic pollution of the environment exceeds human adaptational capacities”

“The danger of mobile telephones consists of the fact that in addition to direct effects on the brain, the whole body is irradiated via the biologically active points of the concha of the ear”

“Observed higher resonance frequencies of a living cell coincide with frequencies of radiation of communications satellites. The power densities and duration of irradiation created by these satellites will significantly exceed.....the energetic doses inducing changes in living cells..... there will be a likelihood of changes (including negative changes) in the genetic apparatus of living cells during prolonged exposure to low-energy electromagnetic radiation from communications satellites”

“Combination with other deleterious factors: ionizing radiation, toxic substances, geomagnetic anomalies and stress significantly increase the effects of HF EMR.”

“Occurrence of a narcotic-type dependency (by stimulating production of endorphins) is possible under regular irradiation with HF EMR.”

“in animals irradiated with EMF, the nature of the infectious process changes—the course of the infectious process is aggravated”

“Absorption of EMF in biologically active points is many times more effective than in other parts of the skin, and this energy influences the internal organs and the body as a whole through the system of Chinese meridians.”

In summary, these excerpts show that

- adverse effects can be initiated with very low doses of EMR,
- millimeter-wave radiation can impact regions below the skin, and
- adverse effects may be exacerbated when the EMR is combined with other toxic stimuli.

Given Kositsky’s statement in [section 2D4](#) about the potential of a narcotic-type dependency from exposure to EMR through stimulating production of endorphins, could EMR be effectively serving as one of the gateway ‘drugs’ to the increased opioid use we observe today? [Appendix 5](#) addresses the potential impact of wireless radiation exposure on the opioid crisis, and shows that wireless radiation could indeed be a contributing factor to the overuse of opioids we are seeing today!

Particularly troubling are Kositsky's statements about the potential adverse effects of communications satellites. He bases his conclusions on the matching of communications satellites' frequencies with living cell resonances, as follows:

“Observed higher resonance frequencies of a living cell coincide with frequencies of radiation of communications satellites. The power densities and duration of irradiation created by these satellites will significantly exceed (by ten or more orders of magnitude—such irradiation is possible over the course of a whole lifetime) the energetic doses inducing changes in living cells.”

From some perspectives, the concept is counter-intuitive. Hormetic behavior of toxic substances and vaccines tends to be observed at extremely low doses of toxic stimuli. The average power fluxes from communications satellites are extremely low at the Earth's surface, and one would not expect adverse effects based on these low numbers. In the NTP experiments that many people cite as the wireless radiation experimental Gold Standard [Melnick, 2019], serious adverse effects were not observed until the power fluxes approached the FCC limit.

While his statements may seem counter-intuitive to some people, that does not mean they are incorrect. The issue needs to be resolved, sooner rather than later. At this time, 5G satellites are in fact being launched, and there are projections that tens of thousands of these satellites will eventually be launched to complete the global terrestrial and space 5G network. Launching of this number of satellites without the demonstrated evidence of safety would add to the unethical and harmful nature of the mobile networking experiment already observed.

#### 2D4d4. “Confirmation” of Soviet microwave effects studies forty years later

The Soviet studies on adverse health effects from athermal radiofrequency exposures performed 40++ years ago showed clearly the dangers to human health from this toxic stimulus. Even though there was voluminous non-Soviet research showing a wide spectrum of adverse health effects from radiofrequency during that 40++ year period, some researchers undertook studies under ‘similar’ conditions to purportedly ‘confirm’ or validate the results from the Soviet studies [e.g., de Gannes et al, 2009; Repacholi et al, 2011; Grigoriev et al, 2010; Grigoriev, 2011]. This would require “validation” of health and safety research findings that were generated forty years ago in a ***completely different sponsorship and motivational context*** than has existed in the past decade. As one would expect, given the history of wireless radiation health and safety research, the results were mixed.

What type of independence and objectivity would one expect from ‘confirmation’ research sponsored by the promoters of 2G, 3G, 4G and now 5G mobile networking technology? Trillions of dollars in revenues are at stake in maintaining the fiction of wireless radiation safety under current exposure limit regulations. While the results could be correct, they should be interpreted with this context in mind.

## 2E. Potential Adverse Health Effects Expected from 5G Mobile Networking Technology

The potential 5G adverse health effects derive from the intrinsic nature of the radiation, and how this radiation interacts with tissue and other target structures. 4G networking technology was associated mainly with carrier frequencies in the range of ~1-2.5 GHz (cell phones, WiFi). The wavelength of 1 GHz radiation is 30 cm, and the penetration depth in human tissue is a few centimeters. The highest performance 5G networking technology is mainly associated with carrier frequencies at least an order of magnitude above the 4G frequencies, although, as stated previously, “ELFs (0–3000Hz) are always present in all telecommunication EMFs in the form of pulsing and modulation”. Penetration depths for the high-performance carrier frequency component of 5G radiation will be on the order of a few millimeters.

For much of the early implementation of 5G, and perhaps later, 5G will be integrated with 4G. Some vendors will start out/have started out with ‘low-band’ 5G (~600-900 MHz); some will start out with ‘mid-band’ 5G (~2.5 GHz-4.2 GHz); and some will start out with ‘high band’ 5G (~24-47 GHz). All these modes are associated with potentially severe adverse health effects, and none have been tested for safety in any credible manner.

At the millimeter carrier wavelengths characteristic of high-band high performance 5G, one can expect resonance phenomena with small-scale human structures [Betzael, 2018; [Appendix 7B-3](#)], as well as resonances with insects/insect components [Thielens et al, 2018].

The common ‘wisdom’ being presented in the literature and the broader media is that, if there are adverse impacts resulting from millimeter-wave 5G, the main impacts will be focused on near-surface phenomena, such as skin cancer, cataracts, and other skin conditions, because of shallow RF penetration depths. However, there is evidence that biological responses to millimeter-wave irradiation can be initiated within the skin, and the subsequent systemic signaling in the skin can result in physiological effects on the nervous system, heart, and immune system [Russell, 2018]. There is additional evidence that adverse effects from millimeter-wave radiation can occur in organs and tissue well below the skin surface (e.g., consider the example shown in section 2D4d2 in the box titled [SYSTEMIC ADVERSE EFFECTS FROM MILLIMETER-WAVE RADIATION](#), or the example shown in section 2D4d3 in the box titled [BIOLOGICAL EFFECTS FROM MILLIMETER-WAVE RADIATION](#)) This should not be surprising, since there are myriad signaling conduits connecting the skin to deeper structures in the body.

## 2F. Why is there not Full Consensus on Adverse Effects from Wireless Radiation?

### 2F1. Reasons for Lack of Full Consensus

Not all studies of wireless radiation have shown adverse effects. There are many possibilities to explain this [Kostoff et al, 2020].

1) There could be ‘windows’ in parameter space where adverse effects occur, and the studies/experiments were conducted outside these ‘windows’. Operation outside these windows could show i) no effects or ii) hormetic effects or iii) therapeutic effects.

For example, assume information content of the signal is a strong contributor to adverse health effects [Panagopoulos, 2019]. Experiments that involve only the carrier frequencies may be outside the ‘window’ where adverse health effects occur, and no adverse effects would be identified. Alternatively, in this specific example, the carrier signal and the information signal could be viewed as a combination of potentially toxic stimuli, where the adverse effects of each component are enabled because of the synergistic effects of the combination. If only one of the members of the combination were studied, again, adverse effects would not be identified.

As another example, an adverse health impact on one strain of rodent was shown for a combination of 50 Hz EMF and DMBA, while no adverse health impact was shown on another rodent strain for the same toxic stimuli combination [Fedrowitz et al, 2004]. From a higher-order combination perspective, if genetics are viewed conceptually as potentially equivalent to a toxic stimulus for combination purposes, then a synergistic three-constituent combination of 50 Hz EMF, DMBA, and genetics was required to elicit adverse health impacts in the above experiment. If these results can be extrapolated across species, then human beings could exhibit different responses to the same electromagnetic stimuli based on their genetic predispositions.

This particular experiment may be one of the most important conducted in wireless radiation toxicology. It shows that adverse effects from wireless radiation could depend on species/strain selection for the test subjects. This raises the question: which species or strain is most representative of human populations with respect to mirroring the adverse effects of wireless radiation. Is it rats; if so, is it Sprague-Dawley rats; if so, which strain of Sprague-Dawley rats? Or, are myriad strains of rats required to simulate effects on human populations with different genetic and other makeups? If not rats, is it dogs; if so, which species/strains of dogs. For setting regulatory exposure limits, should laboratory tests be conducted on a wide variety of species and strains, to determine which are the most representative of human responses to wireless radiation? Would the optimal species differ for different types of wireless radiation (e.g., high-frequency/low-frequency; high-power/low-power; pulsed/continuous, etc) and/or different types of other toxic stimuli?

The single stressor studies that constitute most of wireless radiation laboratory health research, and indeed constitute most of the laboratory medical research literature, essentially yield very narrow windows. Adverse effects are shown over very limited parameter ranges. As the above examples show, as well as the examples in Kostoff and Lau [2017] and Kostoff et al [2018], adverse effects shown by many combinations of stressors are not revealed when these stressors are tested in isolation over the same parametric ranges.

One could conclude that, whether by design or accident, ***the real-world impact of single stressor studies is to conceal, rather than reveal, many of the more serious adverse health effects of wireless radiation.***

The stressor variables to be used for health studies should not be limited to single stressors in isolation, but should include to the extent possible combinations of toxic stimuli stressors, since these combinations reflect more accurately real-life exposures.

- 2) Research quality could be poor, and adverse effects were overlooked.
- 3) Or, the research team could have had a preconceived agenda

***where finding no adverse effects from wireless radiation was the main objective of the research.***

## 2F2. The Role of Conflicts-of-Interest in Lack of Full Consensus

At this point, the reader would be well-advised to re-read [section 2A1](#) on conflicts-of-interest relative to wireless radiation health and safety studies.

These conflicts pollute the well of knowledge relevant to health and safety, and are the ***largest contributor to mis-informing the public about the serious adverse health and safety impacts from wireless radiation.***

For example, studies have shown that industry-funded research of wireless radiation adverse health effects is far more likely to show no effects than funding from non-industry sources [Huss et al, 2007; Slesin, 2006; Carpenter, 2019]. Studies in disciplines other than wireless radiation have shown that, for products of high military, commercial, and political sensitivity, ‘researchers’/organizations are hired to publish articles that conflict with the credible science (aka ‘product defense’ companies (<https://www.fastcompany.com/1139299/manufacturing-doubt-product-defense>), ‘hired guns’, etc), and therefore create doubt as to whether the product of interest is harmful [Michaels, 2008, 2020; Oreskes and Conway, 2011; Ong and Glantz, 2000; McGarity and Wagner, 2008; Walker, 2017].

Section 3.2.2 in a 2016 article on under-reporting of adverse effects of myriad substances in the biomedical literature [Kostoff, 2016] shows clearly the collusion of the USA government

and industry (and academia in some cases) in concealing harm of toxic substances (whose continued use is of importance to one or both organizations). These examples, and many others in the large USA government-industry candidate pool from which they were selected, show that

government-industry collusion to suppress adverse effects from technologies is endemic across technologies; ***it is not an aberration, but may be closer to the norm for technologies that are sensitive commercially, militarily, and politically.***

A comprehensive article in The New Yorker magazine (<https://www.newyorker.com/magazine/2014/02/10/a-valuable-reputation?verso=true>) details the travails that Prof. Tyrone Hays had to endure from industry in his quest to show that the herbicide Atrazine contributes to severe adverse effects. While the European Union banned the use of Atrazine almost two decades ago, the EPA has allowed its use to continue in the USA.

Finally, [Appendix 6](#) lists study references showing effects of industry funding on research outcomes for myriad research disciplines (mainly within biomedical). What these references don't show (for the most part) is how industry convinced the regulators to incorporate the results of these studies in setting the lax regulations we see in practice today [e.g., Kostoff, 2018a]. Given that the sponsor and performer incentives of those studies are no different from the sponsor-performer incentives of wireless radiation health effects studies, there is little reason for expecting less concealment of adverse effects in the wireless radiation studies. Given the magnitude of revenues at stake for wireless radiation technology implementation, there is much reason for expecting more concealment and/or neutralization of adverse effects in the wireless radiation studies!

### 2F3. Interpreting Wireless Radiation Health Study Findings

Wireless radiation can play two roles as a contributor to adverse health effects: **initiator** and/or **promoter/accelerator**. The **initiator** role is reflected by single stressor studies (EMF alone) that show adverse health effects. The **promoter/accelerator** role is reflected by 1) combination studies that show no adverse effects from any of the constituents when tested in isolation, but show adverse effects (synergies) when tested in combination or 2) accelerating emergence of serious diseases. There can also be **initiator and promoter/accelerator** roles shown by combination studies, where each constituent tested in isolation shows a modest adverse effect, but the combination shows a much larger (i.e., synergistic) effect [Kostoff and Lau, 2013, 2017; Kostoff et al, 2018; Kostoff, 2018b].

So, if a study shows an adverse health effect from wireless radiation, and if it passes the criteria for high quality research, then that specific adverse effect for the parameter range shown could be accepted as credible. If a study shows no adverse health effects from wireless radiation in a single stressor experiment, the study MAY reflect no **initiator** role *in the parameter window selected*, if the study is deemed to be of high research quality. However, such an experiment

offers little insight as to the **promoter/accelerator** role of the wireless radiation *in the parameter range selected*. The same would hold true for no adverse effects shown in combination experiments; there is no reason to believe that, even if wireless radiation serves as a promoter/accelerator for some combinations, it would therefore serve as a promoter/accelerator for all combinations.

In summary, the adverse effects of wireless radiation that result from credible high-quality studies published in the biomedical literature form the ‘floor’ for total adverse impacts of this wireless radiation. Given the insights of synergies from toxic stimuli combination studies evidenced in [Kostoff and Lau, 2013, 2017, Kostoff et al, 2018b, Juutilin, 2006, 2008], many more adverse impacts from wireless radiation can be expected if the parameter range of single stressor studies is expanded and the numbers of combination studies are greatly expanded.

Further, there is little doubt that the biological effects of wireless radiation studies that have been classified (by the organization promoting the expansion of this technology, the Federal government, for alleged ‘national security’ purposes) show substantially more harmful effects from this technology in real-life situations.

Even the Gold Standard for research credibility – **independent replication of research results** – is questionable in politically, commercially, and militarily sensitive areas like wireless radiation safety. Suppose there are two research groups (funded by the same government agency) who both arrive at the same conclusion that just coincidentally coincides with what the government sponsor wanted. Would this be considered independent? Or, these two research groups received funding from different agencies of the same government. Would that be considered independent? Or, these two research groups received funding from two different governments that both had the same accelerated development objectives for the technology of interest. Review articles tend to treat these types of cases as independent, and don’t make the distinction as long as the validation doesn’t arise from within the performer group/organization.

Given the broad support exhibited today by the USA Federal government, military, and industry for the rapid implementation of 5G (and, indeed, the governments of most, if not all, the major developed countries globally), all these organizations must present a united front in declaring 5G (and previous generations of mobile networking technology) to be safe. If one government lab, or one highly-funded performer, were to perform a credible real-life simulation of wireless radiation effects and show the potential damage that might result, then the

government’s and industry’s current fast-track effort to ***implement 5G before the full extent of the damage becomes known*** would be derailed.

**It is unrealistic that any government would allow this to happen!**

Even reporting of conflict-of-interest in wireless radiation research papers or evaluation panels leaves much to be desired. Currently, potential research performer conflicts of interest are identified by listing of funding sources in the published papers, or other formal documented evidence of conflicts of interest. However, there are many potential conflicts of interest that may not be as formal, but could be at least as influential as the formal conflicts in determining the outcome of the research or proposal. To ascertain these other less formal conflicts of interest would require vetting:

- 1) any elements of the researchers'/evaluators' investment portfolio that would profit from operation and expansion of the mobile telecommunications network, including impacts on related industries;
- 2) any elements of their present business endeavors that would profit from operation and expansion of this network, including impacts on related industries;
- 3) any elements of present or future pensions that would profit from operation and expansion of this network, including impacts on related industries;
- 4) any proposals or future employment offers in the pipeline or being considered that would profit from operation and expansion of this network, including impacts on related industries;
- 5) any other conflicts of interest by which they could profit from operation and expansion of the mobile telecommunications network, including impacts on related industries.

## **2G. Conclusions**

Wireless radiation offers the promise of improved 1) remote sensing, 2) communications and data transfer, and 3) connectivity. Unfortunately, there is a large body of data from laboratory and epidemiological studies showing that previous generations of wireless networking technology have significant adverse health impacts. Much of this data was obtained under conditions not reflective of the real-world. When real-world considerations are added, such as 1) including the information content of signals along with the carrier frequencies, and 2) including other toxic stimuli in combination with the wireless radiation, **the adverse effects are increased substantially**. Superimposing 5G mobile networking technology on an imbedded toxic wireless radiation environment (4G, 3G, etc) will exacerbate the myriad adverse health effects already shown to exist. Far more research and testing of potential 5G health effects is required before further rollout can be justified. Without this additional testing and demonstrated safety of potential 5G health effects, we will be even further along in **The Largest Unethical Medical Experiment in Human History!**



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## Chapter 4 – Appendices

### **Appendix 1 – Unethical Medical Experiments**

#### A1-A. Overview

The biomedical literature reflects much good research. However, the world today is also awash in unethical medical experiments. There are two major types. The first type is classical unethical medical experiments, where test subjects are explicitly/proactively selected for experiments on biological effects of drugs or potentially harmful substances, and participate in these experiments without having given ‘informed consent’. The second type may be far more prevalent. Here, potentially harmful substances are introduced into commercial, military, or other government practice without adequate demonstration of safety. Then, test subjects are implicitly/reactively selected ‘a posteriori’ to participate in these de facto experiments, again without having given informed consent. These latter studies are usually epidemiological studies.

In parallel with the burgeoning conduct of unethical medical experiments is production of a literature that addresses the ethics of, and in many cases bemoans the prevalence and conduct of, these myriad unethical medical experiments. The experiments and the accompanying ethics literature form a symbiosis, where the literature feeds off the experiments, and the experiments spawn an additional literature. It is not clear how much, if any, impact the ethics literature has had/does have/will have on the conduct of the unethical medical experiments, especially those unethical medical experiments of the second type defined above.

[Appendix 1A](#) provides a few examples of mainly classical unethical medical experiments, and [Appendix 1B](#) provides a few references that reflect the medical experiment ethics literature.

## Appendix 1A – Unethical Medical Experiments - Examples

This Sub-Appendix provides examples of unethical medical experiments, conducted mainly 1) over the last 100 years and 2) within the USA or under its auspices. The list is not exhaustive, since an abbreviated search approach was used, covering both Medline and the Web. Some of the more useful Web sources of information are shown in the following table:

[https://en.wikipedia.org/wiki/Unethical\\_human\\_experimentation;](https://en.wikipedia.org/wiki/Unethical_human_experimentation;)  
[https://en.wikipedia.org/wiki/Human\\_subject\\_research;](https://en.wikipedia.org/wiki/Human_subject_research;)  
[https://en.wikipedia.org/wiki/Unethical\\_human\\_experimentation\\_in\\_the\\_United\\_States;](https://en.wikipedia.org/wiki/Unethical_human_experimentation_in_the_United_States;)  
[https://en.wikipedia.org/wiki/Medical\\_torture;](https://en.wikipedia.org/wiki/Medical_torture;)  
[https://abuse.wikia.org/wiki/Unethical\\_human\\_experimentation\\_in\\_the\\_United\\_States;](https://abuse.wikia.org/wiki/Unethical_human_experimentation_in_the_United_States;)  
[https://www.amazon.com/s?k=human+experimentation&i=stripbooks&page=2&gclid=Cj0KCQiA89zvBRDoARIsAOIePbBy8acwX6tfMZcGkZyi UTov17 PxcFYDAGDWiAgHVc7anOyx57slaAgtNEALw wCB&hvadid=241915884190&hvdev=c&hvlocphy=9007578&hvnetw=g&hvpos=2o1&hvqmt=b&hvrand=1261052967636955269&hvtargid=kwd-1053626641&hydadcr=22561\\_10346245&qid=1576539483&ref=sr\\_pg\\_2;](https://www.amazon.com/s?k=human+experimentation&i=stripbooks&page=2&gclid=Cj0KCQiA89zvBRDoARIsAOIePbBy8acwX6tfMZcGkZyi UTov17 PxcFYDAGDWiAgHVc7anOyx57slaAgtNEALw wCB&hvadid=241915884190&hvdev=c&hvlocphy=9007578&hvnetw=g&hvpos=2o1&hvqmt=b&hvrand=1261052967636955269&hvtargid=kwd-1053626641&hydadcr=22561_10346245&qid=1576539483&ref=sr_pg_2;)  
[https://www.bibliotecapleyades.net/ciencia/ciencia\\_industryweapons173.htm.](https://www.bibliotecapleyades.net/ciencia/ciencia_industryweapons173.htm)

It should be noted that information of this type is not easy to obtain. The research performers and their sponsors are not motivated to reveal such odious experiments to any oversight organizations, and therefore tend to conceal these experiments to the largest extent possible. There are three main routes by which this information eventually gets to the public: whistle-blowers; discovery in legal lawsuits; inadvertent access by researchers examining other topics. While we don't know the extent of these types of experiments that have not been reported, it is probably a good assumption that there are huge numbers.

Following are some of the books and journal/magazine articles that describe these experiments. It is by no means a complete list, and the interested reader would be well-advised to read the articles with the Web links provided in the box.

### **Examples of Unethical Medical Experiments**

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## **Appendix 2 – Manual Taxonomy of Adverse EMF Health Effects Database**

### **A2-A. Category Themes**

A query to retrieve Medline records showing adverse health effects of wireless radiation was generated. The query was entered into the Medline search engine, and ~15,000 records were retrieved. Filtering was applied to the retrieval to remove records not associated with adverse health effects of wireless radiation, and 5311 records remained. Thousands of the highest frequency title and abstract phrases were read, the categories from the factor analysis and text clustering approaches of [Appendices 3](#) and [4](#) were evaluated, and a manual taxonomy of main categories in the database was generated. The ~10,000 highest frequency abstract phrases were visually inspected, and assigned to the appropriate categories in the taxonomy.

The following table ([A2-1](#)) shows the categories in the taxonomy, and the phrases associated with each category. For each category, the records associated with the phrases identified were highlighted, and the titles of those records were extracted. Following the table, each category and representative record titles are shown in order to display the breadth of coverage of the category.

In the process of selecting the record titles to represent the category's theme, a second level of filtering was done (visual inspection). Strong emphasis was placed on 1) records associated with microwave frequencies; 2) exposures not exceeding FCC and ICNIRP-based limits; 3) records that clearly showed adverse effects. This meant that ***large numbers of records showing adverse health effects from especially i) power/ELF frequencies and ii) high microwave power exposures that had both thermal and athermal effects were not shown.***

In the latter case (high microwave power exposures), where thermal effects exist, the assumption is usually made that any adverse effects shown are due to thermal effects. This may or may not be correct. Adverse effects could be due to thermal effects, they could be due to higher radiation intensity athermal effects, or they could be due to some (potentially synergistic) combination of thermal and athermal effects. In the record selection process, I used the conservative approach of not selecting records where the radiation flux was associated with increased temperatures.

The categories are not orthogonal; there is some overlap, especially among categories that cover different levels of detail (e.g., cancer-genotoxicity, reproduction-biomarkers, etc). Therefore, some representative record titles may appear in more than one category.

The major adverse effects are listed in the first column (Category), and the phrases associated with the theme are listed in the second column (Key Phrases). These adverse effects are self-explanatory. Each category in the taxonomy is hyper-linked to its respective record titles. To obtain the full record, insert title into Pubmed, or similar Medline search engine.

**Table A2-1 – Manual Taxonomy**

<b>CATEGORY</b>	<b>KEY PHRASES</b>
<b><u>Cancer/Tumors</u></b>	cancer, leukemia, cancers, carcinogenic, breast cancer, malignant, leukaemia, cancer risk, glioma, brain cancer, carcinogenesis, brain tumours, lymphoma, carcinogen, childhood cancer, childhood leukaemia, carcinoma, brain tumor, cancer incidence, carcinogenicity, lymphoblastic, acute lymphoblastic, melanoma, gliomas, neoplasms, acute lymphoblastic leukemia, breast cancer risk, carcinogens, lymphoblastic leukemia, neoplastic, glioblastoma, leukemia risk, malignancy, leukemias, malignancies, neuroblastoma, cancer risks, lung cancer, childhood cancers, lymphomas, astrocytoma, malignant brain, Acute leukemia, mammary gland, brain cancers, glioma risk, Malignant melanoma, malignant neoplasms, neoplasia, hyperplasia, myeloid leukemia, carcinomas, neuroblastoma cells, testicular cancer, leukaemias, neoplasm, mammary cancer, myeloma, nervous system cancers, adenocarcinoma, cocarcinogenic, colorectal, glioblastoma multiforme, Hodgkin's disease, multiple myeloma, non-Hodgkin's lymphoma, seminoma, breast carcinoma, colon cancer, glioma meningioma, larynx, neoplastic transformation, Non-Hodgkin lymphoma, tumor, tumors, tumours, brain tumors, tumour, neuroma, acoustic neuroma, meningioma, brain tumour, tumor risk, tumor growth, tumor incidence, mammary tumors, tumor promotion, intracranial tumors, tumor promoter, gland tumors, meningiomas, tumorigenesis, tumour risk, benign tumors, nervous system tumors, neuromas, acoustic neuromas, breast tumors, gland tumours, parotid gland tumors, tumor-promoting
<b><u>Neurodegenerative</u></b>	memory, cognitive, central nervous system, learning, neurodegenerative, Alzheimer's, learning and memory, Alzheimer's disease, cognition, amyotrophic lateral sclerosis, neurodegenerative diseases, cognitive function, cognitive functions, neurobehavioral, dementia, spatial learning, acetylcholine, Parkinson's disease, epilepsy, Glial fibrillary, motor activity, multiple sclerosis, cognitive impairment, spatial learning and memory, neurodegenerative disease, neuronal damage, Alzheimer disease, cognitive effects, seizure, seizures, autism, cognitive functioning, cognitive processing, memory function, memory impairment, memory loss, neurological diseases, neuronal excitability, cognitive dysfunction, memory deficit, memory functions, neurocognitive, neuronal degeneration, spatial working memory
<b><u>Reproduction</u></b>	pregnancy, reproductive, pregnant, sperm, embryos, testicular, fertility, embryo, testis, embryonic, fetuses, testosterone, motility, infertility, reproduction, testes, semen, spermatozoa,

	spermatogenesis, reproductive system, sperm motility, male fertility, sperm count, embryogenesis, abortion, male reproductive, spermatogenic, embryonic development, mating, male infertility, birth defects, serum testosterone, adverse reproductive, miscarriage, reproductive organs, semen parameters, sperm concentration, sperm parameters, testicular function, testosterone level, epididymis, male reproductive system, spermatogenic cells, spermatogonia, fertilized eggs, ovaries, reproductive capacity, reproductive outcomes, sperm cells, sperm morphology, fertile, pregnancies, reproductive function, testicular tissue, rat testes, rat testis, reproductive functions, reproductive systems, sperm DNA, spermatogonial, testis tissue, embryogeny, reproductive health, sperm cell, miscarriages, offsprings, oocyte, oogenesis, preterm birth, seminal vesicles, Sperm head, spermatids, sperms, testicles, fetal loss, genital, gonads, reproductive hormones, semen analysis
<b><u>Genotoxicity</u></b>	DNA damage, genotoxic, micronuclei, chromosomal, micronucleus, chromosome, genotoxicity, genotoxic effects, mutagenic, strand breaks, chromatin, mutation, DNA strand, Chromatid, mutations, chromosome aberrations, chromosomes, DNA fragmentation, double-strand, chromosomal aberrations, DNA repair, DNA strand breaks, micronucleus (MN), genetic damage, micronuclei (MN), Sister Chromatid, genome, blood leukocytes, double-strand breaks, oxidative DNA, chromosomal damage, DNA synthesis, mutant, cellular stress, chromosome aberration, oxidative DNA damage, Purkinje cells, DNA breaks, cell cycle arrest, clastogenic, genotoxic potential, keratinocytes, micronucleated, single strand, cell division, chromatid exchange, Chromatid Exchanges, genetic material, micronucleus test, Mutagenesis, cell cycle progression, cellular DNA, Cytochrome c, double strand, genetic effects, genomic instability, micronucleus frequency, DNA single-strand, DNA-damaging, Mutagen, mutagenicity, single strand breaks, chromatin condensation, chromosomal aberration, double-strand breaks (DSBs), strand breakage, cell cycle distribution, cell DNA, genetically, strand DNA
<b><u>Cardiovascular</u></b>	Cardiac, cardiovascular, pacemaker, pacemakers, implanted, blood pressure, implantable, vascular, heart rate variability, myocardial, heart rate variability (HRV), implants, cardiac pacemakers, implantation, defibrillators, implant, cardioverter, myocardium, cardiovascular system, implantable cardioverter, Cardiovascular disease, defibrillator, fibrillation, arrhythmia, arterial blood pressure, autonomic nervous system, cardioverter defibrillators, implanted pacemakers, cardiac pacemaker, hypertension, arrhythmias, cardioverter-defibrillators, implantable cardioverter defibrillators, implantable cardioverter-defibrillators, pacemaker function, heart disease, implanted cardiac, tachycardia, cardiac devices, circulatory system, microcirculation, blood vessels,

	cardiomyocytes, cardiovascular effects, vascular permeability, atherosclerosis, cardiovascular diseases, ventricular fibrillation, arterial pressure, Atrial fibrillation, cardiac output, cardiovascular function, Implantable cardioverter defibrillator (ICD), implantable devices, arrhythmic, carotid artery, pacemaker dysfunction, pacemaker malfunction
<b><u>Immunity</u></b>	lymphocytes, immune, lymphocyte, immune system, immunity, blood lymphocytes, leukocytes, antibodies, immune response, human lymphocytes, antibody, peripheral blood lymphocytes, immunological, leukocyte, neutrophils, lymphocytic, immune functions, immunoreactivity, autoimmune, immunization, monocytes, neutrophil, antigens, macrophage, immune parameters, immune responses, immunocompetent, natural killer cells, spleen lymphocytes, immunologic, immunoreactive, micronucleated cells, monoclonal antibodies, spleen cells, splenocytes, T lymphocytes, antibody production, antibody-forming, monoclonal antibody
<b><u>Biomarkers</u></b>	apoptosis, oxidative stress, Malondialdehyde, reactive oxygen species, apoptotic, superoxide dismutase, lipid peroxidation, permeability, catalase, MDA, ROS, ROS), reactive oxygen species (ROS), Malondialdehyde (MDA), SOD), cell death, glutathione peroxidase, inflammatory, erythrocytes, oxidative damage, SOD, caspase-3, free radical, nitric oxide, free radicals, biomarkers, bcl-2, catalase (CAT), inflammation, corticosterone, edema, glutathione peroxidase (GSH-Px), cytokine, cytokines, alkaline phosphatase, cell apoptosis, protein kinase, ATP, glutathione (GSH), oxidation, TNF-alpha, Bax, Ca <sup>2+</sup> , estrogen, ornithine decarboxylase, red blood cells, intracellular calcium, cell damage, apoptotic cell, hemoglobin, lactate dehydrogenase, cerebral blood flow, glutamate, hydrogen peroxide, IL-1beta, Purkinje, serotonin, apoptotic cell death, barrier permeability, carbonyl, hormone levels, ornithine decarboxylase (ODC), acetylcholinesterase, calcium ion, Calcium ions, endothelial cells, GABA, MDA levels, ODC, xanthine oxidase, creatinine, intracellular ROS, cholinesterase, lipid peroxidation levels, pro-inflammatory, protein kinase C, adrenocorticotrophic hormone, alanine aminotransferase, aspartate aminotransferase, caspase 3, caspase-9, catalase activity, glutathione levels, NF-kappaB, atrophy, nitric oxide synthase, cAMP, acid phosphatase, adenosine deaminase, adrenocorticotrophic hormone (ACTH), blood cell count, blood platelets, Ca <sup>++</sup> , adrenaline, C-reactive protein, oxidative damages, Reactive Oxygen Species), vascular endothelial growth factor
<b><u>Sensory Disorders</u></b>	auditory, acoustic, ear, hypersensitivity, EHS), EHS, electromagnetic hypersensitivity, otoacoustic, vestibular, hypersensitive, cataract, cochlea, auditory system, inner ear, lens epithelial, corneal, tinnitus, vision, lenses, otoacoustic emissions, hearing loss, otoacoustic emission, epidermis, rabbit lens,

	dermatitis, auditory stimuli, cataractogenic, Auditory brainstem response (ABR), auditory evoked, electrohypersensitive, electrosensitivity, vestibular system, cochlear implants, dermatological, hearing function, hearing thresholds, pain sensitivity, pain threshold, skin complaints
<b><u>Discomfort Symptoms</u></b>	depression, anxiety, headache, headaches, dizziness, depressed, depressive, vertigo, cataracts, behavioral effects, nausea, headache dizziness, low back pain, behavioural effects,
<b><u>Congenital Abnormalities</u></b>	malformations, teratogenic, congenital, congenital malformations, teratogenicity, malformation, teratogens, teratologic, cleft palate, congenital anomalies, malformed, teratological
<b><u>Circadian Rhythm and Melatonin</u></b>	melatonin, sleep, circadian, melatonin production, sleep disturbances, insomnia, melatonin levels, melatonin secretion, sleep disorders, sleep EEG, poor sleep, pineal function
<b><u>Chronic Conditions</u></b>	metabolism, metabolic, glucose, endocrine, cholesterol, Diabetes, calcium homeostasis, glucose levels, homeostatic, metabolic activity, metabolic heat production, Diabetes Mellitus, diabetic, glucose metabolism, obesity

All the records shown in this Appendix, and their relevant citing papers, were analyzed further for most frequent keywords relating to serious symptoms/disease. In order of frequency, they are: oxidative stress; Apoptosis; DNA damage; melatonin; Reactive oxygen species; glioma; Testis; cancer; liver; Malondialdehyde; Brain cancer; testosterone; Anxiety; Depression; Lipid peroxidation; ROS; Chromosomal aberrations; Learning and memory; oxidative damage; sperm; testes; Infertility; spermatogenesis; Breast cancer; Cell cycle; Genotoxicity; Kidney; Leukemia; Male infertility; micronuclei; Pregnancy; Sleep; sperm motility; acoustic neuroma; carcinogenesis; carcinogenicity; Cognitive function; fertility; Heart rate variability; Micronucleus; Reproduction; Spatial memory; Stress; Alzheimer's disease; astrocytoma; Autophagy; Cognition; Cytotoxicity; free radicals.

These match well with the prior results shown for this strongly filtered database.

A2-B. Category Record Titles**CANCER/TUMORS**

Keywords – cancer, leukemia, cancers, carcinogenic, breast cancer, malignant, leukaemia, cancer risk, glioma, brain cancer, carcinogenesis, brain tumours, lymphoma, carcinogen, childhood cancer, childhood leukaemia, carcinoma, brain tumor, cancer incidence, carcinogenicity, lymphoblastic, acute lymphoblastic, melanoma, gliomas, neoplasms, acute lymphoblastic leukemia, breast cancer risk, carcinogens, lymphoblastic leukemia, neoplastic, glioblastoma, leukemia risk, malignancy, leukemias, malignancies, neuroblastoma, cancer risks, lung cancer, childhood cancers, lymphomas, astrocytoma, malignant brain, Acute leukemia, mammary gland, brain cancers, glioma risk, Malignant melanoma, malignant neoplasms, neoplasia, hyperplasia, myeloid leukemia, carcinomas, neuroblastoma cells, testicular cancer, leukaemias, neoplasm, mammary cancer, myeloma, nervous system cancers, adenocarcinoma, cocarcinogenic, colorectal, glioblastoma multiforme, Hodgkin's disease, multiple myeloma, non-Hodgkin's lymphoma, seminoma, breast carcinoma, colon cancer, glioma meningioma, larynx, neoplastic transformation, Non-Hodgkin lymphoma, tumor, tumors, tumours, brain tumors, tumour, neuroma, acoustic neuroma, meningioma, brain tumour, tumor risk, tumor growth, tumor incidence, mammary tumors, tumor promotion, intracranial tumors, tumor promoter, gland tumors, meningiomas, tumorigenesis, tumour risk, benign tumors, nervous system tumors, neuromas, acoustic neuromas, breast tumors, gland tumours, parotid gland tumors, tumor-promoting

**Titles**

2.45-Gz wireless devices induce oxidative stress and proliferation through cytosolic Ca(2)(+) influx in human leukemia cancer cells.

A case-case study of mobile phone use and acoustic neuroma risk in Japan.

A cluster of male breast cancer in office workers.

A cross-sectional case control study on genetic damage in individuals residing in the vicinity of a mobile phone base station.

A new electromagnetic exposure metric: high frequency voltage transients associated with increased cancer incidence in teachers in a California school.

A population-based case-control study of radiofrequency exposure in relation to childhood neoplasm.

Acceleration of the development of benzopyrene-induced skin cancer in mice by microwave radiation.

Adult and childhood leukemia near a high-power radio station in Rome, Italy.

Association between exposure to pulsed electromagnetic fields and cancer in electric utility workers in Quebec, Canada, and France.

Association between number of cell phone contracts and brain tumor incidence in nineteen U.S. States.

Association between radiation from mobile phones and tumour risk in adults].

Association between vestibular schwannomas and mobile phone use.

Biological effects from electromagnetic field exposure and public exposure standards.

Brain cancer and occupational exposure to magnetic fields among men: results from a Canadian population-based case-control study.

Cancer in radar technicians exposed to radiofrequency/microwave radiation: sentinel episodes.

Cancer incidence and mortality and proximity to TV towers.

Cancer incidence near radio and television transmitters in Great Britain. I. Sutton Coldfield transmitter.

Cancer incidence vs. FM radio transmitter density.

Cancer morbidity in subjects occupationally exposed to high frequency (radiofrequency and microwave) electromagnetic radiation.

Cancer versus FM radio polarization types.

Case-control study of the association between malignant brain tumours diagnosed between 2007 and 2009 and mobile and cordless phone use.

Case-control study on the use of cellular and cordless phones and the risk for malignant brain tumours.

Causes of death among Belgian professional military radar operators: a 37-year retrospective cohort study.

Cell phone radiation exposure on brain and associated biological systems.

Cell phone use and acoustic neuroma: the need for standardized questionnaires and access to industry data.

Cell phone use and risk of thyroid cancer: a population-based case-control study in Connecticut.

Cell phones and brain tumors: a review including the long-term epidemiologic data.

Cellular and cordless telephone use and the association with brain tumors in different age groups.

Cellular and cordless telephones and the risk for brain tumours.

Cellular neoplastic transformation induced by 916 MHz microwave radiation.

Cellular phone use and risk of benign and malignant parotid gland tumors--a nationwide case-control study.



Cellular telephones and their relay stations: a health risk?].

Commentary on the utility of the National Toxicology Program study on cell phone radiofrequency radiation data for assessing human health risks despite unfounded criticisms aimed at minimizing the findings of adverse health effects.

Connection between Cell Phone use, p53 Gene Expression in Different Zones of Glioblastoma Multiforme and Survival Prognoses.

Current Understanding of the Health Effects of Electromagnetic Fields.

Danger of cellular telephones and their relay stations].

Decreased survival for childhood leukemia in proximity to television towers.

Decreased survival of glioma patients with astrocytoma grade IV (glioblastoma multiforme) associated with long-term use of mobile and cordless phones.

Delayed biological effect of electromagnetic fields action].

Determining health policy for sensible mobile phone use--current world status].

Dirty electricity, chronic stress, neurotransmitters and disease.

Does cell phone use increase the chances of parotid gland tumor development? A systematic review and meta-analysis.

Ecological study on residences in the vicinity of AM radio broadcasting towers and cancer death: preliminary observations in Korea.

Effect of cell-phone radiofrequency on angiogenesis and cell invasion in human head and neck cancer cells.

Effect of Exposure to 900 MHz GSM Mobile Phone Radiofrequency Radiation on Estrogen Receptor Methylation Status in Colon Cells of Male Sprague Dawley Rats.

Effect of Mobile Phone-Induced Electromagnetic Field on Brain Hemodynamics and Human Stem Cell Functioning: Possible Mechanistic Link to Cancer Risk and Early Diagnostic Value of Electronphotonic Imaging.

Effects of Mobile Phones on Children's and Adolescents' Health: A Commentary.

Effects of the microwave radiation from the cellular phones on humans and animals].

Electromagnetic field exposure and male breast cancer risk: a meta-analysis of 18 studies.

Electromagnetic field exposures and childhood cancers in New Zealand.

Electromagnetic field induced biological effects in humans.

Electromagnetic fields and cancer: the cost of doing nothing.

Enzymatic alterations in developing rat brain cells exposed to a low-intensity 16.5 GHz microwave radiation.

Epidemiologic evidence relevant to radar (microwave) effects.

Epidemiological evidence for a health risk from mobile phone base stations.

EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses.

Evaluation of genotoxic effects in male Wistar rats following microwave exposure.

Evaluation of health risks caused by radio frequency accelerated carcinogenesis: the importance of processes driven by the calcium ion signal.

Evaluation of Mobile Phone and Cordless Phone Use and Glioma Risk Using the Bradford Hill Viewpoints from 1965 on Association or Causation.

Evaluation of the cytogenotoxic damage in immature and mature rats exposed to 900 MHz radiofrequency electromagnetic fields.

Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure.

Evidence for microwave carcinogenesis in vitro.

Exposure to low-intensive superhigh frequency electromagnetic field as a factor of carcinogenesis in experimental animals.

Follow-up of radio and telegraph operators with exposure to electromagnetic fields and risk of breast cancer.

Further aspects on cellular and cordless telephones and brain tumours.

Genotoxic and carcinogenic effects of non-ionizing electromagnetic fields.

Human disease resulting from exposure to electromagnetic fields.

Incidence of cancer in the vicinity of Korean AM radio transmitters.

Incidence of Seminoma Cancer in Staffs that Worked in Electromagnetic Waves Station; Three Cases Report.

Increased incidence of cancer in a cohort of office workers exposed to strong magnetic fields.

Increased mortality in amateur radio operators due to lymphatic and hematopoietic malignancies.

Indication of cocarcinogenic potential of chronic UMTS-modulated radiofrequency exposure in an ethylnitrosourea mouse model.

Inferring the 1985-2014 impact of mobile phone use on selected brain cancer subtypes using Bayesian structural time series and synthetic controls.

Investigation of increased incidence in childhood leukemia near radio towers in Hawaii: preliminary observations.

Leukemia mortality and incidence of infantile leukemia near the Vatican Radio Station of Rome].

Long-term exposure to microwave radiation provokes cancer growth: evidences from radars and mobile communication systems.

Long-term use of cellular phones and brain tumours: increased risk associated with use for  $\geq 10$  years.

Melanoma incidence and frequency modulation (FM) broadcasting.

Melatonin and a spin-trap compound block radiofrequency electromagnetic radiation-induced DNA strand breaks in rat brain cells.

Meta-analysis of association between mobile phone use and glioma risk.

Meta-analysis of long-term mobile phone use and the association with brain tumours.

Microwaves from Mobile Phones Inhibit 53BP1 Focus Formation in Human Stem Cells More Strongly Than in Differentiated Cells: Possible Mechanistic Link to Cancer Risk.

Mitochondrial DNA damage and oxidative damage in HL-60 cells exposed to 900MHz radiofrequency fields.

Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen (2A) (review).

Mobile phone use and brain tumours in the CERENAT case-control study.

Mobile phone use and glioma risk: A systematic review and meta-analysis.

Mobile phone use and location of glioma: a case-case analysis.

Mobile phone use and risk for intracranial tumors and salivary gland tumors - A meta-analysis.

Mobile phone use and risk of brain tumours: a systematic review of association between study quality, source of funding, and research outcomes.

Mobile phone use and risk of tumors: a meta-analysis.

Mobile phone use and the risk for malignant brain tumors: a case-control study on deceased cases and controls.

Mobile phone use and the risk of acoustic neuroma.

Mobile Phone Use and the Risk of Parotid Gland Tumors: A Retrospective Case-Control Study.

Mobile phones and head tumours. The discrepancies in cause-effect relationships in the epidemiological studies - how do they arise?

Mobile phones and head tumours: it is time to read and highlight data in a proper way].

Mobile phones, cordless phones and the risk for brain tumours.

Mobile phones: time to rethink and limit usage.

Mobile telephones and cancer--a review of epidemiological evidence.

Modulation of wireless (2.45 GHz)-induced oxidative toxicity in laryngotracheal mucosa of rat by melatonin.

Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil.

Mutagenic response of 2.45 GHz radiation exposure on rat brain.

Neoplastic transformation of C3H/10T1/2 cells following exposure to 120-Hz modulated 2.45-GHz microwaves and phorbol ester tumor promoter.

Neuroblastoma and paternal occupation. A case-control analysis.

New Zealand adolescents' cellphone and cordless phone user-habits: are they at increased risk of brain tumours already? A cross-sectional study.

Non-thermal activation of the hsp27/p38MAPK stress pathway by mobile phone radiation in human endothelial cells: molecular mechanism for cancer- and blood-brain barrier-related effects.

Occupational exposure to high-frequency electromagnetic fields and brain tumor risk in the INTEROCC study: An individualized assessment approach.

Occupational exposures and brain cancer mortality: a preliminary study of east Texas residents.

Overproduction of free radical species in embryonal cells exposed to low intensity radiofrequency radiation.

Oxidative and mutagenic effects of low intensity GSM 1800 MHz microwave radiation.

Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation.

Parental occupational exposures to electromagnetic fields and radiation and the incidence of neuroblastoma in offspring.

Pooled analysis of case-control studies on acoustic neuroma diagnosed 1997-2003 and 2007-2009 and use of mobile and cordless phones.

Pooled analysis of case-control studies on malignant brain tumours and the use of mobile and cordless phones including living and deceased subjects.

Pooled analysis of Swedish case-control studies during 1997-2003 and 2007-2009 on meningioma risk associated with the use of mobile and cordless phones.

Power-frequency magnetic fields and childhood brain tumors: a case-control study in Japan.

Probabilistic Multiple-Bias Modeling Applied to the Canadian Data From the Interphone Study of Mobile Phone Use and Risk of Glioma, Meningioma, Acoustic Neuroma, and Parotid Gland Tumors.

Proteomic analysis of continuous 900-MHz radiofrequency electromagnetic field exposure in testicular tissue: a rat model of human cell phone exposure.

Radio frequency radiation-related cancer: assessing causation in the occupational/military setting.

Radio-frequency radiation exposure from AM radio transmitters and childhood leukemia and brain cancer.

Radiofrequency-induced carcinogenesis: cellular calcium homeostasis changes as a triggering factor.

Real versus Simulated Mobile Phone Exposures in Experimental Studies.

Real-world cell phone radiofrequency electromagnetic field exposures.

Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8GHz GSM base station environmental emission.

Risk of brain tumours in relation to estimated RF dose from mobile phones: results from five Interphone countries.

Risks of carcinogenesis from electromagnetic radiation of mobile telephony devices.

Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices.

Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts at non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action.

Selenium reduces mobile phone (900 MHz)-induced oxidative stress, mitochondrial function, and apoptosis in breast cancer cells.

Setting prudent public health policy for electromagnetic field exposures.

Simulation of the incidence of malignant brain tumors in birth cohorts that started using mobile phones when they first became popular in Japan.

Synergism between sinusoidal-50Hz magnetic field and formaldehyde in triggering carcinogenic effects in male Sprague-Dawley rats.

Terahertz radiation increases genomic instability in human lymphocytes.

The effect of electromagnetic radiation on the rat brain: an experimental study.

The electromagnetic fields of cellular phones and the health of children and of teenagers (the situation requiring to take an urgent measure)].

The Intracranial Distribution of Gliomas in Relation to Exposure From Mobile Phones: Analyses From the INTERPHONE Study.

The possible role of radiofrequency radiation in the development of uveal melanoma.

The probability of developing brain tumours among users of cellular telephones (scientific information to the decision of the International Agency for Research on Cancer (IARC) announced on May 31, 2011)].

Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective.

Towards 5G communication systems: Are there health implications?

Use of cellular or cordless telephones and the risk for non-Hodgkin's lymphoma.

Use of cellular telephones and brain tumour risk in urban and rural areas.

Use of electric bedding devices and risk of breast cancer in African-American women.

Use of electric blankets and association with prevalence of endometrial cancer.

Use of mobile and cordless phones and survival of patients with glioma.

Using the Hill viewpoints from 1965 for evaluating strengths of evidence of the risk for brain tumors associated with use of mobile and cordless phones.

Wi-Fi technology--an uncontrolled global experiment on the health of mankind.

Wireless Phone Use and Risk of Adult Glioma: Evidence from a Meta-Analysis.

X-rays, microwaves and vinyl chloride monomer: their clastogenic and aneugenic activity, using the micronucleus assay on human lymphocytes.

## NEURODEGENERATIVE

Keywords – memory, cognitive, central nervous system, learning, neurodegenerative, Alzheimer's, learning and memory, Alzheimer's disease, cognition, amyotrophic lateral sclerosis, neurodegenerative diseases, cognitive function, cognitive functions, neurobehavioral, dementia, spatial learning, acetylcholine, Parkinson's disease, epilepsy, Glial fibrillary, motor activity, multiple sclerosis, cognitive impairment, spatial learning and memory, neurodegenerative disease, neuronal damage, Alzheimer disease, cognitive effects, seizure, seizures, autism, cognitive functioning, cognitive processing, memory function, memory impairment, memory loss, neurological diseases, neuronal excitability, cognitive dysfunction, memory deficit, memory functions, neurocognitive, neuronal degeneration, spatial working memory

### **Titles**

2.45 GHz Microwave Radiation Impairs Learning and Spatial Memory via Oxidative/Nitrosative Stress Induced p53-Dependent/Independent Hippocampal Apoptosis: Molecular Basis and Underlying Mechanism.

A case-control study on the risk factors of Alzheimer's disease in military elderly men].

A cross-sectional case control study on genetic damage in individuals residing in the vicinity of a mobile phone base station.

A meta-analysis for neurobehavioural effects due to electromagnetic field exposure emitted by GSM mobile phones.

A possible association between fetal/neonatal exposure to radiofrequency electromagnetic radiation and the increased incidence of autism spectrum disorders (ASD).

Activity and expression of acetylcholinesterase in PC12 cells exposed to intermittent 1.8 GHz 217-GSM mobile phone signal.

Acute exposure to GSM 900-MHz electromagnetic fields induces glial reactivity and biochemical modifications in the rat brain.

Acute exposure to pulsed 2450-MHz microwaves affects water-maze performance of rats.

Adverse effects of excessive mobile phone use.

Alteration of adaptive behaviors of progeny after maternal mobile phone exposure.

Alterations of cognitive function and 5-HT system in rats after long term microwave exposure.

Altered cortical excitability in subjectively electrosensitive patients: results of a pilot study.

Amyotrophic lateral sclerosis and occupational exposure to electromagnetic fields.

Amyotrophic Lateral Sclerosis and Occupational Exposures: A Systematic Literature Review and Meta-Analyses.

Assessment of auditory evoked potential in long-term mobile phone users.

Behavioral Abnormality along with NMDAR-related CREB Suppression in Rat Hippocampus after Shortwave Exposure.

Behavioral evaluation of microwave irradiation.

Biochemical modifications and neuronal damage in brain of young and adult rats after long-term exposure to mobile phone radiations.

Biological effects from electromagnetic field exposure and public exposure standards.

Blood-brain barrier permeability and nerve cell damage in rat brain 14 and 28 days after exposure to microwaves from GSM mobile phones.

Calcium-binding proteins and GFAP immunoreactivity alterations in murine hippocampus after 1 month of exposure to 835 MHz radiofrequency at SAR values of 1.6 and 4.0 W/kg.

Cell phone radiation exposure on brain and associated biological systems.

Cognitive and neurobiological alterations in electromagnetic hypersensitive patients: results of a case-control study.

Cognitive impairment and neurogenotoxic effects in rats exposed to low-intensity microwave radiation.

Cognitive impairment in rats after long-term exposure to GSM-900 mobile phone radiation.

Controversies on electromagnetic field exposure and the nervous systems of children.

Could myelin damage from radiofrequency electromagnetic field exposure help explain the functional impairment electrohypersensitivity? A review of the evidence.

Cumulated biological effects of microwaves and their reflection in behavior, work capacity, growth of body mass and state of brain neurons].

Dataset on significant role of Candesartan on cognitive functions in rats having memory impairment induced by electromagnetic waves.

Effect of electromagnetic fields emitted by cellular phones on the latency of evoked electrodermal activity.

Effect of electromagnetic radiation on discharge activity of neurons in the hippocampus CA1 in rats].

Effect of low level microwave radiation exposure on cognitive function and oxidative stress in rats.

Effect of Low Level Subchronic Microwave Radiation on Rat Brain.

Effect of Low-Intensity Microwave Radiation on Monoamine Neurotransmitters and Their Key Regulating Enzymes in Rat Brain.



Effect of Short-term 900 MHz low level electromagnetic radiation exposure on blood serotonin and glutamate levels.

Effect of whole-body exposure to high-frequency electromagnetic field on the brain electrogeny in neurodefective and healthy mice.

Effects of 2.4 GHz radiofrequency radiation emitted from Wi-Fi equipment on microRNA expression in brain tissue.

Effects of 2G and 3G mobile phones on performance and electrophysiology in adolescents, young adults and older adults.

Effects of 7 Hz-modulated 450 MHz electromagnetic radiation on human performance in visual memory tasks.

Effects of cell phone radiation on lipid peroxidation, glutathione and nitric oxide levels in mouse brain during epileptic seizure.

Effects of electromagnetic radiation from handsets of cellular telephone on neurobehavioral function].

Effects of electromagnetic radiation on spatial memory and synapses in rat hippocampal CA1.

Effects of exposure to 2100MHz GSM-like radiofrequency electromagnetic field on auditory system of rats.

Effects of fetal microwave radiation exposure on offspring behavior in mice.

Effects of millimeter wave irradiation with different frequency and power density on their offsprings in mice].

Effects of mobile phone radiation (900 MHz radiofrequency) on structure and functions of rat brain.

Effects of Mobile Phones on Children's and Adolescents' Health: A Commentary.

Effects of nano-selenium on cognition performance of mice exposed in 1800 MHz radiofrequency fields].

Effects of pulsed electromagnetic fields on cognitive processes - a pilot study on pulsed field interference with cognitive regeneration.

Effects of radiofrequency exposure emitted from a GSM mobile phone on proliferation, differentiation, and apoptosis of neural stem cells.

Effects of radiofrequency exposure on the GABAergic system in the rat cerebellum: clues from semi-quantitative immunohistochemistry.

Electromagnetic field and brain development.

Electromagnetic Fields, Pulsed Radiofrequency Radiation, and Epigenetics: How Wireless Technologies May Affect Childhood Development.

Electromagnetic hypersensitivity: biological effects of dirty electricity with emphasis on diabetes and multiple sclerosis.

Electromagnetic hypersensitivity--an increasing challenge to the medical profession.

Electromagnetic radiation (Wi-Fi) and epilepsy induce calcium entry and apoptosis through activation of TRPV1 channel in hippocampus and dorsal root ganglion of rats.

Electromagnetic radiation 2450 MHz exposure causes cognition deficit with mitochondrial dysfunction and activation of intrinsic pathway of apoptosis in rats.

Electromagnetic radiation of non-thermal intensity and short exposition as a sub-threshold irritant for the central nervous system].

Electrophysiological Assessment of the Impact of Mobile Phone Radiation on Cognition in Persons With Epilepsy.

Elevated risk of Alzheimer's disease among workers with likely electromagnetic field exposure.

Epidemiological evidence for a health risk from mobile phone base stations.

EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses.

Evidence of oxidative stress in American kestrels exposed to electromagnetic fields.

Exposure to GSM 900-MHz mobile radiation impaired inhibitory avoidance memory consolidation in rat: Involvements of opioidergic and nitrenergic systems.

Exposure to radio-frequency electromagnetic waves alters acetylcholinesterase gene expression, exploratory and motor coordination-linked behaviour in male rats.

Fetal radiofrequency radiation exposure from 800-1900 mhz-rated cellular telephones affects neurodevelopment and behavior in mice.

From the Cover: 2.45-GHz Microwave Radiation Impairs Hippocampal Learning and Spatial Memory: Involvement of Local Stress Mechanism-Induced Suppression of iGluR/ERK/CREB Signaling.

Fundamentally new electromagnetic pollution and the lack of adequate regulatory framework--on the risk assessment (analysis of modern domestic and foreign data)].

GFAP expression in the rat brain following sub-chronic exposure to a 900 MHz electromagnetic field signal.

Glial markers and emotional memory in rats following acute cerebral radiofrequency exposures.

Glucose administration attenuates spatial memory deficits induced by chronic low-power-density microwave exposure.

GSM 900 MHz radiation inhibits ants' association between food sites and encountered cues.

GSM radiation triggers seizures and increases cerebral c-Fos positivity in rats pretreated with subconvulsive doses of picrotoxin.

Health effects of living near mobile phone base transceiver station (BTS) antennae: a report from Isfahan, Iran.

Hippocampal lipidome and transcriptome profile alterations triggered by acute exposure of mice to GSM 1800 MHz mobile phone radiation: An exploratory study.

Influence of microwave radiation on synaptic structure and function of hippocampus in Wistar rats].

Influence of pre- and postnatal exposure of rats to 2.45-GHz microwave radiation on neurobehavioral function.

Interaction of microwaves and a temporally incoherent magnetic field on spatial learning in the rat.

Investigation on the health of people living near mobile telephone relay stations: I/Incidence according to distance and sex].

Long term exposure to cell phone frequencies (900 and 1800 MHz) induces apoptosis, mitochondrial oxidative stress and TRPV1 channel activation in the hippocampus and dorsal root ganglion of rats.

Long term impairment of cognitive functions and alterations of NMDAR subunits after continuous microwave exposure.

Maternal cell phone use during pregnancy and child cognition at age 5years in 3 birth cohorts.

Maternal mobile phone exposure adversely affects the electrophysiological properties of Purkinje neurons in rat offspring.

Maternal mobile phone exposure alters intrinsic electrophysiological properties of CA1 pyramidal neurons in rat offspring.

Melatonin and a spin-trap compound block radiofrequency electromagnetic radiation-induced DNA strand breaks in rat brain cells.

Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression.

Microwave irradiation affects radial-arm maze performance in the rat.

Microwave radiation induced oxidative stress, cognitive impairment and inflammation in brain of Fischer rats.

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Motor activity of rabbits in conditions of chronic low-intensity pulse microwave irradiation].

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Relationship between millimeter wave irradiation in pregnant mice and c-Fos protein expression in hippocampus and learning and memory functions in their offsprings].

RKIP Regulates Neural Cell Apoptosis Induced by Exposure to Microwave Radiation Partly Through the MEK/ERK/CREB Pathway.

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Spatial memory performance of Wistar rats exposed to mobile phone.

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The chronic effect of pulsed 1800 MHz electromagnetic radiation on amino acid neurotransmitters in three different areas of juvenile and young adult rat brain.

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The effect of pulsed electromagnetic radiation from mobile phone on the levels of monoamine neurotransmitters in four different areas of rat brain.

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## REPRODUCTION

Keywords – pregnancy, reproductive, pregnant, sperm, embryos, testicular, fertility, embryo, testis, embryonic, fetuses, testosterone, motility, infertility, reproduction, testes, semen, spermatozoa, spermatogenesis, reproductive system, sperm motility, male fertility, sperm count, embryogenesis, abortion, male reproductive, spermatogenic, embryonic development, mating, male infertility, birth defects, serum testosterone, adverse reproductive, miscarriage, reproductive organs, semen parameters, sperm concentration, sperm parameters, testicular function, testosterone level, epididymis, male reproductive system, spermatogenic cells, spermatogonia, fertilized eggs, ovaries, reproductive capacity, reproductive outcomes, sperm cells, sperm morphology, fertile, pregnancies, reproductive function, testicular tissue, rat testes, rat testis, reproductive functions, reproductive systems, sperm DNA, spermatogonial, testis tissue, embryogeny, reproductive health, sperm cell, miscarriages, offsprings, oocyte, oogenesis, preterm birth, seminal vesicles, Sperm head, spermatids, sperms, testicles, fetal loss, genital, gonads, reproductive hormones, semen analysis

### Titles

1800 MHz mobile phone irradiation induced oxidative and nitrosative stress leads to p53 dependent Bax mediated testicular apoptosis in mice, *Mus musculus*.

1950MHz Radio Frequency Electromagnetic Radiation Inhibits Testosterone Secretion of Mouse Leydig Cells.

2.45 GHz microwave irradiation-induced oxidative stress affects implantation or pregnancy in mice, *Mus musculus*.

2.45 GHz microwave radiation induced oxidative and nitrosative stress mediated testicular apoptosis: Involvement of a p53 dependent bax-caspase-3 mediated pathway.

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Commentary on the utility of the National Toxicology Program study on cell phone radiofrequency radiation data for assessing human health risks despite unfounded criticisms aimed at minimizing the findings of adverse health effects.

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Effect of mobile telephones on sperm quality: a systematic review and meta-analysis.

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Effects of radiofrequency electromagnetic wave exposure from cellular phones on the reproductive pattern in male Wistar rats.

Effects of radiofrequency electromagnetic waves (RF-EMW) from cellular phones on human ejaculated semen: an in vitro pilot study.

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Electromagnetic radiation at 900 MHz induces sperm apoptosis through bcl-2, bax and caspase-3 signaling pathways in rats.

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Maternal occupational exposure to extremely low frequency magnetic fields and the risk of brain cancer in the offspring.

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Microwave radiation (2.45 GHz)-induced oxidative stress: Whole-body exposure effect on histopathology of Wistar rats.

Microwave radiation enhances teratogenic effect of cytosine arabinoside in mice.

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Mobile phone radiation induces mode-dependent DNA damage in a mouse spermatocyte-derived cell line: a protective role of melatonin.

Mobile phone radiation induces reactive oxygen species production and DNA damage in human spermatozoa in vitro.

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Oxidative changes and apoptosis induced by 1800-MHz electromagnetic radiation in NIH/3T3 cells.

Oxidative effects of extremely low frequency magnetic field and radio frequency radiation on testes tissues of diabetic and healthy rats.

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Prenatal and postnatal exposure to cell phone use and behavioral problems in children.

Probing the Origins of 1,800 MHz Radio Frequency Electromagnetic Radiation Induced Damage in Mouse Immortalized Germ Cells and Spermatozoa in vitro.

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Pulsed magnetic field from video display terminals enhances teratogenic effects of cytosine arabinoside in mice.

Pulsed or continuous electromagnetic field induce p53/p21-mediated apoptotic signaling pathway in mouse spermatogenic cells in vitro and thus may affect male fertility.

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Radiofrequency electromagnetic radiation from cell phone causes defective testicular function in male Wistar rats.

Radiofrequency radiation (900 MHz)-induced DNA damage and cell cycle arrest in testicular germ cells in swiss albino mice.

Relationship between millimeter wave irradiation in pregnant mice and c-Fos protein expression in hippocampus and learning and memory functions in their offsprings].

Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts at non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action.

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## GENOTOXICITY

Keywords – DNA damage, genotoxic, micronuclei, chromosomal, micronucleus, chromosome, genotoxicity, genotoxic effects, mutagenic, strand breaks, chromatin, mutation, DNA strand, Chromatid, mutations, chromosome aberrations, chromosomes, DNA fragmentation, double-strand, chromosomal aberrations, DNA repair, DNA strand breaks, micronucleus (MN), genetic damage, micronuclei (MN), Sister Chromatid, genome, blood leukocytes, double-strand breaks, oxidative DNA, chromosomal damage, DNA synthesis, mutant, cellular stress, chromosome aberration, oxidative DNA damage, Purkinje cells, DNA breaks, cell cycle arrest, clastogenic, genotoxic potential, keratinocytes, micronucleated, single strand, cell division, chromatid exchange, Chromatid Exchanges, genetic material, micronucleus test, Mutagenesis, cell cycle progression, cellular DNA, Cytochrome c, double strand, genetic effects, genomic instability, micronucleus frequency, DNA single-strand, DNA-damaging, Mutagen, mutagenicity, single strand breaks, chromatin condensation, chromosomal aberration, double-strand breaks (DSBs), strand breakage, cell cycle distribution, cell DNA, genetically, strand DNA

### Titles

1800 MHz mobile phone irradiation induced oxidative and nitrosative stress leads to p53 dependent Bax mediated testicular apoptosis in mice, *Mus musculus*.

1950MHz Radio Frequency Electromagnetic Radiation Inhibits Testosterone Secretion of Mouse Leydig Cells.

2.45 GHz microwave irradiation-induced oxidative stress affects implantation or pregnancy in mice, *Mus musculus*.

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Biophysical evaluation of radiofrequency electromagnetic field effects on male reproductive pattern.

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Chromosomal damage in human diploid fibroblasts by intermittent exposure to extremely low-frequency electromagnetic fields.

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Connection between Cell Phone use, p53 Gene Expression in Different Zones of Glioblastoma Multiforme and Survival Prognoses.

Cytogenetic changes induced by low-intensity microwaves in the species *Triticum aestivum*].

Cytogenetic consequences of microwave irradiation on mammalian cells incubated in vitro.

Cytogenetic damage in human lymphocytes following GSMK phase modulated microwave exposure.

Cytotoxic and genotoxic effects of high-frequency electromagnetic fields (GSM 1800 MHz) on immature and mature rats.

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Effect of 950 MHz UHF electromagnetic radiation on biomarkers of oxidative damage, metabolism of UFA and antioxidants in the livers of young rats of different ages.

Effect of acute exposure to microwave from mobile phone on DNA damage and repair of cultured human lens epithelial cells in vitro].

Effect of early pregnancy electromagnetic field exposure on embryo growth ceasing].

Effect of electromagnetic irradiation produced by 3G mobile phone on male rat reproductive system in a simulated scenario.

Effect of electromagnetic radiation of millimetric wave band on genome of somatic cells].

Effect of exposure to radio frequency radiation emitted by cell phone on the developing dorsal root ganglion of chick embryo: a light microscopic study.

Effect of GSTM1 and GSTT1 Polymorphisms on Genetic Damage in Humans Populations Exposed to Radiation From Mobile Towers.

Effect of Low Level Subchronic Microwave Radiation on Rat Brain.

Effect of low power microwave on the mouse genome: a direct DNA analysis.

Effect of low-intensity microwave radiation on proliferation of cultured epithelial cells of rabbit lens].

Effect of Mobile Phone Radiation on Cardiovascular Development of Chick Embryo.

Effect of Radiofrequency Radiation Emitted from 2G and 3G Cell Phone on Developing Liver of Chick Embryo - A Comparative Study.

Effect of Radiofrequency Radiation on Human Hematopoietic Stem Cells.



Effect of whole-body exposure to high-frequency electromagnetic field on the brain electrogeny in neurodefective and healthy mice.

Effects of GSM 1800 MHz radiofrequency electromagnetic fields on DNA damage in Chinese hamster lung cells].

Effects of low-intensity extremely high frequency electromagnetic radiation on chromatin structure of lymphoid cells in vivo and in vitro].

Effects of microwave radiation on thymocytes in mice at different power densities].

Effects of radiofrequency electromagnetic wave exposure from cellular phones on the reproductive pattern in male Wistar rats.

Effects of radiofrequency electromagnetic waves (RF-EMW) from cellular phones on human ejaculated semen: an in vitro pilot study.

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Electromagnetic fields enhance chemically-induced hyperploidy in mammalian oocytes.

Electromagnetic noise inhibits radiofrequency radiation-induced DNA damage and reactive oxygen species increase in human lens epithelial cells.

Electromagnetic radiation at 900 MHz induces sperm apoptosis through bcl-2, bax and caspase-3 signaling pathways in rats.

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Evaluation of selected biochemical parameters in the saliva of young males using mobile phones.

Evaluation of the cytogenotoxic damage in immature and mature rats exposed to 900 MHz radiofrequency electromagnetic fields.

Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure.

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Exposure to 1800 MHz radiofrequency electromagnetic radiation induces oxidative DNA base damage in a mouse spermatocyte-derived cell line.

Exposure to 915 MHz radiation induces micronuclei in *Vicia faba* root tips.

Exposure to global system for mobile communication (GSM) cellular phone radiofrequency alters gene expression, proliferation, and morphology of human skin fibroblasts.

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Exposure to non-ionizing electromagnetic fields emitted from mobile phones induced DNA damage in human ear canal hair follicle cells.

Exposure to non-ionizing electromagnetic radiation of public risk prevention instruments threatens the quality of spermatozooids.

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GSM-like radiofrequency exposure induces apoptosis via caspase-dependent pathway in infant rabbits.

Immunohistopathologic demonstration of deleterious effects on growing rat testes of radiofrequency waves emitted from conventional Wi-Fi devices.

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Interference of vitamin E on the brain tissue damage by electromagnetic radiation of cell phone in pregnant and fetal rats].

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Neural cell apoptosis induced by microwave exposure through mitochondria-dependent caspase-3 pathway.

Oxidative and mutagenic effects of low intensity GSM 1800 MHz microwave radiation.

Oxidative changes and apoptosis induced by 1800-MHz electromagnetic radiation in NIH/3T3 cells.

Probing the Origins of 1,800 MHz Radio Frequency Electromagnetic Radiation Induced Damage in Mouse Immortalized Germ Cells and Spermatozoa in vitro.

Protective effects of Genistein on human renal tubular epithelial cells damage of microwave radiation].

Pulsed or continuous electromagnetic field induce p53/p21-mediated apoptotic signaling pathway in mouse spermatogenic cells in vitro and thus may affect male fertility.

Purkinje cell number decreases in the adult female rat cerebellum following exposure to 900 MHz electromagnetic field.

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RAPD Profiling, DNA Fragmentation, and Histomorphometric Examination in Brains of Wistar Rats Exposed to Indoor 2.5 Ghz Wi-Fi Devices Radiation.

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Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices.

RKIP Regulates Neural Cell Apoptosis Induced by Exposure to Microwave Radiation Partly Through the MEK/ERK/CREB Pathway.

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Single- and double-strand DNA breaks in rat brain cells after acute exposure to radiofrequency electromagnetic radiation.

Single strand DNA breaks in rat brain cells exposed to microwave radiation.

Single-strand DNA breaks in human hair root cells exposed to mobile phone radiation.

Status quo of the researches on the biological effect of electromagnetic radiation on the testis and epididymal sperm].

Study of low-intensity 2450-MHz microwave exposure enhancing the genotoxic effects of mitomycin C using micronucleus test and comet assay in vitro.

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The effect of mobile phone on the number of Purkinje cells: a stereological study.

The effect of radiofrequency radiation on DNA and lipid damage in female and male infant rabbits.

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The effects of radiofrequency electromagnetic radiation on sperm function.

The effects of radiofrequency fields on cell proliferation are non-thermal.

The genomic effects of cell phone exposure on the reproductive system.

The genotoxic effect of radiofrequency waves on mouse brain.

The influence of 1800 MHz GSM-like signals on hepatic oxidative DNA and lipid damage in nonpregnant, pregnant, and newly born rabbits.

The influence of direct mobile phone radiation on sperm quality.

The link between radiofrequencies emitted from wireless technologies and oxidative stress.

The therapeutic effect of a pulsed electromagnetic field on the reproductive patterns of male Wistar rats exposed to a 2.45-GHz microwave field.

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Wi-Fi is an important threat to human health.

X-rays, microwaves and vinyl chloride monomer: their clastogenic and aneugenic activity, using the micronucleus assay on human lymphocytes.

## CARDIOVASCULAR

Keywords – Cardiac, cardiovascular, pacemaker, pacemakers, implanted, blood pressure, implantable, vascular, heart rate variability, myocardial, heart rate variability (HRV), implants, cardiac pacemakers, implantation, defibrillators, implant, cardioverter, myocardium, cardiovascular system, implantable cardioverter, Cardiovascular disease, defibrillator, fibrillation, arrhythmia, arterial blood pressure, autonomic nervous system, cardioverter defibrillators, implanted pacemakers, cardiac pacemaker, hypertension, arrhythmias, cardioverter-defibrillators, implantable cardioverter defibrillators, implantable cardioverter-defibrillators, pacemaker function, heart disease, implanted cardiac, tachycardia, cardiac devices, circulatory system, microcirculation, blood vessels, cardiomyocytes, cardiovascular effects, vascular permeability, atherosclerosis, cardiovascular diseases, ventricular fibrillation, arterial pressure, Atrial fibrillation, cardiac output, cardiovascular function, Implantable cardioverter defibrillator (ICD), implantable devices, arrhythmic, carotid artery, pacemaker dysfunction, pacemaker malfunction

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2.45 GHz microwave irradiation-induced oxidative stress affects implantation or pregnancy in mice, *Mus musculus*.

5-HT contents change in peripheral blood of workers exposed to microwave and high frequency radiation].

Activation of VEGF/Flk-1-ERK Pathway Induced Blood-Brain Barrier Injury After Microwave Exposure.

AduoLa Fuzhenglin down-regulates microwave-induced expression of beta1-adrenergic receptor and muscarinic type 2 acetylcholine receptor in myocardial cells of rats.

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Cell phone radiation exposure on brain and associated biological systems.

Cellular Phone Irradiation of the Head Affects Heart Rate Variability Depending on Inspiration/Expiration Ratio.

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Effect of qindan fuzheng capsule on ultrastructure of microwave radiation injured cardiomyocytes and hepatocytes in rats].

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Electromagnetic fields produced by incubators influence heart rate variability in newborns.

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Evaluation of selected functional circulation parameters of workers from various occupational groups exposed to electromagnetic fields of high frequency. III. 24-h monitoring of arterial blood pressure (ABP)].

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In vitro and in vivo study of electromagnetic compatibility of cellular phones and pacemakers].

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Leukemia mortality and incidence of infantile leukemia near the Vatican Radio Station of Rome].

Long-term exposure to microwave radiation provokes cancer growth: evidences from radars and mobile communication systems.

Mobile phone interference with medical equipment and its clinical relevance: a systematic review.

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The health problems of computer operators].

The influence of the call with a mobile phone on heart rate variability parameters in healthy volunteers.

Use of mobile phones in ICU--why not ban?

A Journal Course: update for nurse anesthetists. Arrhythmia management devices and electromagnetic interference.

## IMMUNITY

Keywords – lymphocytes, immune, lymphocyte, immune system, immunity, blood lymphocytes, leukocytes, antibodies, immune response, human lymphocytes, antibody, peripheral blood lymphocytes, immunological, leukocyte, neutrophils, lymphocytic, immune functions, immunoreactivity, autoimmune, immunization, monocytes, neutrophil, antigens, macrophage, immune parameters, immune responses, immunocompetent, natural killer cells, spleen lymphocytes, immunologic, immunoreactive, micronucleated cells, monoclonal antibodies, spleen cells, splenocytes, T lymphocytes, antibody production, antibody-forming, monoclonal antibody

### **Titles**

954 MHz microwaves enhance the mutagenic properties of mitomycin C.

Cellphone electromagnetic radiation damages the testicular ultrastructure of male rats].

Electromagnetic fields may act via calcineurin inhibition to suppress immunity, thereby increasing risk for opportunistic infection: Conceivable mechanisms of action.

Exposure to 1.8 GHz electromagnetic fields affects morphology, DNA-related Raman spectra and mitochondrial functions in human lympho-monocytes.

Exposure to 900 MHz radiofrequency radiation induces caspase 3 activation in proliferating human lymphocytes.

Exposure to radiation from single or combined radio frequencies provokes macrophage dysfunction in the RAW 264.7 cell line.

Gene expression changes in the skin of rats induced by prolonged 35 GHz millimeter-wave exposure.

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Immunobiological effect of bitemporal exposure of rabbits to microwaves].

Immunomorphologic changes in the testes upon exposure to a microwave electromagnetic field].

Immunosuppressive effect of the decimeter-band electromagnetic field].

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Individual responsiveness to induction of micronuclei in human lymphocytes after exposure in vitro to 1800-MHz microwave radiation.

Influence of 1.8 GHz microwave on DNA damage induced by 4 chemical mutagens].

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Mutagenic and morphologic impacts of 1.8GHz radiofrequency radiation on human peripheral blood lymphocytes (hPBLs) and possible protective role of pre-treatment with Ginkgo biloba (EGb 761).

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Radiofrequency-induced carcinogenesis: cellular calcium homeostasis changes as a triggering factor.

Radioprotective effects of honeybee venom (*Apis mellifera*) against 915-MHz microwave radiation-induced DNA damage in wistar rat lymphocytes: in vitro study.

Reaction of the immune system to low-level RF/MW exposures.

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Studying the synergistic damage effects induced by 1.8 GHz radiofrequency field radiation (RFR) with four chemical mutagens on human lymphocyte DNA using comet assay in vitro.

Terahertz radiation increases genomic instability in human lymphocytes.

The effect of electromagnetic radiation with extremely high frequency and low intensity on cytotoxic activity of human natural killer cells].

The effects of 2100-MHz radiofrequency radiation on nasal mucosa and mucociliary clearance in rats.

The immune response of women with prolonged exposure to electromagnetic fields produced by radiotelevision broadcasting stations.

Effect of electromagnetic radiation on T-lymphocyte subpopulations and immunoglobulin level in human blood serum after occupational exposure].

Effect of electromagnetic waves from mobile phone on immune status of male rats: possible protective role of vitamin D.

Effect of extremely high frequency electromagnetic radiation of low intensity on parameters of humoral immunity in healthy mice].

Effect of low intensity and very high frequency electromagnetic radiation on occupationally exposed personnel].

Effect of low-intensity microwave of on mitomycin C-induced genotoxicity in vitro].

Effect of microwave radiation on cellular immunity indices in conditions of chronic exposure].

Effect of wide-band modulated electromagnetic fields on the workers of high-frequency telephone exchanges].

Effects of 2000  $\mu\text{W}/\text{cm}^2$ ; electromagnetic radiation on expression of immunoreactive protein and mRNA of NMDA receptor 2A subunit in rats hippocampus].

Effects of electromagnetic radiation on health and immune function of operators].

Effects of GSM 1800 MHz radiofrequency electromagnetic fields on DNA damage in Chinese hamster lung cells].

## BIOMARKERS

Keywords – apoptosis, oxidative stress, Malondialdehyde, reactive oxygen species, apoptotic, superoxide dismutase, lipid peroxidation, permeability, catalase, MDA, ROS, ROS), reactive oxygen species (ROS), Malondialdehyde (MDA), SOD), cell death, glutathione peroxidase, inflammatory, erythrocytes, oxidative damage, SOD, caspase-3, free radical, nitric oxide, free radicals, biomarkers, bcl-2, catalase (CAT), inflammation, corticosterone, edema, glutathione peroxidase (GSH-Px), cytokine, cytokines, alkaline phosphatase, cell apoptosis, protein kinase, ATP, glutathione (GSH), oxidation, TNF-alpha, Bax, Ca<sup>2+</sup>, estrogen, ornithine decarboxylase, red blood cells, intracellular calcium, cell damage, apoptotic cell, hemoglobin, lactate dehydrogenase, cerebral blood flow, glutamate, hydrogen peroxide, IL-1beta, Purkinje, serotonin, apoptotic cell death, barrier permeability, carbonyl, hormone levels, ornithine decarboxylase (ODC), acetylcholinesterase, calcium ion, Calcium ions, endothelial cells, GABA, MDA levels, ODC, xanthine oxidase, creatinine, intracellular ROS, cholinesterase, lipid peroxidation levels, pro-inflammatory, protein kinase C, adrenocorticotrophic hormone, alanine aminotransferase, aspartate aminotransferase, caspase 3, caspase-9, catalase activity, glutathione levels, NF-kappaB, atrophy, nitric oxide synthase, cAMP, acid phosphatase, adenosine deaminase, adrenocorticotrophic hormone (ACTH), blood cell count, blood platelets, Ca<sup>++</sup>, adrenaline, C-reactive protein, oxidative damages, Reactive Oxygen Species), vascular endothelial growth factor

## Titles

1800 MHz mobile phone irradiation induced oxidative and nitrosative stress leads to p53 dependent Bax mediated testicular apoptosis in mice, *Mus musculus*.

1950MHz Radio Frequency Electromagnetic Radiation Inhibits Testosterone Secretion of Mouse Leydig Cells.

2.45 GHz microwave irradiation-induced oxidative stress affects implantation or pregnancy in mice, *Mus musculus*.

2.45 GHz Microwave Radiation Impairs Learning and Spatial Memory via Oxidative/Nitrosative Stress Induced p53-Dependent/Independent Hippocampal Apoptosis: Molecular Basis and Underlying Mechanism.

2.45 GHz microwave radiation induced oxidative and nitrosative stress mediated testicular apoptosis: Involvement of a p53 dependent bax-caspase-3 mediated pathway.

2.45-GHz microwave irradiation adversely affects reproductive function in male mouse, *Mus musculus* by inducing oxidative and nitrosative stress.

8-oxoG DNA glycosylase-1 inhibition sensitizes Neuro-2a cells to oxidative DNA base damage induced by 900 MHz radiofrequency electromagnetic radiation.

900 MHz pulse-modulated radiofrequency radiation induces oxidative stress on heart, lung, testis and liver tissues.

900 MHz radiofrequency-induced histopathologic changes and oxidative stress in rat endometrium: protection by vitamins E and C.

900-MHz microwave radiation enhances gamma-ray adverse effects on SHG44 cells.

900-MHz microwave radiation promotes oxidation in rat brain.

915 MHz microwaves and 50 Hz magnetic field affect chromatin conformation and 53BP1 foci in human lymphocytes from hypersensitive and healthy persons.

Activation of VEGF/Flk-1-ERK Pathway Induced Blood-Brain Barrier Injury After Microwave Exposure.

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Alterations of cognitive function and 5-HT system in rats after long term microwave exposure.

Alternating magnetic field damages the reproductive function of murine testes].

Apoptosis is induced by radiofrequency fields through the caspase-independent mitochondrial pathway in cortical neurons.

Biochemical and histological studies on adverse effects of mobile phone radiation on rat's brain.

Biochemical and pathological changes in the male rat kidney and bladder following exposure to continuous 900-MHz electromagnetic field on postnatal days 22-59<sup/>.

Biochemical changes in rat brain exposed to low intensity 9.9 GHz microwave radiation.

Biochemical modifications and neuronal damage in brain of young and adult rats after long-term exposure to mobile phone radiations.

Bioeffects induced by exposure to microwaves are mitigated by superposition of ELF noise.

Bioeffects of mobile telephony radiation in relation to its intensity or distance from the antenna.

Biological effects from electromagnetic field exposure and public exposure standards.

Biological effects of continuous exposure of embryos and young chickens to electromagnetic fields emitted by video display units.

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Changes in serum alkaline phosphatase activity during in vitro exposure to amplitude-modulated electromagnetic field of ultrahigh frequency (2375 MHz) in guinea pigs].

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Cytotoxic and genotoxic effects of high-frequency electromagnetic fields (GSM 1800 MHz) on immature and mature rats.

DNA Damage of Lymphocytes in Volunteers after 4 hours Use of Mobile Phone.

Effect of 2.45 GHz microwave radiation on the fertility pattern in male mice.

Effect of 3G cell phone exposure with computer controlled 2-D stepper motor on non-thermal activation of the hsp27/p38MAPK stress pathway in rat brain.

Effect of 835 MHz radiofrequency radiation exposure on calcium binding proteins in the hippocampus of the mouse brain.

Effect of 900 MHz Electromagnetic Radiation on the Induction of ROS in Human Peripheral Blood Mononuclear Cells.

Effect of 900 MHz radio frequency radiation on beta amyloid protein, protein carbonyl, and malondialdehyde in the brain.

Effect of 900 MHz radiofrequency radiation on oxidative stress in rat brain and serum.

Effect of 900-, 1800-, and 2100-MHz radiofrequency radiation on DNA and oxidative stress in brain.

Effect of 900Mhz electromagnetic fields on energy metabolism in postnatal rat cerebral cortical neurons].

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Effect of cell phone use on salivary total protein, enzymes and oxidative stress markers in young adults: a pilot study.

Effect of Exposure to 900 MHz GSM Mobile Phone Radiofrequency Radiation on Estrogen Receptor Methylation Status in Colon Cells of Male Sprague Dawley Rats.

Effect of Guilingji Capsule on the fertility, liver functions, and serum LDH of male SD rats exposed by 900 mhz cell phone].

Effect of low level microwave radiation exposure on cognitive function and oxidative stress in rats.

Effect of Low-Intensity Microwave Radiation on Monoamine Neurotransmitters and Their Key Regulating Enzymes in Rat Brain.

Effect of mobile phone electromagnetic emission on characteristics of cerebral blood circulation and neurohumoral regulations in humans].

Effect of Mobile Phone-Induced Electromagnetic Field on Brain Hemodynamics and Human Stem Cell Functioning: Possible Mechanistic Link to Cancer Risk and Early Diagnostic Value of Electronphotonic Imaging.

Effect of radiofrequency electromagnetic field exposure on in vitro models of neurodegenerative disease.

Effect of Short-term 900 MHz low level electromagnetic radiation exposure on blood serotonin and glutamate levels.

Effects of 1800 MHz GSM-like exposure on the gonadal function and hematological parameters of male mice].

Effects of 2.4 GHz radiofrequency radiation emitted from Wi-Fi equipment on microRNA expression in brain tissue.

Effects of 2.45 GHz microwave exposures on the peroxidation status in Wistar rats.

Effects of 900-MHz electromagnetic field emitted from cellular phone on brain oxidative stress and some vitamin levels of guinea pigs.

Effects of 900-MHz electromagnetic fields exposure throughout middle/late adolescence on the kidney morphology and biochemistry of the female rat.

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Electromagnetic fields (1.8 GHz) increase the permeability to sucrose of the blood-brain barrier in vitro.

Electromagnetic fields (UHF) increase voltage sensitivity of membrane ion channels; possible indication of cell phone effect on living cells.

Electromagnetic fields at a mobile phone frequency (900 MHz) trigger the onset of general stress response along with DNA modifications in *Eisenia fetida* earthworms.

Electromagnetic fields may act via calcineurin inhibition to suppress immunity, thereby increasing risk for opportunistic infection: Conceivable mechanisms of action.



Electromagnetic fields, such as those from mobile phones, alter regional cerebral blood flow and sleep and waking EEG.

Electromagnetic pulse exposure induces overexpression of beta amyloid protein in rats.

Electromagnetic radiation (Wi-Fi) and epilepsy induce calcium entry and apoptosis through activation of TRPV1 channel in hippocampus and dorsal root ganglion of rats.

Electromagnetic radiation 2450 MHz exposure causes cognition deficit with mitochondrial dysfunction and activation of intrinsic pathway of apoptosis in rats.

Electromagnetic radiation at 900 MHz induces sperm apoptosis through bcl-2, bax and caspase-3 signaling pathways in rats.

Electromagnetic-pulse-induced activation of p38 MAPK pathway and disruption of blood-retinal barrier.

Enhanced cytotoxic and genotoxic effects of gadolinium following ELF-EMF irradiation in human lymphocytes.

Enhancement of X-ray Induced Apoptosis by Mobile Phone-Like Radio-Frequency Electromagnetic Fields in Mouse Spermatocyte-Derived Cells.

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Exposure to 1950-MHz TD-SCDMA electromagnetic fields affects the apoptosis of astrocytes via caspase-3-dependent pathway.

Exposure to 900 MHz radiofrequency radiation induces caspase 3 activation in proliferating human lymphocytes.

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Exposure to cell phone induce oxidative stress in mice preantral follicles during in vitro cultivation: An experimental study.

Exposure to cell phone radiation up-regulates apoptosis genes in primary cultures of neurons and astrocytes.

Exposure to ELF-pulse modulated X band microwaves increases in vitro human astrocytoma cell proliferation.

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Exposure to radiation from single or combined radio frequencies provokes macrophage dysfunction in the RAW 264.7 cell line.

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From the Cover: 2.45-GHz Microwave Radiation Impairs Hippocampal Learning and Spatial Memory: Involvement of Local Stress Mechanism-Induced Suppression of iGluR/ERK/CREB Signaling.

GSM 900 MHz microwave radiation affects embryo development of Japanese quails.

GSM-like radiofrequency exposure induces apoptosis via caspase-dependent pathway in infant rabbits.

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Immunomorphologic changes in the testes upon exposure to a microwave electromagnetic field].

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In vivo exposure of rats to a weak alternating magnetic field increases ornithine decarboxylase activity in the mammary gland by a similar extent as the carcinogen DMBA.

Increased ornithine decarboxylase activity in cultured cells exposed to low energy modulated microwave fields and phorbol ester tumor promoters.

Interference of vitamin E on the brain tissue damage by electromagnetic radiation of cell phone in pregnant and fetal rats].

Japanese encephalitis virus (JEV): potentiation of lethality in mice by microwave radiation.

Lipid peroxide damage in retinal ganglion cells induced by microwave].

Long term and excessive use of 900 MHz radiofrequency radiation alter microRNA expression in brain.

Long term exposure to cell phone frequencies (900 and 1800 MHz) induces apoptosis, mitochondrial oxidative stress and TRPV1 channel activation in the hippocampus and dorsal root ganglion of rats.

Long-term exposure of 2450MHz electromagnetic radiation induces stress and anxiety like behavior in rats.

Long-term exposure to electromagnetic radiation from mobile phones and Wi-Fi devices decreases plasma prolactin, progesterone, and estrogen levels but increases uterine oxidative stress in pregnant rats and their offspring.

Long-term exposure to microwave radiation provokes cancer growth: evidences from radars and mobile communication systems.

Low intensity microwave radiation induced oxidative stress, inflammatory response and DNA damage in rat brain.

Low power density microwave radiation induced early changes in rabbit lens epithelial cells.

Magnetic-field-induced DNA strand breaks in brain cells of the rat.

Maternal exposure to a continuous 900-MHz electromagnetic field provokes neuronal loss and pathological changes in cerebellum of 32-day-old female rat offspring.

Maternal mobile phone exposure adversely affects the electrophysiological properties of Purkinje neurons in rat offspring.

Microwave exposure impairs synaptic plasticity in the rat hippocampus and PC12 cells through over-activation of the NMDA receptor signaling pathway.

Microwave radiation (2.45 GHz)-induced oxidative stress: Whole-body exposure effect on histopathology of Wistar rats.

Microwave radiation induced oxidative stress, cognitive impairment and inflammation in brain of Fischer rats.

Microwave radiation induces injury to GC-2spd cells].

Microwave-induced Apoptosis and Cytotoxicity of NK Cells through ERK1/2 Signaling.

Mobile phone (1800MHz) radiation impairs female reproduction in mice, *Mus musculus*, through stress induced inhibition of ovarian and uterine activity.

Mobile phone affects cerebral blood flow in humans.

Mobile phone radiation induces reactive oxygen species production and DNA damage in human spermatozoa in vitro.

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Neural cell apoptosis induced by microwave exposure through mitochondria-dependent caspase-3 pathway.

Neurodegenerative changes and apoptosis induced by intrauterine and extrauterine exposure of radiofrequency radiation.

Non-thermal activation of the hsp27/p38MAPK stress pathway by mobile phone radiation in human endothelial cells: molecular mechanism for cancer- and blood-brain barrier-related effects.

Overproduction of free radical species in embryonal cells exposed to low intensity radiofrequency radiation.

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Oxidative stress-mediated skin damage in an experimental mobile phone model can be prevented by melatonin.

p25/CDK5 is partially involved in neuronal injury induced by radiofrequency electromagnetic field exposure.

Pathological study of testicular injury induced by high power microwave radiation in rats].

Permeability of the blood-brain barrier induced by 915 MHz electromagnetic radiation, continuous wave and modulated at 8, 16, 50, and 200 Hz.

Pernicious effects of long-term, continuous 900-MHz electromagnetic field throughout adolescence on hippocampus morphology, biochemistry and pyramidal neuron numbers in 60-day-old Sprague Dawley male rats.

Protective effect of Liuweidihuang Pills against cellphone electromagnetic radiation-induced histomorphological abnormality, oxidative injury, and cell apoptosis in rat testes].

Protective effects of beta-glucan against oxidative injury induced by 2.45-GHz electromagnetic radiation in the skin tissue of rats.

Protective effects of Genistein on human renal tubular epithelial cells damage of microwave radiation].

Protective effects of luteolin on rat testis following exposure to 900 MHz electromagnetic field.

Pulse modulated 900 MHz radiation induces hypothyroidism and apoptosis in thyroid cells: a light, electron microscopy and immunohistochemical study.

Pulsed electromagnetic fields accelerate apoptotic rate in osteoclasts.

Pulsed or continuous electromagnetic field induce p53/p21-mediated apoptotic signaling pathway in mouse spermatogenic cells in vitro and thus may affect male fertility.

Radio frequency electromagnetic radiation (RF-EMR) from GSM (0.9/1.8GHz) mobile phones induces oxidative stress and reduces sperm motility in rats.

Radiofrequency electromagnetic radiation from cell phone causes defective testicular function in male Wistar rats.

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Radiofrequency radiation emitted from Wi-Fi (2.4 GHz) causes impaired insulin secretion and increased oxidative stress in rat pancreatic islets.

Radiofrequency-induced carcinogenesis: cellular calcium homeostasis changes as a triggering factor.

Reactive oxygen species formation and apoptosis in human peripheral blood mononuclear cell induced by 900 MHz mobile phone radiation.

Reactive oxygen species levels and DNA fragmentation on astrocytes in primary culture after acute exposure to low intensity microwave electromagnetic field.

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Role of Mitochondria in the Oxidative Stress Induced by Electromagnetic Fields: Focus on Reproductive Systems.

Selenium reduces mobile phone (900 MHz)-induced oxidative stress, mitochondrial function, and apoptosis in breast cancer cells.

Selenium supplementation ameliorates electromagnetic field-induced oxidative stress in the HEK293 cells.

Ten gigahertz microwave radiation impairs spatial memory, enzymes activity, and histopathology of developing mice brain.

Testicular apoptosis and histopathological changes induced by a 2.45 GHz electromagnetic field.

The antioxidant effect of Green Tea Mega EGCG against electromagnetic radiation-induced oxidative stress in the hippocampus and striatum of rats.

Ultrastructural change of rabbit lens epithelial cells induced by low power level microwave radiation].

Vitamin C protects rat cerebellum and encephalon from oxidative stress following exposure to radiofrequency wave generated by a BTS antenna model.

Zinc supplementation ameliorates electromagnetic field-induced lipid peroxidation in the rat brain.

## SENSORY DISORDERS

Keywords – auditory, acoustic, ear, hypersensitivity, EHS, electromagnetic hypersensitivity, otoacoustic, vestibular, hypersensitive, cataract, cochlea, auditory system, inner ear, lens epithelial, corneal, tinnitus, vision, lenses, otoacoustic emissions, hearing loss, otoacoustic emission, epidermis, rabbit lens, dermatitis, auditory stimuli, cataractogenic, Auditory brainstem response (ABR), auditory evoked, electrophysiological, electrosensitivity, vestibular system, cochlear implants, dermatological, hearing function, hearing thresholds, pain sensitivity, pain threshold, skin complaints

### **Titles**

A quantitative study on early changes in rabbit lens capsule epithelium induced by low power density microwave radiation].

A study on the effect of prolonged mobile phone use on pure tone audiometry thresholds of medical students of Sikkim.

Acceleration of the development of benzopyrene-induced skin cancer in mice by microwave radiation.

Alteration of glycine receptor immunoreactivity in the auditory brainstem of mice following three months of exposure to radiofrequency radiation at SAR 4.0 W/kg.

Assessment of intermittent UMTS electromagnetic field effects on blood circulation in the human auditory region using a near-infrared system.

Association between vestibular schwannomas and mobile phone use.

Audiologic disturbances in long-term mobile phone users.

Blocking 1800 MHz mobile phone radiation-induced reactive oxygen species production and DNA damage in lens epithelial cells by noise magnetic fields].

Cell phone use and acoustic neuroma: the need for standardized questionnaires and access to industry data.

Changes in gap junctional intercellular communication in rabbits lens epithelial cells induced by low power density microwave radiation.

Cognitive and neurobiological alterations in electromagnetic hypersensitive patients: results of a case-control study.

Contribution of physical factors to the complex anthropogenic load in an industrial town].

Decrease in the intensity of the cellular immune response and nonspecific inflammation upon exposure to extremely high frequency electromagnetic radiation].

DNA damage and repair induced by acute exposure of microwave from mobile phone on cultured human lens epithelial cells].

EEG Changes Due to Experimentally Induced 3G Mobile Phone Radiation.

Effect Of Electromagnetic Waves Emitted From Mobile Phone On Brain Stem Auditory Evoked Potential In Adult Males.

Effect of low-intensity microwave radiation on proliferation of cultured epithelial cells of rabbit lens].

Effect of superposed electromagnetic noise on DNA damage of lens epithelial cells induced by microwave radiation.

Effect of wide-band modulated electromagnetic fields on the workers of high-frequency telephone exchanges].

Effects of 2.45-GHz microwaves on primate corneal endothelium.

Effects of different dose microwave radiation on protein components of cultured rabbit lens].

Effects of exposure to 2100MHz GSM-like radiofrequency electromagnetic field on auditory system of rats.

Effects of GSM-like radiofrequency on distortion product otoacoustic emissions in pregnant adult rabbits.

Effects of intensive and moderate cellular phone use on hearing function.

Effects of low level electromagnetic field exposure at 2.45 GHz on rat cornea.

Effects of microwave radiation on the eye: the occupational health perspective.

Effects of mobile phones on oxidant/antioxidant balance in cornea and lens of rats.

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Electromagnetic field induced biological effects in humans.

Electromagnetic hypersensitivity--an increasing challenge to the medical profession.

Experimental studies on the influence of millimeter radiation on light transmission through the lens].

Increased sensitivity of the non-human primate eye to microwave radiation following ophthalmic drug pretreatment.

Intraoperative observation of changes in cochlear nerve action potentials during exposure to electromagnetic fields generated by mobile phones.

Is human saliva an indicator of the adverse health effects of using mobile phones?

Low power density microwave radiation induced early changes in rabbit lens epithelial cells.

Mobile phone induced sensorineural hearing loss.



Mobile phone related-hazards and subjective hearing and vision symptoms in the Saudi population.

Non-thermal electromagnetic radiation damage to lens epithelium.

Occupational safety: effects of workplace radiofrequencies on hearing function.

Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder.

Replication of heart rate variability provocation study with 2.4-GHz cordless phone confirms original findings.

Single-strand DNA breaks in human hair root cells exposed to mobile phone radiation.

Some ocular symptoms and sensations experienced by long term users of mobile phones.

Some ocular symptoms experienced by users of mobile phones.

The acute auditory effects of exposure for 60 minutes to mobile's electromagnetic field.

The effect of radiofrequency radiation generated by a Global System for Mobile Communications source on cochlear development in a rat model.

The effect of very low dose pulsed magnetic waves on cochlea.

The effects of pulsed low-level EM fields on memory processes].

The electromagnetic fields of cellular phones and the health of children and of teenagers (the situation requiring to take an urgent measure)].

Tinnitus and cell phones: the role of electromagnetic radiofrequency radiation.

Tinnitus and mobile phone use.

Ultrastructural change of rabbit lens epithelial cells induced by low power level microwave radiation].

## DISCOMFORT SYMPTOMS

Keywords – depression, anxiety, headache, headaches, dizziness, depressed, depressive, vertigo, cataracts, behavioral effects, nausea, headache dizziness, low back pain, behavioural effects

### **Titles**

A study on the biological effects of exposure mobile-phone frequency EMF].

A survey study on some neurological symptoms and sensations experienced by long term users of mobile phones.

Adverse effects of excessive mobile phone use.

Anxiogenic effect of chronic exposure to extremely low frequency magnetic field in adult rats.

Association of mobile phone radiation with fatigue, headache, dizziness, tension and sleep disturbance in Saudi population.

Chronic exposure to ELF fields may induce depression.

Clinical features of headache associated with mobile phone use: a cross-sectional study in university students.

Effect of electromagnetic radiations from mobile phone base stations on general health and salivary function.

Effect of high-frequency EMF on public health and its neuro-chemical investigations].

Effect of low intensity and very high frequency electromagnetic radiation on occupationally exposed personnel].

Effects of electromagnetic radiation from cellular telephone handsets on symptoms of neurasthenia].

Effects of electromagnetic radiation on health and immune function of operators].

Effects of GSM-Frequency Electromagnetic Radiation on Some Physiological and Biochemical Parameters in Rats.

Effects of low intensity radiofrequency electromagnetic fields on electrical activity in rat hippocampal slices.

Effects of microwave radiation on the eye: the occupational health perspective.

Effects of mobile phone radiation (900 MHz radiofrequency) on structure and functions of rat brain.

Exposure to mobile phone electromagnetic field radiation, ringtone and vibration affects anxiety-like behaviour and oxidative stress biomarkers in albino wistar rats.

Exposure to radio-frequency electromagnetic waves alters acetylcholinesterase gene expression, exploratory and motor coordination-linked behaviour in male rats.

Long-term exposure of 2450MHz electromagnetic radiation induces stress and anxiety like behavior in rats.

Magnetic fields of transmission lines and depression.

Microwave radiation and chlordiazepoxide: synergistic effects on fixed-interval behavior.

Microwave sickness: a reappraisal.

Mobile phone use and health symptoms in children.

Mobile Phone Use and The Risk of Headache: A Systematic Review and Meta-analysis of Cross-sectional Studies.

Mobile phone use, school electromagnetic field levels and related symptoms: a cross-sectional survey among 2150 high school students in Izmir.

Motor activity of rabbits in conditions of chronic low-intensity pulse microwave irradiation].

MRI magnetic field stimulates rotational sensors of the brain.

Neurobehavioral effects among inhabitants around mobile phone base stations.

Postnatal development and behavior effects of in-utero exposure of rats to radiofrequency waves emitted from conventional WiFi devices.

Preliminary report: symptoms associated with mobile phone use.

Prevalence of headache among handheld cellular telephone users in Singapore: a community study.

Radiofrequency electromagnetic radiation-induced behavioral changes and their possible basis.

Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts at non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action.

Self-reported symptoms associated with exposure to electromagnetic fields: a questionnaire study.

Self-reporting of symptom development from exposure to radiofrequency fields of wireless smart meters in victoria, australia: a case series.

Subjective complaints of people living near mobile phone base stations in Poland.

Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations.



## CONGENITAL ABNORMALITIES

Keywords – malformations, teratogenic, congenital, congenital malformations, teratogenicity, teratogens, teratologic, cleft palate, congenital anomalies, malformed, teratological

### **Titles**

Are microwaves a co-teratogen? Experimental model concept and its verification].

Effect of early pregnancy electromagnetic field exposure on embryo growth ceasing].

Effects of continuous low-level exposure to radiofrequency radiation on intrauterine development in rats.

Effects of GSM-like radiofrequency irradiation during the oogenesis and spermiogenesis of *Xenopus laevis*.

Effects of MR exposure at 1.5 T on early embryonic development of the chick.

First cell cycles of sea urchin *Paracentrotus lividus* are dramatically impaired by exposure to extremely low-frequency electromagnetic field.

Lethal and teratogenic effects of long-term low-intensity radio frequency radiation at 428 MHz on developing chick embryo.

Microwave radiation enhances teratogenic effect of cytosine arabinoside in mice.

*Morinda officinalis* how extract improves microwave-induced reproductive impairment in male rats].

MRI effects on craniofacial size and crown-rump length in C57BL/6J mice in 1.5T fields.

Pathological study of testicular injury induced by high power microwave radiation in rats].

Pulsed magnetic field from video display terminals enhances teratogenic effects of cytosine arabinoside in mice.

Reproductive hazards among workers at high voltage substations.

Studies of the teratogenic potential of exposure of rats to 6000-MHz microwave radiation. I. Morphologic analysis at term.

Studies of the teratogenic potential of exposure of rats to 6000-MHz microwave radiation. II. Postnatal psychophysiologic evaluations.

Teratogenic effects of sinusoidal extremely low frequency electromagnetic fields on morphology of 24 hr chick embryos.

Teratogenic, biochemical, and histological studies with mice prenatally exposed to 2.45-GHz microwave radiation.

VDT pulse magnetic field enhances teratogenic effect of ara-c in mice.



## CIRCADIAN RHYTHYM AND MELATONIN

Keywords – melatonin, sleep, circadian, melatonin production, sleep disturbances, insomnia, melatonin levels, melatonin secretion, sleep disorders, sleep EEG, poor sleep, pineal function

### **Titles**

900-MHz microwave radiation promotes oxidation in rat brain.

A 50-Hz electromagnetic field impairs sleep.

Association between Excessive Use of Mobile Phone and Insomnia and Depression among Japanese Adolescents.

Association between overuse of mobile phones on quality of sleep and general health among occupational health and safety students.

Association of mobile phone radiation with fatigue, headache, dizziness, tension and sleep disturbance in Saudi population.

Bedtime mobile phone use and sleep in adults.

Biological effects of continuous exposure of embryos and young chickens to electromagnetic fields emitted by video display units.

Breast cancer and electric power.

Cellular phones: are they detrimental?

Chronic exposure to ELF fields may induce depression.

Chronotoxicity of 1800 MHz microwave radiation on sex hormones and spermatogenesis in male mice].

Circadian rhythmicity of antioxidant markers in rats exposed to 1.8 GHz radiofrequency fields.

Direct suppressive effects of weak magnetic fields (50 Hz and 16 2/3 Hz) on melatonin synthesis in the pineal gland of Djungarian hamsters (*Phodopus sungorus*).

Do magnetic fields cause increased risk of childhood leukemia via melatonin disruption?

Effect of electromagnetic radiations from mobile phone base stations on general health and salivary function.

Effect of low intensity and very high frequency electromagnetic radiation on occupationally exposed personnel].

Effects of 1800-MHz radiofrequency fields on circadian rhythm of plasma melatonin and testosterone in male rats.

Effects of electromagnetic fields exposure on plasma hormonal and inflammatory pathway biomarkers in male workers of a power plant.

Effects of melatonin on Wi-Fi-induced oxidative stress in lens of rats.

Effects of Mobile Phones on Children's and Adolescents' Health: A Commentary.

Effects of prenatal 900 MHz electromagnetic field exposures on the histology of rat kidney.

EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses.

Exposure to electromagnetic fields and suicide among electric utility workers: a nested case-control study.

Health effects of living near mobile phone base transceiver station (BTS) antennae: a report from Isfahan, Iran.

Individual differences in the effects of mobile phone exposure on human sleep: rethinking the problem.

Investigation on the health of people living near mobile telephone relay stations: I/[Incidence according to distance and sex].

Melatonin and a spin-trap compound block radiofrequency electromagnetic radiation-induced DNA strand breaks in rat brain cells.

Melatonin attenuates radiofrequency radiation (900 MHz)-induced oxidative stress, DNA damage and cell cycle arrest in germ cells of male Swiss albino mice.

Melatonin modulates 900 Mhz microwave-induced lipid peroxidation changes in rat brain.

Melatonin protects rat thymus against oxidative stress caused by exposure to microwaves and modulates proliferation/apoptosis of thymocytes.

Melatonin reduces oxidative stress induced by chronic exposure of microwave radiation from mobile phones in rat brain.

Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression.

Mitochondrial DNA damage and oxidative damage in HL-60 cells exposed to 900MHz radiofrequency fields.

Mobile phone radiation induces mode-dependent DNA damage in a mouse spermatocyte-derived cell line: a protective role of melatonin.

Mobile phone use, school electromagnetic field levels and related symptoms: a cross-sectional survey among 2150 high school students in Izmir.

Mobile phones: time to rethink and limit usage.

Modulation of wireless (2.45 GHz)-induced oxidative toxicity in laryngotracheal mucosa of rat by melatonin.



Neurobehavioral effects among inhabitants around mobile phone base stations.

Neuroprotective effects of melatonin and omega-3 on hippocampal cells prenatally exposed to 900 MHz electromagnetic fields.

Non-thermal biomarkers of exposure to radiofrequency/microwave radiation.

Non-thermal continuous and modulated electromagnetic radiation fields effects on sleep EEG of rats.

Oxidative stress-mediated skin damage in an experimental mobile phone model can be prevented by melatonin.

## CHRONIC CONDITIONS

Keywords - metabolism, metabolic, glucose, endocrine, cholesterol, Diabetes, calcium homeostasis, glucose levels, homeostatic, metabolic activity, metabolic heat production, Diabetes Mellitus, diabetic, glucose metabolism, obesity

### **Titles**

Assessment of biological changes of continuous whole-body exposure to static magnetic field and extremely low frequency electromagnetic fields in mice.

Association of exposure to radio-frequency electromagnetic field radiation (RF-EMFR) generated by mobile phone base stations with glycated hemoglobin (HbA1c) and risk of Type 2 Diabetes Mellitus.

Biological accounts emerging from some kinds of electromagnetic waves in the environment.

Calreticulin attenuated microwave radiation-induced human microvascular endothelial cell injury through promoting actin acetylation and polymerization.

Cardiovascular risk in operators under radiofrequency electromagnetic radiation.

Cell oxidation-reduction imbalance after modulated radiofrequency radiation.

Changes in mitochondrial functioning with electromagnetic radiation of ultra high frequency as revealed by electron paramagnetic resonance methods.

Common behaviors alterations after extremely low-frequency electromagnetic field exposure in rat animal model.

Dirty electricity, chronic stress, neurotransmitters and disease.

Disordered redox metabolism of brain cells in rats exposed to low doses of ionizing radiation or UHF electromagnetic radiation.

Disturbances of glucose tolerance in workers exposed to electromagnetic radiation].

Dynamics of metabolic parameters in rats during repeated exposure to modulated low-intensity UHF radiation.

Effect of a 20 kHz sawtooth magnetic field exposure on the estrous cycle in mice.

Effect of coherent extremely high-frequency and low-intensity electromagnetic radiation on the activity of membrane systems in *Escherichia coli*].

Effect of discontinuous short-wave electromagnetic field irradiation on the state of the endocrine glands].

Effect of Exposure to 900 MHz GSM Mobile Phone Radiofrequency Radiation on Estrogen Receptor Methylation Status in Colon Cells of Male Sprague Dawley Rats.

Effects of continuous low-level exposure to radiofrequency radiation on intrauterine development in rats.

Effects of continuous-wave, pulsed, and sinusoidal-amplitude-modulated microwaves on brain energy metabolism.

Effects of electromagnetic fields on the immune systems of occupationally exposed humans and mice.

Effects of electromagnetic radiation exposure on bone mineral density, thyroid, and oxidative stress index in electrical workers.

Effects of exposure to electromagnetic field radiation (EMFR) generated by activated mobile phones on fasting blood glucose.

Effects of extremely low frequency electromagnetic field and its combination with lead on the antioxidant system in mouse].

Effects of microwave radiation on the eye: the occupational health perspective.

Effects of RF-EMF Exposure from GSM Mobile Phones on Proliferation Rate of Human Adipose-derived Stem Cells: An In-vitro Study.

Endocrine mechanism of placental circulatory disturbances induced by microwave in pregnant rats].

Evidence that dirty electricity is causing the worldwide epidemics of obesity and diabetes.

Exposure to GSM 900 MHz electromagnetic fields affects cerebral cytochrome c oxidase activity.

Functional activity and metabolism of blood neutrophils exposed to low-intensity microwaves].

Glucose administration attenuates spatial memory deficits induced by chronic low-power-density microwave exposure.

GSM mobile phone radiation suppresses brain glucose metabolism.

High-frequency electromagnetic field exposure on reproductive and endocrine functions of female workers].

Hippocampal lipidome and transcriptome profile alterations triggered by acute exposure of mice to GSM 1800 MHz mobile phone radiation: An exploratory study.

Long-term exposure to microwave radiation provokes cancer growth: evidences from radars and mobile communication systems.

Metabolic changes in cells under electromagnetic radiation of mobile communication systems].

Occupations with exposure to electromagnetic fields: a possible risk factor for Alzheimer's disease.

Pulse modulated 900 MHz radiation induces hypothyroidism and apoptosis in thyroid cells: a light, electron microscopy and immunohistochemical study.

Radio frequency electromagnetic radiation (RF-EMR) from GSM (0.9/1.8GHz) mobile phones induces oxidative stress and reduces sperm motility in rats.

Radiofrequency radiation emitted from Wi-Fi (2.4 GHz) causes impaired insulin secretion and increased oxidative stress in rat pancreatic islets.

Towards 5G communication systems: Are there health implications?

Wi-Fi is an important threat to human health.

## A2-C. Citing Papers

Essentially all the papers referenced in A2-B show adverse effects. The papers that cite these adverse effects papers (and some associated papers) were retrieved, and were filtered by visual inspection. The references to these citing papers that also show adverse effects from wireless radiation are presented in the following. The combination of relevant papers in A2-B and their citing papers in A2-C constitutes a representative sample of the wireless radiation adverse effects literature.

The actual literature is far larger. The query used to retrieve relevant papers for A2-B was quite simple, and mainly the citing papers component of the citation network (citing papers, cited papers, related records, etc) was used to expand the relevant papers.

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### **Appendix 3 – Factor Analysis of Adverse EMF Effects Database**

#### **A3-A. Factor Themes**

A query to retrieve Medline records showing adverse health effects of wireless radiation was generated. The query was entered into the Medline search engine, and ~15,000 records were retrieved. Filtering was applied to the retrieval to remove records not associated with adverse health effects of wireless radiation, and 5311 records remained. These records did not receive the further filtering as the database in Appendix 2.

Thousands of the highest frequency MeSH terms were read, and those strongly related to adverse health effects of wireless radiation were selected. A factor analysis was performed using these terms, and a 21-factor taxonomy was generated.

The following table ([A3-1](#)) shows the categories/factors in the taxonomy, and the highest weighted (most influential in determining the factor theme) MeSH Headings associated with each category/factor. For each category, the records associated with the highest weighted MeSH Headings identified were highlighted, and the titles of those records were extracted. Following the table, each category and associated record titles are shown in order to display the breadth of coverage of the category. The categories in [Table A3-1](#) are hyperlinked to their respective titles. Because of the limitations on record filtering, most of the records show adverse health effects, but not all do. Some of the records go beyond the FCC exposure limits, and some address frequencies much lower than microwave. There is some overlap among factors, since some MeSH Headings may be influential in determining the themes of multiple factors.

Major themes from the table include cancer, breast cancer, liver cancer, skin cancer, brain cancer, leukemia, tumors, precancerous conditions, neurodegenerative diseases, cardiovascular disease, electronic implant dysfunction, cerebrovascular disorders, inflammation, oxidative stress, male infertility, electrohypersensitivity, sleep, congenital abnormalities, sensory disorders, symptoms of discomfort, eye diseases.



**Table A3-1 - Factor Analysis Taxonomy**

<b>FACTOR THEME</b>	<b>MESH HEADINGS</b>
<b><u>1</u> Electromagnetic hypersensitivity and inflammation</b>	C-Reactive Protein, Liver Diseases, Thyroid Diseases, Inflammation, Tonsillitis, Hypersensitivity
<b><u>2</u> Coronary artery disease</b>	Plaque, Atherosclerotic, Coronary Artery Disease, Diabetes Mellitus, Carotid Artery Diseases, Inflammation, Hypertension
<b><u>3A</u> Congenital abnormalities</b>	Cleft Lip, Cleft Palate, Calcification, Physiologic, Congenital Abnormalities
<b><u>3B</u> Mammary tumors</b>	Fibroadenoma, Adenoma, Mammary Neoplasms, Animal, Mammary Neoplasms, Experimental, Adenocarcinoma
<b><u>4</u> Male infertility</b>	Sperm Count, Spermatozoa, Sperm Motility, Semen, Testis, Infertility, Male, Spermatogenesis, Testosterone, Fertility
<b><u>5</u> Brain neoplasms</b>	Meningioma, Glioma, Meningeal Neoplasms, Neuroma, Acoustic, Brain Neoplasms, Glioblastoma, Neoplasms, Radiation-Induced, Neuroma, Cranial Nerve Neoplasms, Parotid Neoplasms, Central Nervous System Neoplasms
<b><u>6</u> Sensory disorders</b>	Burning Mouth Syndrome, Taste Disorders, Skin Diseases, Mouth Diseases, Dizziness, Vision Disorders, Hypersensitivity, Delayed, Fatigue
<b><u>7</u> Breast neoplasms</b>	Carcinoma, Lobular, Carcinoma, Ductal, Breast, Breast Neoplasms, Male, Adenoma
<b><u>8</u> Oxidative stress</b>	Oxidative Stress, Malondialdehyde, Glutathione Peroxidase, Lipid Peroxidation, Reactive Oxygen Species, Apoptosis, DNA Damage, Nitric Oxide, Protein Carbonylation
<b><u>9</u> Neurodegenerative diseases</b>	Parkinson Disease, Neurodegenerative Diseases, Alzheimer Disease, Amyotrophic Lateral Sclerosis, Motor Neuron Disease, Occupational Diseases, Dementia, Brain Diseases, Dementia, Vascular
<b><u>10</u> Cerebrovascular disorders</b>	Cerebrovascular Disorders, Dementia, Migraine Disorders, Tinnitus, Headache, Sleep Wake Disorders, Carotid Artery Diseases, Alzheimer Disease, Dementia, Vascular

<a href="#"><u>11</u></a> <b>Congenital abnormalities and glandular-based tumors</b>	Cleft Lip, Cleft Palate, Fibroadenoma, Adenoma, Calcification, Physiologic, Mammary Neoplasms, Animal, Mammary Neoplasms, Experimental, Adenocarcinoma
<a href="#"><u>12</u></a> <b>Skin neoplasms</b>	Carcinoma, Basal Cell, Carcinoma, Squamous Cell, Skin Neoplasms, Cocarcinogenesis, Neoplasms, Experimental, Neoplasms, Radiation-Induced, Colonic Neoplasms
<a href="#"><u>13</u></a> <b>Leukemia</b>	Leukemia, Myeloid, Acute, Leukemia, Lymphocytic, Chronic, B-Cell, Leukemia, Myelogenous, Chronic, BCR-ABL Positive, Leukemia, Myeloid, Leukemia, Multiple Myeloma, Lymphoma, Leukemia, Radiation-Induced, Acute Disease, Liver Neoplasms, Experimental, Central Nervous System Neoplasms
<a href="#"><u>14</u></a> <b>Precancerous conditions</b>	Atrophy, Precancerous Conditions, Hyperplasia, Hypersensitivity, Delayed, Thymus Gland, Capillary Permeability, Lymphoma
<a href="#"><u>15</u></a> <b>Circadian Rhythm</b>	Melatonin, Circadian Rhythm, Pineal Gland
<a href="#"><u>16</u></a> <b>Eye diseases</b>	Eye Diseases, Cataract, Vision Disorders, Sensation Disorders, Neurotic Disorders, Lens, Crystalline, Corneal Diseases, Edema, Hematologic Diseases
<a href="#"><u>17</u></a> <b>Electromagnetic interference in implanted electronic devices</b>	Tachycardia, Ventricular, Ventricular Fibrillation, Death, Sudden, Cardiac, Arrhythmias, Cardiac
<a href="#"><u>18</u></a> <b>Liver Neoplasms</b>	Liver Neoplasms, Carcinoma, Hepatocellular, Neoplasm Recurrence, Local, Lymphatic Metastasis
<a href="#"><u>19</u></a> <b>Symptoms of discomfort</b>	Headache, Dizziness, Fatigue, Depression, Anxiety, Tremor, Sleep Wake Disorders, Neurotic Disorders, Stress, Psychological, Anxiety Disorders, Nervous System Diseases
<a href="#"><u>20</u></a> <b>Neoplasms</b>	Lung Neoplasms, Ovarian Neoplasms, Pituitary Neoplasms, Lymphoma, Prostatic Neoplasms, Colonic Neoplasms, Carcinoma, Breast Neoplasms, Hematologic Neoplasms, Neoplasms, Liver Neoplasms, Cell Transformation, Neoplastic, Nervous System Neoplasms

A3-B. Factor Record Titles

## FACTOR 1

Theme – Electromagnetic hypersensitivity and inflammation

Key MeSH Headings - C-Reactive Protein, Liver Diseases, Thyroid Diseases, Inflammation, Tonsillitis, Hypersensitivity

**Titles**

915 MHz microwaves and 50 Hz magnetic field affect chromatin conformation and 53BP1 foci in human lymphocytes from hypersensitive and healthy persons.

A cognitive-behavioral treatment of patients suffering from "electric hypersensitivity". Subjective effects and reactions in a double-blind provocation study.

A systematic review of treatments for electromagnetic hypersensitivity.

Activation of TLR signalling regulates microwave radiation-mediated impairment of spermatogenesis in rat testis.

Analysis of the effect of a 60 Hz AC field on histamine release by rat peritoneal mast cells.

Are thyroid dysfunctions related to stress or microwave exposure (900 MHz)?

Bilateral symmetry of local inflammatory activation in human carotid atherosclerotic plaques.

Biological effects of low-level environmental agents.

Blood laboratory findings in patients suffering from self-perceived electromagnetic hypersensitivity (EHS).

Changes in antioxidant capacity of blood due to mutual action of electromagnetic field (1800 MHz) and opioid drug (tramadol) in animal model of persistent inflammatory state.

Changes in the chromatin structure of lymphoid cells under the influence of low-intensity extremely high-frequency electromagnetic radiation against the background of inflammatory process].

Clinical significance of tonsillar provocation test in diagnosis of tonsillar focal infection--by indirect irradiation of ultra-micro waves].

Controversies around electromagnetic fields and electromagnetic hypersensitivity. The construction of "low noise" public problems].

Decrease in the intensity of the cellular immune response and nonspecific inflammation upon exposure to extremely high frequency electromagnetic radiation].

Dependence of anti-inflammatory effects of high peak-power pulsed electromagnetic radiation of extremely high frequency on exposure parameters].

Description of persons with symptoms presumed to be caused by electricity or visual display units--oral aspects.

Development and evaluation of the electromagnetic hypersensitivity questionnaire.

Earthing: health implications of reconnecting the human body to the Earth's surface electrons.

Effect of high frequency electromagnetic wave stimulation on muscle injury in a rat model.

Effect of mobile phone use on salivary concentrations of protein, amylase, lipase, immunoglobulin A, lysozyme, lactoferrin, peroxidase and C-reactive protein of the parotid gland.

Effect of quinacrine on inflammatory reaction of blood system induced by microwave irradiation].

Effect of the pulsed electromagnetic field on the release of inflammatory mediators from adipose-derived stem cells (ADSCs) in rats.

Effects of low-intensity ultrahigh frequency electromagnetic radiation on inflammatory processes.

Effects of personalised exposure on self-rated electromagnetic hypersensitivity and sensibility - A double-blind randomised controlled trial.

Effects of RF fields emitted from smart phones on cardio-respiratory parameters: a preliminary provocation study.

Electrical hypersensitivity in humans--fact or fiction?

Electrohypersensitivity: a functional impairment due to an inaccessible environment.

Electromagnetic fields (EMF): do they play a role in children's environmental health (CEH)?

Electromagnetic fields and health outcomes.

Electromagnetic fields hypersensitivity].

Electromagnetic hypersensitivity (EHS) and subjective health complaints associated with electromagnetic fields of mobile phone communication--a literature review published between 2000 and 2004.

Electromagnetic hypersensitivity--an increasing challenge to the medical profession.

Electromagnetic hypersensitivity: biological effects of dirty electricity with emphasis on diabetes and multiple sclerosis.

Electromagnetic hypersensitivity: fact or fiction?

Epidemiology and etiology of gliomas.

Extremely low-frequency electromagnetic field exposure enhances inflammatory response and inhibits effect of antioxidant in RAW 264.7 cells.

Features of anti-inflammatory effects of modulated extremely high-frequency electromagnetic radiation.

Functional brain MRI in patients complaining of electrohypersensitivity after long term exposure to electromagnetic fields.

Heavy metal exposure in patients suffering from electromagnetic hypersensitivity.

Hsp70 is an independent stress marker among frequent users of mobile phones.

Hypersensitivity symptoms associated with exposure to cellular telephones: no causal link.

Hypersensitivity syndrome].

Hypersensitivity to electricity: working definition and additional characterization of the syndrome.

Idiopathic environmental intolerance attributed to electromagnetic fields (formerly 'electromagnetic hypersensitivity'): An updated systematic review of provocation studies.

Increased mercury release from dental amalgam restorations after exposure to electromagnetic fields as a potential hazard for hypersensitive people and pregnant women.

Induction of macrophage migration inhibitory factor precedes the onset of acute tonsillitis.

Microwaves from GSM mobile telephones affect 53BP1 and gamma-H2AX foci in human lymphocytes from hypersensitive and healthy persons.

Mobile-phone-based home exercise training program decreases systemic inflammation in COPD: a pilot study.

Physiological variables and subjective symptoms by 60 Hz magnetic field in EHS and non-EHS persons.

Prevalence of self-reported hypersensitivity to electric or magnetic fields in a population-based questionnaire survey.

Provocation of electric hypersensitivity under everyday conditions.

Provocation study of persons with perceived electrical hypersensitivity and controls using magnetic field exposure and recording of electrophysiological characteristics.

Provocation with stress and electricity of patients with "sensitivity to electricity".

Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder.

Sensitivity of spiral ganglion neurons to damage caused by mobile phone electromagnetic radiation will increase in lipopolysaccharide-induced inflammation in vitro model.

Some ocular symptoms and sensations experienced by long term users of mobile phones.

The amelioration of phagocytic ability in microglial cells by curcumin through the inhibition of EMF-induced pro-inflammatory responses.

The effect of melatonin on the liver of rats exposed to microwave radiation.

The implications of non-linear biological oscillations on human electrophysiology for electrohypersensitivity (EHS) and multiple chemical sensitivity (MCS).

The microwave syndrome or electro-hypersensitivity: historical background.

The role of fatty acids in anti-inflammatory effects of low-intensity extremely high-frequency electromagnetic radiation.

The role of microwave radiometry in carotid artery disease. Diagnostic and clinical prospective.

Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective.

Thermal Response of In Vivo Human Skin to Fractional Radiofrequency Microneedle Device.

Use of terahertz electromagnetic radiation at nitric oxide frequencies for the correction of thyroid functional state during stress].

Wireless communication fields and non-specific symptoms of ill health: a literature review.

Women growing older with environmental sensitivities: A grounded theory model of meeting one's needs.

## FACTOR 2

Theme – Coronary artery disease

Key MeSH Headings - Plaque, Atherosclerotic, Coronary Artery Disease, Diabetes Mellitus, Carotid Artery Diseases, Inflammation, Hypertension

### **Titles**

A study on the biological effects of exposure mobile-phone frequency EMF].

A survey on diabetes mellitus in the staff of electric power system in Baotou city].

Activation of TLR signalling regulates microwave radiation-mediated impairment of spermatogenesis in rat testis.

Analysis of the effect of a 60 Hz AC field on histamine release by rat peritoneal mast cells.

Bilateral symmetry of local inflammatory activation in human carotid atherosclerotic plaques.

Blood laboratory findings in patients suffering from self-perceived electromagnetic hypersensitivity (EHS).

Cardiovascular risk in operators under radiofrequency electromagnetic radiation.

Changes in antioxidant capacity of blood due to mutual action of electromagnetic field (1800 MHz) and opioid drug (tramadol) in animal model of persistent inflammatory state.

Changes in the chromatin structure of lymphoid cells under the influence of low-intensity extremely high-frequency electromagnetic radiation against the background of inflammatory process].

Decrease in the intensity of the cellular immune response and nonspecific inflammation upon exposure to extremely high frequency electromagnetic radiation].

Dependence of anti-inflammatory effects of high peak-power pulsed electromagnetic radiation of extremely high frequency on exposure parameters].

Development of hypertension after long-term exposure to static magnetic fields among workers from a magnetic resonance imaging device manufacturing facility.

Earthing: health implications of reconnecting the human body to the Earth's surface electrons.

Effect of electromagnetic irradiation of the millimetric range on hemodynamics in patients with arterial hypertension].

Effect of high frequency electromagnetic wave stimulation on muscle injury in a rat model.

Effect of quinacrine on inflammatory reaction of blood system induced by microwave irradiation].

Effect of the pulsed electromagnetic field on the release of inflammatory mediators from adipose-derived stem cells (ADSCs) in rats.

Effects of low-intensity ultrahigh frequency electromagnetic radiation on inflammatory processes.

Electromagnetic effects on people.

Electromagnetic hypersensitivity: biological effects of dirty electricity with emphasis on diabetes and multiple sclerosis.

Epidemiological risk assessment of pathology development in occupational exposure to radiofrequency electromagnetic fields].

Evaluation of occupational risk caused by exposure to electromagnetic rays].

Evidence that dirty electricity is causing the worldwide epidemics of obesity and diabetes.

Exacerbation of hypertension and disturbances of the geomagnetic field].

Exposure to radio-frequency radiation from an aircraft radar unit.

Extremely low-frequency electromagnetic field exposure enhances inflammatory response and inhibits effect of antioxidant in RAW 264.7 cells.

Features of anti-inflammatory effects of modulated extremely high-frequency electromagnetic radiation.

Health care utilisation and attitudes towards health care in subjects reporting environmental annoyance from electricity and chemicals.

Mobile-phone-based home exercise training program decreases systemic inflammation in COPD: a pilot study.

Psychological symptoms and intermittent hypertension following acute microwave exposure.

Radiofrequency Scanning for Retained Surgical Items Can Cause Electromagnetic Interference and Pacing Inhibition if an Asynchronous Pacing Mode Is Not Applied.

Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder.

Role of ultrasonic dopplerography in monitoring the effectiveness of treatment of patients who have sustained a stroke with decimeter-range electromagnetic waves].

Sensitivity of spiral ganglion neurons to damage caused by mobile phone electromagnetic radiation will increase in lipopolysaccharide-induced inflammation in vitro model.

Some ocular symptoms and sensations experienced by long term users of mobile phones.

The amelioration of phagocytic ability in microglial cells by curcumin through the inhibition of EMF-induced pro-inflammatory responses.



The heliogeophysical aspects of circumpolar health.

The role of fatty acids in anti-inflammatory effects of low-intensity extremely high-frequency electromagnetic radiation.

The role of microwave radiometry in carotid artery disease. Diagnostic and clinical prospective.

Thermal Response of In Vivo Human Skin to Fractional Radiofrequency Microneedle Device.

## FACTOR 3A

Theme – Congenital abnormalities

Key MeSH Headings - Cleft Lip, Cleft Palate, Calcification, Physiologic, Congenital Abnormalities

### **Titles**

A confirmation study of Russian and Ukrainian data on effects of 2450 MHz microwave exposure on immunological processes and teratology in rats.

Adverse human reproductive outcomes and electromagnetic fields: a brief summary of the epidemiologic literature.

Age diseases depending on geomagnetic field activity inside the womb period].

Alternative functional relationships between ELF field exposure and possible health effects: report on an expert workshop.

An evaluation of the mutagenic, carcinogenic and teratogenic potential of microwaves.

An international project to confirm Soviet-era results on immunological and teratological effects of RF field exposure in Wistar rats and comments on Grigoriev et al. [2010].

Anesthesia as an effective agent against the production of congenital anomalies in mouse fetuses exposed to electromagnetic radiation.

Are microwaves a co-teratogen? Experimental model concept and its verification].

Case-control study on maternal residential proximity to high voltage power lines and congenital anomalies in France.

Chick embryo development can be irreversibly altered by early exposure to weak extremely-low-frequency magnetic fields.

Clinical teratology.

Congenital anomalies in the offspring of rats after exposure of the testis to an electrostatic field.

Contribution of physical factors to the complex anthropogenic load in an industrial town].

Development of chicken embryos in a pulsed magnetic field.

Development of preincubated chicken eggs following exposure to 50 Hz electromagnetic fields with 1.33-7.32 mT flux densities.

Developmental changes in *Drosophila melanogaster* following exposure to alternating electromagnetic fields.

Developmental toxicity interactions of salicylic acid and radiofrequency radiation or 2-methoxyethanol in rats.

Effects of 2.45 GHz CW microwave radiation on embryofetal development in mice.

Effects of gestational exposure to 1.95-GHz W-CDMA signals for IMT-2000 cellular phones: Lack of embryotoxicity and teratogenicity in rats.

Effects of noise and electromagnetic fields on reproductive outcomes.

Electromagnetic poles and reproduction].

EMF and health.

Epidemiological studies of work with video display terminals and adverse pregnancy outcomes (1984-1992).

Evaluation of the developmental toxicity of 60 Hz magnetic fields and harmonic frequencies in Sprague-Dawley rats.

Interaction of static and extremely low frequency electric and magnetic fields with living systems: health effects and research needs.

Joint actions of environmental nonionizing electromagnetic fields and chemical pollution in cancer promotion.

Maternal exposure to magnetic fields from high-voltage power lines and the risk of birth defects.

Maternal proximity to extremely low frequency electromagnetic fields and risk of birth defects.

Mouse early embryos obtained by natural breeding or in vitro fertilization display a differential sensitivity to extremely low-frequency electromagnetic fields.

Mutagenic, carcinogenic and teratogenic effects induced by radiofrequency electromagnetic field of mobile phone].

Neural and behavioral teratological evaluation of rats exposed to ultra-wideband electromagnetic fields.

Paternal work in the power industry: effects on children at delivery.

Possible effects of electric blankets and heated waterbeds on fetal development.

Prospective study of pregnancy outcomes after parental cell phone exposure: the Norwegian Mother and Child Cohort Study.

Pulsed magnetic field from video display terminals enhances teratogenic effects of cytosine arabinoside in mice.

Recent advances in research on radiofrequency fields and health.

Reproductive and teratologic effects of electromagnetic fields.

Risk of birth defects by parental occupational exposure to 50 Hz electromagnetic fields: a population based study.

Search for teratogenic risks with the aid of malformation registries.

Some effects of exposure of the Japanese quail embryo to 2.45-GHz microwave radiation.

Teratogenic effects of sinusoidal extremely low frequency electromagnetic fields on morphology of 24 hr chick embryos.

Teratology, survival, and reversal learning after fetal irradiation of mice by 2450-MHz microwave energy.

The effects of ionizing radiation, microwaves, and ultrasound on the developing embryo: clinical interpretations and applications of the data.

The influence of electromagnetic radiation generated by a mobile phone on the skeletal system of rats.

VDT pulse magnetic field enhances teratogenic effect of ara-c in mice].

Video display terminal use during pregnancy and reproductive outcome--a meta-analysis.

Video display terminals: risk of electromagnetic radiation.

## FACTOR 3B

Theme – Mammary tumors

Key MeSH Headings - Fibroadenoma, Adenoma, Mammary Neoplasms, Animal, Mammary Neoplasms, Experimental, Adenocarcinoma

### **Titles**

A histopathological study on alterations in DMBA-induced mammary carcinogenesis in rats with 50 Hz, 100  $\mu$ T magnetic field exposure.

Acceleration of mammary tumorigenesis by exposure of 7,12-dimethylbenz[a]anthracene-treated female rats in a 50-Hz, 100-microT magnetic field: replication study.

Bioelectromagnetic field effects on cancer cells and mice tumors.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in B6C3F1 mice.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in F344/N rats.

Chronic, low-level (1.0 W/kg) exposure of mice prone to mammary cancer to 2450 MHz microwaves.

Do cocarcinogenic effects of ELF electromagnetic fields require repeated long-term interaction with carcinogens? Characteristics of positive studies using the DMBA breast cancer model in rats.

Effect of 13 week magnetic field exposures on DMBA-initiated mammary gland carcinomas in female Sprague-Dawley rats.

Effect of 26 week magnetic field exposures in a DMBA initiation-promotion mammary gland model in Sprague-Dawley rats.

Effect of a 9 mT pulsed magnetic field on C3H/Bi female mice with mammary carcinoma. A comparison between the 12 Hz and the 460 Hz frequencies.

Effects of 50- or 60-hertz, 100 microT magnetic field exposure in the DMBA mammary cancer model in Sprague-Dawley rats: possible explanations for different results from two laboratories.

Effects of 900 MHz GSM wireless communication signals on DMBA-induced mammary tumors in rats.

Effects of GSM-900 microwaves on DMBA-induced mammary gland tumors in female Sprague-Dawley rats.

Effects of magnetic fields on mammary tumor development induced by 7,12-dimethylbenz(a)anthracene in rats.

Effects of mobile-phone microwave on dimethylbenz (a) anthracene induced mammary carcinoma development in rats].

Effects of weak alternating magnetic fields on nocturnal melatonin production and mammary carcinogenesis in rats.

Evaluation of health risks caused by radio frequency accelerated carcinogenesis: the importance of processes driven by the calcium ion signal.

Evaluation of the potential carcinogenicity of 60 Hz linear sinusoidal continuous-wave magnetic fields in Fischer F344 rats.

Low-frequency electromagnetic radiation enhances the induction of rat mammary tumors by nitrosomethyl urea.

Magnetic fields and mammary cancer in rodents: a critical review and evaluation of published literature.

Male breast tumors in railway engine drivers: investigation of 5 cases].

Microwave absorption by normal and tumor cells.

Modifying effect of light and electromagnetic field on development of mammary tumors induced by N-nitrosomethyl urea in female rats].

Non dietetic environmental risk factors in prostate cancer].

Occupational exposure to magnetic fields in relation to male breast cancer and testicular cancer: a Swedish case-control study.

On the role of the interactions of ions with external magnetic fields in physiologic processes and their importance in chronobiology.

Repeated exposure of C3H/HeJ mice to ultra-wideband electromagnetic pulses: lack of effects on mammary tumors.

Significant differences in the effects of magnetic field exposure on 7,12-dimethylbenz(a)anthracene-induced mammary carcinogenesis in two substrains of Sprague-Dawley rats.

Study on potential effects of "902-MHz GSM-type Wireless Communication Signals" on DMBA-induced mammary tumours in Sprague-Dawley rats.

The effect of low-frequency electromagnetic fields on the development of experimental mammary tumors].

Transferrin receptors and natural killer cell lysis. A study using Colo 205 cells exposed to 60 Hz electromagnetic fields.

## FACTOR 4

Theme – Male infertility

Key MeSH Headings - Sperm Count, Spermatozoa, Sperm Motility, Semen, Testis, Infertility, Male, Spermatogenesis, Testosterone, Fertility

### **Titles**

1800 MHz mobile phone irradiation induced oxidative and nitrosative stress leads to p53 dependent Bax mediated testicular apoptosis in mice, *Mus musculus*.

1950MHz Radio Frequency Electromagnetic Radiation Inhibits Testosterone Secretion of Mouse Leydig Cells.

2.45 GHz microwave radiation induced oxidative and nitrosative stress mediated testicular apoptosis: Involvement of a p53 dependent bax-caspase-3 mediated pathway.

2.45-GHz microwave irradiation adversely affects reproductive function in male mouse, *Mus musculus* by inducing oxidative and nitrosative stress.

900 MHz pulse-modulated radiofrequency radiation induces oxidative stress on heart, lung, testis and liver tissues.

A 50-Hz electromagnetic field impairs sleep.

Abnormal physical architecture of the lipophilic domains of human sperm membrane in oligospermia: a logical cause for low fertility profiles.

Action of UHF microwaves on the germ and somatic cells of mammals].

Activation of TLR signalling regulates microwave radiation-mediated impairment of spermatogenesis in rat testis.

Acute, whole-body microwave exposure and testicular function of rats.

Adolescent in-school cellphone habits: a census of rules, survey of their effectiveness, and fertility implications.

Alternating magnetic field damages the reproductive function of murine testes].

An evaluation of the effects of long-term cell phone use on the testes via light and electron microscope analysis.

An ultrastructural analysis of the testes in mice subjected to long-term exposure to a 17-kHz electrical field].

Analysis of Gene Expression in Mice Testes Exposed to 1.765 GHz Microwave in Utero.

Are men talking their reproductive health away?

Association between mobile phone use and semen quality: a systemic review and meta-analysis.

Biologic effects of prolonged exposure to ELF electromagnetic fields in rats: II. 50 Hz magnetic fields.

Biological and morphological effects on the reproductive organ of rats after exposure to electromagnetic field.

Biological effects of non-ionizing electromagnetic fields: Two sides of a coin.

Biophysical evaluation of radiofrequency electromagnetic field effects on male reproductive pattern.

Cell phones and male infertility: a review of recent innovations in technology and consequences.

Cell phones and male infertility: dissecting the relationship.

Cell phones: modern man's nemesis?

Cellphone electromagnetic radiation damages the testicular ultrastructure of male rats].

Challenging cell phone impact on reproduction: a review.

Changes of rat testicular germ cell apoptosis after high power microwave radiation].

Chronotoxicity of 1800 MHz microwave radiation on sex hormones and spermatogenesis in male mice].

Combined effects of traffic and electromagnetic fields on the immune system of fertile atopic women.

Combined effects of varicocele and cell phones on semen and hormonal parameters.

Comparative effectiveness of different tests to determine the mutagenicity of certain factors in mammals. II. Frequency of anomalous sperm head in mice exposed to different factors].

Comparison of native and microwave irradiated DNA.

Congenital anomalies in the offspring of rats after exposure of the testis to an electrostatic field.

Cytogenetic effects of microwave irradiation on male germ cells of the mouse.

Cytokines produced by microwave-radiated Sertoli cells interfere with spermatogenesis in rat testis.

DNA damage, cell kinetics and ODC activities studied in CBA mice exposed to electromagnetic fields generated by transmission lines.

Does exposure to computers affect the routine parameters of semen quality?

Does prolonged radiofrequency radiation emitted from Wi-Fi devices induce DNA damage in various tissues of rats?

Does static electric field from ultra-high voltage direct-current transmission lines affect male reproductive capacity? Evidence from a laboratory study on male mice.



Dominant lethal studies in male mice after exposure to 2.45 GHz microwave radiation.

Dominant lethal studies in male mice after exposure to a 50 Hz magnetic field.

Dominant lethal studies in male mice after exposure to a 50-Hz electric field.

Dosimetry for a study of effects of 2.45-GHz microwaves on mouse testis.

Effect of 2.45 GHz microwave radiation on the fertility pattern in male mice.

Effect of 2450 MHz microwaves on the fertility of Swiss female mice].

Effect of cell phone usage on semen analysis in men attending infertility clinic: an observational study.

Effect of discontinuous short-wave electromagnetic field irradiation on the state of the endocrine glands].

Effect of electromagnetic irradiation produced by 3G mobile phone on male rat reproductive system in a simulated scenario.

Effect of Electromagnetic Waves from Mobile Phones on Spermatogenesis in the Era of 4G-LTE.

Effect of Guilingji Capsule on the fertility, liver functions, and serum LDH of male SD rats exposed by 900 mhz cell phone].

Effect of long-term exposure of 2.4 GHz radiofrequency radiation emitted from Wi-Fi equipment on testes functions.

Effect of low power microwave on the mouse genome: a direct DNA analysis.

Effect of low-intensity extremely high frequency radiation on reproductive function in wistar rats.

Effect of mobile telephones on sperm quality: a systematic review and meta-analysis.

Effect of Modified Wuzi Yanzong Pill () on Tip60-Mediated Apoptosis in Testis of Male Rats after Microwave Radiation.

Effect of rosmarinic acid on sertoli cells apoptosis and serum antioxidant levels in rats after exposure to electromagnetic fields.

Effect of whole-body 1800MHz GSM-like microwave exposure on testicular steroidogenesis and histology in mice.

Effects of 1800-MHz radiofrequency fields on circadian rhythm of plasma melatonin and testosterone in male rats.

Effects of 2.45 GHz CW microwave radiation on embryofetal development in mice.

Effects of 2.45 GHz microwave radiation and heat on mouse spermatogenic epithelium.

Effects of 2.45 GHz microwaves on meiotic chromosomes of male CBA/CAY mice.

Effects of 60 Hz electromagnetic field exposure on testicular germ cell apoptosis in mice.

Effects of a unique electromagnetic field system on the fertility of rats.

Effects of cellular phone emissions on sperm motility in rats.

Effects of electromagnetic fields exposure on plasma hormonal and inflammatory pathway biomarkers in male workers of a power plant.

Effects of electromagnetic fields on fecundity in the chicken.

Effects of electromagnetic fields on the reproductive success of American kestrels.

Effects of electromagnetic pulses on apoptosis and TGF-beta3 expression of mouse testis tissue].

Effects of electromagnetic radiation from a cellular phone on human sperm motility: an in vitro study.

Effects of electromagnetic radiation on morphology and TGF-beta3 expression in mouse testicular tissue.

Effects of electromagnetic waves emitted from 3G+wi-fi modems on human semen analysis.

Effects of exposure to a mobile phone on sexual behavior in adult male rabbit: an observational study.

Effects of exposure to a mobile phone on testicular function and structure in adult rabbit.

Effects of exposure to electromagnetic field (1.8/0.9 GHz) on testicular function and structure in growing rats.

Effects of extremely low-frequency electromagnetic fields (ELF-EMF) exposure on B6C3F1 mice.

Effects of GSM-like radiofrequency irradiation during the oogenesis and spermiogenesis of *Xenopus laevis*.

Effects of high power microwave on the expressions of Bcl-2 and C-myc proteins in the rat testis].

Effects of microwaves (950 MHZ mobile phone) on morphometric and apoptotic changes of rabbit epididymis.

Effects of mobile phone radiation on serum testosterone in Wistar albino rats.

Effects of radiofrequency electromagnetic fields (UMTS) on reproduction and development of mice: a multi-generation study.

Effects of radiofrequency electromagnetic fields on mammalian spermatogenesis].

Effects of radiofrequency electromagnetic wave exposure from cellular phones on the reproductive pattern in male Wistar rats.

Effects of radiofrequency electromagnetic waves (RF-EMW) from cellular phones on human ejaculated semen: an in vitro pilot study.

Effects of the exposure to mobile phones on male reproduction: a review of the literature.

Effects of whole-body 50-Hz magnetic field exposure on mouse Leydig cells.

Effects on rat testis of 1.95-GHz W-CDMA for IMT-2000 cellular phones.

Electric power, pineal function, and the risk of breast cancer.

Electromagnetic radiation at 900 MHz induces sperm apoptosis through bcl-2, bax and caspase-3 signaling pathways in rats.

Environmental risk factors in the history of male patients of an infertility clinic.

Evaluation of changes in electrophysiological and hormonal parameters in rabbits resulting from short-term low-intensity ultra-high-frequency irradiation].

Evaluation of testicular degeneration induced by low-frequency electromagnetic fields.

Evaluation of the effect of using mobile phones on male fertility.

Evidence for mobile phone radiation exposure effects on reproductive pattern of male rats: role of ROS.

Examination of electric field effects on tissues by using back propagation neural network.

Exercise testing in the evaluation of human responses to powerline frequency fields.

Experimental research on the biological action of the pulse-modulated microwave radiation created by shipboard radar stations].

Exposure to a 900 MHz electromagnetic field for 1 hour a day over 30 days does change the histopathology and biochemistry of the rat testis.

Exposure to magnetic fields and the risk of poor sperm quality.

Exposure to non-ionizing electromagnetic radiation of public risk prevention instruments threatens the quality of spermatozooids.

Extremely low frequency electromagnetic field exposure affects fertilization outcome in swine animal model.

Extremely low-frequency magnetic fields can impair spermatogenesis recovery after reversible testicular damage induced by heat.

Flow cytometric analysis of the effects of 50 Hz magnetic fields on mouse spermatogenesis].

Germ cell degeneration in normal and microwave-irradiated rats: potential sperm production rates at different developmental steps in spermatogenesis.

Growing concern over the safety of using mobile phones and male fertility.

Habits of cell phone usage and sperm quality - does it warrant attention?

Health problems among workers of iron welding machines: an effect of electromagnetic fields.

Histological and cytological examination of rat reproductive tissue after short-time intermittent radiofrequency exposure.

How does long term exposure to base stations and mobile phones affect human hormone profiles?

Human disease resulting from exposure to electromagnetic fields.

Hygienic standardization of electromagnetic radiation from two-channel meteorological radar stations].

Hypospermatogenesis and spermatozoa maturation arrest in rats induced by mobile phone radiation.

Immunohistopathologic demonstration of deleterious effects on growing rat testes of radiofrequency waves emitted from conventional Wi-Fi devices.

Immunomorphologic changes in the testes upon exposure to a microwave electromagnetic field].

Impact of 2.45 GHz microwave radiation on the testicular inflammatory pathway biomarkers in young rats: The role of gallic acid.

Impact of cell phone radiation on male reproduction].

Impact of cell phone use on men's semen parameters.

Impact of microwave at X-band in the aetiology of male infertility.

Impact of mobile phone radiation on the quality and DNA methylation of human sperm in vitro].

Impact of radio frequency electromagnetic radiation on DNA integrity in the male germline.

In vitro effect of pulsed 900 MHz GSM radiation on mitochondrial membrane potential and motility of human spermatozoa.

In vitro effects of radiofrequency electromagnetic waves on bovine spermatozoa motility.

In vitro fertilization of mouse ova by spermatozoa exposed isothermally to radio-frequency radiation.

Influence of a 50 hz extra low frequency electromagnetic field on spermatozoa motility and fertilization rates in rabbits.

Influence of electromagnetic fields emitted by GSM-900 cellular telephones on the circadian patterns of gonadal, adrenal and pituitary hormones in men.

Influence of electromagnetic fields on reproductive system of male rats.

Influence of in vitro microwave radiation on the fertilizing capacity of turkey sperm.

Influence of microwave exposure on fertility of male rats.

Influence of radiofrequency-electromagnetic waves from 3rd-generation cellular phones on fertilization and embryo development in mice.

Inhibition by Egb761 of the effect of cellphone radiation on the male reproductive system.

Inhibitory effects of low doses of melatonin on induction of preneoplastic liver lesions in a medium-term liver bioassay in F344 rats: relation to the influence of electromagnetic near field exposure.

Interaction of microwave radiation with turkey sperm.

Is there a relationship between cell phone use and semen quality?

Long-term effects of 900 MHz radiofrequency radiation emitted from mobile phone on testicular tissue and epididymal semen quality.

Long-term exposure of male and female mice to 50 Hz magnetic field: effects on fertility.

Long-term exposure to low intensity microwave radiation affects male reproductivity].

Long-term microwave radiation affects male reproduction in rats].

Low frequency electromagnetic waves increase human sperm motility - A pilot study revealing the potent effect of 43 kHz radiation.

Mechanisms of biological effects of radiofrequency electromagnetic fields: an overview.

Melatonin attenuates radiofrequency radiation (900 MHz)-induced oxidative stress, DNA damage and cell cycle arrest in germ cells of male Swiss albino mice.

Metabolic and ultrastructural adaptation mechanisms during the primary prophylactic action of low-intensity electromagnetic radiation under normal and radiation conditions].

Microwave emissions from police radar.

Microwave exposure affecting reproductive system in male rats.

Microwave radiation decreases the expressions of occludin and JAM-1 in rats].

Mobile phone radiation induces reactive oxygen species production and DNA damage in human spermatozoa in vitro.

Mobile phone usage and male infertility in Wistar rats.

Morinda officialis how extract improves microwave-induced reproductive impairment in male rats].

Multigeneration reproductive toxicity assessment of 60-Hz magnetic fields using a continuous breeding protocol in rats.

Occupational exposures obtained by questionnaire in clinical practice and their association with semen quality.

Occupational hazards for the male reproductive system.

Occupational influences on male fertility and sexuality. I.

Oxidative effects of extremely low frequency magnetic field and radio frequency radiation on testes tissues of diabetic and healthy rats.

Oxidative stress-mediated alterations on sperm parameters in male Wistar rats exposed to 3G mobile phone radiation.

PARAMETERS OF SPERMATOGENESIS IN MEN EXPOSED TO DIFFICULT ENVIRONMENTS].

Pathological study of testicular injury induced by high power microwave radiation in rats].

Poly ADP ribosylation as a possible mechanism of microwave--biointeraction.

Prospective study of pregnancy outcomes after parental cell phone exposure: the Norwegian Mother and Child Cohort Study.

Protective effect of Liuweidihuang Pills against cellphone electromagnetic radiation-induced histomorphological abnormality, oxidative injury, and cell apoptosis in rat testes].

Protective effects of luteolin on rat testis following exposure to 900 MHz electromagnetic field.

Proteomic analysis of continuous 900-MHz radiofrequency electromagnetic field exposure in testicular tissue: a rat model of human cell phone exposure.

Pulsed or continuous electromagnetic field induce p53/p21-mediated apoptotic signaling pathway in mouse spermatogenic cells in vitro and thus may affect male fertility.

Quantitative changes in testicular structure and function in rat exposed to mobile phone radiation.

Radar radiation damages sperm quality].

Radiations and male fertility.

Radio frequency electromagnetic radiation (RF-EMR) from GSM (0.9/1.8GHz) mobile phones induces oxidative stress and reduces sperm motility in rats.

Radiofrequency electromagnetic fields; male infertility and sex ratio of offspring.

Radiofrequency electromagnetic radiation from cell phone causes defective testicular function in male Wistar rats.

Radiofrequency radiation (900 MHz)-induced DNA damage and cell cycle arrest in testicular germ cells in swiss albino mice.

Rat fertility and embryo fetal development: influence of exposure to the Wi-Fi signal.

Reaction of Reproductive System and Epididymal Spermatozoa .of Rats to Electromagnetic Radiation from Mobile Phone (1745 MHz) of Various Duration].

Recent reports of Wi-Fi and mobile phone-induced radiation on oxidative stress and reproductive signaling pathways in females and males.

Reproduction in male Japanese quail exposed to microwave radiation during embryogeny.

Reproductive hazards among workers at high voltage substations.

Response of *Caenorhabditis elegans* to wireless devices radiation exposure.

Response of the seminiferous epithelium of the mouse exposed to low dose high energy (HZE) and electromagnetic radiation.

Scientometric study of the effects of exposure to non-ionizing electromagnetic fields on fertility: A contribution to understanding the reasons of partial failure.

Self-reported mobile phone use and semen parameters among men from a fertility clinic.

Semen analysis of military personnel associated with military duty assignments.

Sperm count and sperm abnormality in male mice after exposure to 2.45 GHz microwave radiation.

State of the reproductive system in male rats of 1st generation obtained from irradiated parents and exposed to electromagnetic radiation (897 MHz) during embryogenesis and postnatal development].

Status quo of the researches on the biological effect of electromagnetic radiation on the testis and epididymal sperm].

Structural and ultrastructural study of rat testes influenced by electromagnetic radiation.

Studies of the induction of dominant lethals and translocations in male mice after chronic exposure to microwave radiation.

Studies of the teratogenic potential of exposure of rats to 6000-MHz microwave radiation. II. Postnatal psychophysiologic evaluations.

Study of bioeffects of ship-borne microwave navigation radar in chronic experiments].

Testicular apoptosis and histopathological changes induced by a 2.45 GHz electromagnetic field.

Testicular development evaluation in rats exposed to 60 Hz and 1 mT electromagnetic field.

Testicular function of rats following exposure to microwave radiation.

Tests of mutagenesis and reproduction in male rats exposed to 2,450-MHz (CW) microwaves.

The biological effects of radiofrequency radiation: a critical review and recommendations.

The combined action of drinking mineral water and low-intensity electromagnetic radiation under the immobilization stress conditions (an experimental study)].

The effect of acute far field exposure at 2.45 GHz on the mouse testis.

The effect of alternating electric field of industrial frequency on testicles of white mice].

The effect of low-intensity prolonged impulse electromagnetic irradiation in the UHF range on the testes and the appendages of the testis in rats].

The effect of male occupational exposure in infertile couples in Norway.

The effect of prenatal exposure to 900-MHz electromagnetic field on the 21-old-day rat testicle.

The effect of pulsed 900-MHz GSM mobile phone radiation on the acrosome reaction, head morphometry and zona binding of human spermatozoa.

The effects of an electromagnetic field on the boundary tissue of the seminiferous tubules of the rat: A light and transmission electron microscope study.

The effects of electromagnetic waves emitted by the cell phones on the testicular tissue.

The effects of extremely low frequency electromagnetic field exposure on the pH of the adult male semen and the motricity parameters of spermatozoa in vitro].

The Effects of Melatonin on Oxidative Stress Parameters and DNA Fragmentation in Testicular Tissue of Rats Exposed to Microwave Radiation.

The effects of radiofrequency electromagnetic radiation on sperm function.

The effects of simultaneous combined exposure to CDMA and WCDMA electromagnetic fields on rat testicular function.

The genomic effects of cell phone exposure on the reproductive system.

The influence of electromagnetic radiation of industrial frequency on *Daphnia magna* (Straus)].

The influence of ultrasound and constant magnetic field on gametes, zygotes, and embryos of the sea urchin].

The interaction of changes in the genitalia in the pathogenesis of sterility in men].

The mobile phone decreases fructose but not citrate in rabbit semen: a longitudinal study.

The semen quality of the mobile phone users.



The specific features of the development of metabolic and regenerative processes under the action of low-intensity electromagnetic radiation in radiation exposure conditions (an experimental study)].

The therapeutic effect of a pulsed electromagnetic field on the reproductive patterns of male Wistar rats exposed to a 2.45-GHz microwave field.

The use of FDTD in establishing in vitro experimentation conditions representative of lifelike cell phone radiation on the spermatozoa.

Therapeutic approaches of melatonin in microwave radiations-induced oxidative stress-mediated toxicity on male fertility pattern of Wistar rats.

Whole-body microwave exposure emitted by cellular phones and testicular function of rats.

Wi-Fi (2.45 GHz)- and mobile phone (900 and 1800 MHz)-induced risks on oxidative stress and elements in kidney and testis of rats during pregnancy and the development of offspring.

## FACTOR 5

Theme – Brain neoplasms

Key MeSH Headings - Meningioma, Glioma, Meningeal Neoplasms, Neuroma, Acoustic, Brain Neoplasms, Glioblastoma, Neoplasms, Radiation-Induced, Neuroma, Cranial Nerve Neoplasms, Parotid Neoplasms, Central Nervous System Neoplasms

### **Titles**

50-Hz electromagnetic environment and the incidence of childhood tumors in Stockholm County.

A Bayesian approach to hazard identification. The case of electromagnetic fields and cancer.

A case-case study of mobile phone use and acoustic neuroma risk in Japan.

A cerebral primitive neuroectodermal tumor in a squirrel monkey (*Saimiri sciureus*).

A literature review of medical side effects from radio-frequency energy in the human environment: involving cancer, tumors, and problems of the central nervous system.

A pooled analysis of extremely low-frequency magnetic fields and childhood brain tumors.

A population-based case-control study of radiofrequency exposure in relation to childhood neoplasm.

A review of in vitro studies: low-frequency electromagnetic fields.

A three-dimensional point process model for the spatial distribution of disease occurrence in relation to an exposure source.

Acoustic neuroma risk in relation to mobile telephone use: results of the INTERPHONE international case-control study.

Adult glioma in relation to residential power frequency electromagnetic field exposures in the San Francisco Bay area.

Adult mortality from leukemia, brain cancer, amyotrophic lateral sclerosis and magnetic fields from power lines: a case-control study in Brazil.

Alternative functional relationships between ELF field exposure and possible health effects: report on an expert workshop.

An epidemiological review of mobile telephones and cancer.

An international prospective cohort study of mobile phone users and health (Cosmos): design considerations and enrolment.

Analyses of temporal and spatial patterns of glioblastoma multiforme and other brain cancer subtypes in relation to mobile phones using synthetic counterfactuals.

Analysis of ear side of mobile phone use in the general population of Japan.

Analysis of gene expression in two human-derived cell lines exposed in vitro to a 1.9 GHz pulse-modulated radiofrequency field.

Analysis of mobile phone use among young patients with brain tumors in Japan.

Anthropogenic Radio-Frequency Electromagnetic Fields Elicit Neuropathic Pain in an Amputation Model.

Application criteria of the precautionary principle].

Assessing the potential carcinogenic activity of magnetic fields using animal models.

Assessment of cellular telephone and other radio frequency exposure for epidemiologic research.

Association between number of cell phone contracts and brain tumor incidence in nineteen U.S. States.

Association between radiation from mobile phones and tumour risk in adults].

Association between vestibular schwannomas and mobile phone use.

Association of childhood cancer with residential traffic density.

Berkson error adjustment and other exposure surrogates in occupational case-control studies, with application to the Canadian INTEROCC study.

Bioeffects of electromagnetic fields--safety limits of each frequency band, especially less than radio one].

Biological effects from electromagnetic field exposure and public exposure standards.

Biological effects of amplitude-modulated radiofrequency radiation.

Biological effects of electromagnetic fields and radiation.

Biological effects of extremely low-frequency electromagnetic fields: in vivo studies.

Biological effects on human health due to radiofrequency/microwave exposure: a synopsis of cohort studies.

Biological indicators in response to radiofrequency/microwave exposure.

Biological interactions and potential health effects of extremely-low-frequency magnetic fields from power lines and other common sources.

Biological responses to electromagnetic fields.

Biomarkers of induced electromagnetic field and cancer.

Biophysical estimation of the environmental importance of electromagnetic fields.

Biophysical mechanisms of electromagnetic fields interaction and health effects].

Brain cancer and occupational exposure to magnetic fields among men: results from a Canadian population-based case-control study.

Brain cancer incidence trends in relation to cellular telephone use in the United States.

Brain cancer risk and electromagnetic fields (EMFs): assessing the geomagnetic component.

Brain tumor risk in children in relation to use of electric blankets and water bed heaters. Results from the United States West Coast Childhood Brain Tumor Study.

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Risk of neoplastic diseases in conditions of exposure to radio- and microwave fields--epidemiologic investigations].

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Selection bias from differential residential mobility as an explanation for associations of wire codes with childhood cancer.

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The controversy about a possible relationship between mobile phone use and cancer.

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The effects of 860 MHz radiofrequency radiation on the induction or promotion of brain tumors and other neoplasms in rats.

The effects of embryonic and fetal exposure to x-ray, microwaves, and ultrasound.

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Trends in incidence of primary brain cancer in New Zealand, 1995 to 2010.

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Use of cellular telephones and the risk for brain tumours: A case-control study.

Use of mobile and cordless phones and survival of patients with glioma.

Use of mobile phones and cancer risk.

Use of mobile phones and risk of brain tumours: update of Danish cohort study.

Use of mobile phones in Norway and risk of intracranial tumours.

Use of wireless phones and the risk of salivary gland tumours: a case-control study.

Using the Hill viewpoints from 1965 for evaluating strengths of evidence of the risk for brain tumors associated with use of mobile and cordless phones.

Validation of self-reported start year of mobile phone use in a Swedish case-control study on radiofrequency fields and acoustic neuroma risk.

Variation in cancer risk estimates for exposure to powerline frequency electromagnetic fields: a meta-analysis comparing EMF measurement methods.

Vestibular schwannoma and cell-phones. Results, limits and perspectives of clinical studies.

Wire codes, magnetic fields, and childhood cancer.

Wireless Phone Use and Risk of Adult Glioma: Evidence from a Meta-Analysis.

World Health Organization, radiofrequency radiation and health - a hard nut to crack (Review).

## FACTOR 6

Theme – Sensory disorders

Key MeSH Headings - Burning Mouth Syndrome, Taste Disorders, Skin Diseases, Mouth Diseases, Dizziness, Vision Disorders, Hypersensitivity, Delayed, Fatigue

### **Titles**

A method for in vivo detection of abnormal subepidermal tissues based on dielectric properties.

A survey study on some neurological symptoms and sensations experienced by long term users of mobile phones.

Adverse cutaneous effects of ionizing and non-ionizing electromagnetic radiation.

Association between exposure to radiofrequency electromagnetic fields assessed by dosimetry and acute symptoms in children and adolescents: a population based cross-sectional study.

Association of mobile phone radiation with fatigue, headache, dizziness, tension and sleep disturbance in Saudi population.

Bedtime mobile phone use and sleep in adults.

Can exposure to a terrestrial trunked radio (TETRA)-like signal cause symptoms? A randomised double-blind provocation study.

Cardiac devices and electromagnetic interference revisited: new radiofrequency technologies and implications for dermatologic surgery.

Description of persons with symptoms presumed to be caused by electricity or visual display units--oral aspects.

Effect of millimeter waves on cyclophosphamide induced suppression of the immune system.

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Electromagnetic hypersensitivity (EHS) and subjective health complaints associated with electromagnetic fields of mobile phone communication--a literature review published between 2000 and 2004.

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Health response of two communities to military antennae in Cyprus.

Health status of the workers exposed to strong, constant magnetic fields].

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Some ocular symptoms and sensations experienced by long term users of mobile phones.

Some ocular symptoms experienced by users of mobile phones.

Specific patterns of weak (1 microTesla) transcerebral complex magnetic fields differentially affect depression, fatigue, and confusion in normal volunteers.

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The effects of cell phone use on peripheral vision.

The effects of multivitamin supplementation on mood and general well-being in healthy young adults. A laboratory and at-home mobile phone assessment.

The risk of subjective symptoms in mobile phone users in Poland--an epidemiological study.

Video display terminals: risk of electromagnetic radiation.



**FACTOR 7**

Theme – Breast neoplasms

Key MeSH Headings - Carcinoma, Lobular, Carcinoma, Ductal, Breast, Breast Neoplasms, Male, Adenoma

**Titles**

A cluster of male breast cancer in office workers.

A meta-analysis of epidemiologic studies of electric and magnetic fields and breast cancer in women and men.

Breast cancer, occupation, and exposure to electromagnetic fields among Swedish men.

Carcinogenic risk of extremely-low-frequency electromagnetic fields: state of the art].

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in B6C3F1 mice.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in F344/N rats.

Effect of 13 week magnetic field exposures on DMBA-initiated mammary gland carcinomas in female Sprague-Dawley rats.

Electromagnetic field exposure and male breast cancer risk: a meta-analysis of 18 studies.

Epidemiology and aetiological factors of male breast cancer: a ten years retrospective study in eastern Turkey.

Evaluation of health risks caused by radio frequency accelerated carcinogenesis: the importance of processes driven by the calcium ion signal.

Magnetic fields and breast cancer in Swedish adults residing near high-voltage power lines.

Magnetic fields and mammary cancer in rodents: a critical review and evaluation of published literature.

Male breast tumors in railway engine drivers: investigation of 5 cases].

Occupational exposure to magnetic fields in relation to male breast cancer and testicular cancer: a Swedish case-control study.

Risk for leukaemia and brain and breast cancer among Danish utility workers: a second follow-up.

The relationship between electromagnetic field and light exposures to melatonin and breast cancer risk: a review of the relevant literature.

## FACTOR 8

Theme – Oxidative stress

Key MeSH Headings - Oxidative Stress, Malondialdehyde, Glutathione Peroxidase, Lipid Peroxidation, Reactive Oxygen Species, Apoptosis, DNA Damage, Nitric Oxide, Protein Carbonylation

### **Titles**

14.6 mT ELF magnetic field exposure yields no DNA breaks in model system Salmonella, but provides evidence of heat stress protection.

1800 MHz mobile phone irradiation induced oxidative and nitrosative stress leads to p53 dependent Bax mediated testicular apoptosis in mice, *Mus musculus*.

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2.45 GHz Microwave Radiation Impairs Learning and Spatial Memory via Oxidative/Nitrosative Stress Induced p53-Dependent/Independent Hippocampal Apoptosis: Molecular Basis and Underlying Mechanism.

2.45 GHz microwave radiation induced oxidative and nitrosative stress mediated testicular apoptosis: Involvement of a p53 dependent bax-caspase-3 mediated pathway.

2.45-GHz microwave irradiation adversely affects reproductive function in male mouse, *Mus musculus* by inducing oxidative and nitrosative stress.

2.45-Gz wireless devices induce oxidative stress and proliferation through cytosolic Ca<sup>2+</sup>(+) influx in human leukemia cancer cells.

50 Hz extremely low frequency electromagnetic fields enhance protein carbonyl groups content in cancer cells: effects on proteasomal systems.

50-Hertz electromagnetic fields induce gammaH2AX foci formation in mouse preimplantation embryos in vitro.

8-Oxo-7, 8-dihydro-2'-deoxyguanosine as a biomarker of DNA damage by mobile phone radiation.

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Adaptive response in mice exposed to 900 MHz radiofrequency fields: primary DNA damage.

Adaptive response in mouse bone-marrow stromal cells exposed to 900-MHz radiofrequency fields: Gamma-radiation-induced DNA strand breaks and repair.

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An evaluation of genotoxicity in human neuronal-type cells subjected to oxidative stress under an extremely low frequency pulsed magnetic field.

An in vitro study of the effects of exposure to a GSM signal in two human cell lines: monocytic U937 and neuroblastoma SK-N-SH.

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Antioxidants alleviate electric field-induced effects on lung tissue based on assays of heme oxygenase-1, protein carbonyl content, malondialdehyde, nitric oxide, and hydroxyproline.

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## FACTOR 9

Theme – Neurodegenerative diseases

Key MeSH Headings - Parkinson Disease, Neurodegenerative Diseases, Alzheimer Disease, Amyotrophic Lateral Sclerosis, Motor Neuron Disease, Occupational Diseases, Dementia, Brain Diseases, Dementia, Vascular

### **Titles**

5-HT contents change in peripheral blood of workers exposed to microwave and high frequency radiation].

60 Hertz magnetic field exposure assessment for an investigation of leukemia in telephone lineworkers.

A case-control study on the risk factors of Alzheimer's disease in military elderly men].

A cluster of male breast cancer in office workers.

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Long term and excessive use of 900 MHz radiofrequency radiation alter microRNA expression in brain.

Low frequency electromagnetic fields in the working environment--exposure and health effects. Elevated risk of cancer, reproductive hazards or other unwanted health effects?].

Low-back pain among electric power supply workers and their attitude toward its prevention and the treatment.

Magnetic field exposure and neurodegenerative disease mortality among electric utility workers.

Magnetic field exposure and neurodegenerative diseases--recent epidemiological studies.

Magnetic field exposure in relation to leukemia and brain cancer mortality among electric utility workers.

Magnetic field exposure related to cancer subtypes.

Magnetic field on the deranged accommodation of visual detector terminal operators].

Magnetic fields and brain tumour risks in UK electricity supply workers.

Magnetic fields and leukaemia risks in UK electricity supply workers.

Magnetic fields exposure from high-voltage power lines and risk of amyotrophic lateral sclerosis in two Italian populations.

Male breast tumors in railway engine drivers: investigation of 5 cases].

Microwave antigen retrieval of beta-amyloid precursor protein immunoreactivity.

Microwave sickness: a reappraisal.

Mobile phone use and brain tumours in the CERENAT case-control study.

Modern concepts and methodology of means, methods of protection, and safety measures for servicemen affected by nonionizing radiation].

Mortality among workers in the geothermal power plants at Larderello, Italy.

Mortality from amyotrophic lateral sclerosis, other chronic disorders, and electric shocks among utility workers.

Mortality from brain cancer and leukaemia among electrical workers.

Mortality from neurodegenerative disease and exposure to extremely low-frequency magnetic fields: 31 years of observations on Swiss railway employees.

Mortality of personnel operating electric power objects with 500 kV voltage].

Myeloid leukemias and myelodysplastic syndromes: chemical exposure, histologic subtype and cytogenetics in a case-control study.

Neurodegenerative disease and magnetic field exposure in UK electricity supply workers.

Neurodegenerative diseases in welders and other workers exposed to high levels of magnetic fields.

Neurodegenerative diseases, suicide and depressive symptoms in relation to EMF.

Neurological effects of microwave exposure related to mobile communication.

Neurological effects of radiofrequency radiation.

News in occupational cancers].

Non-Hodgkin's lymphoma among electric utility workers in Ontario: the evaluation of alternate indices of exposure to 60 Hz electric and magnetic fields.

Non-ionizing radiation exposure causing ill-health and alopecia areata.

Novelties in hygienic evaluation of electromagnetic conditions on computerized workplaces].

Occupation and malignant lymphoma: a population based case control study in Germany.

Occupational assessment of computer placement in school areas].

Occupational electromagnetic field exposures associated with sleep quality: a cross-sectional study.

Occupational exposure and amyotrophic lateral sclerosis in a prospective cohort.

Occupational exposure of healthcare and research staff to static magnetic stray fields from 1.5-7 Tesla MRI scanners is associated with reporting of transient symptoms.

Occupational exposure to electromagnetic field and breast cancer risk in a large, population-based, case-control study in the United States.

Occupational exposure to electromagnetic fields and Alzheimer disease.

Occupational exposure to electromagnetic fields and its health effects in electric energy workers].

Occupational exposure to electromagnetic fields and sex-differential risk of uveal melanoma.

Occupational exposure to electromagnetic fields and the occurrence of brain tumors. An analysis of possible associations.

Occupational exposure to electromagnetic fields of extremely low frequency (with particular regard to power plants) and the health status of workers, based on a literature review].

Occupational exposure to extremely low frequency electric and magnetic fields and Alzheimer disease: a meta-analysis.

Occupational exposure to extremely low frequency magnetic fields and risk of Alzheimer disease: A systematic review and meta-analysis.

Occupational exposure to ionizing radiation and electromagnetic fields in relation to the risk of thyroid cancer in Sweden.

Occupational exposure to low frequency magnetic fields and dementia: a case-control study.

Occupational exposure to low frequency magnetic fields and the risk of low grade and high grade glioma.

Occupational exposure to magnetic fields in case-referent studies of neurodegenerative diseases.

Occupational exposure to non-ionizing radiation and an association with heart disease: an exploratory study.

Occupational exposure to physical agents: the new Italian database for risk assessment and control.

Occupational exposure to power frequency magnetic fields and risk of non-Hodgkin lymphoma.

Occupational exposures and brain cancer mortality: a preliminary study of east Texas residents.

Occupational Exposures and Neurodegenerative Diseases-A Systematic Literature Review and Meta-Analyses.

Occupational exposures and the risk of amyotrophic lateral sclerosis.

Occupational exposures obtained by questionnaire in clinical practice and their association with semen quality.

Occupational exposures to extremely low frequency magnetic fields and postmenopausal breast cancer.

Occupational factors of anxiety and depressive disorders in the French National Electricity and Gas Company. The Anxiety-Depression Group.

Occupational hazards for the male reproductive system.

Occupational health evaluation of electromagnetic fields in electric trains and subway technologic areas].

Occupational magnetic field exposure and neurodegenerative disease.

Occupational magnetic field exposure and site-specific cancer incidence: a Swedish cohort study.

Occupational risk and its prophylaxis for female workers engaged in radio-electronic instrument industry].

Occupational risk factors for acute leukaemia: a case-control study.

Occupational risk factors for cancer of the central nervous system: a case-control study on death certificates from 24 U.S. states.

Occupational risk factors in Alzheimer's disease: a review assessing the quality of published epidemiological studies.

Occupational risks in grocery stores].

Occupations with exposure to electromagnetic fields: a possible risk factor for Alzheimer's disease.

Ocular medical surveillance on microwave and laser workers.

On prevention of a combined impact of electromagnetic radiation and climatic/weather factors on worker's organism].

On prevention of electromagnetic rays effects in workers exposed to extreme climate conditions].

On the microwave exposure.

Optimization of methods for measurement and assessment of occupational exposure to electromagnetic fields in physiotherapy (SW diathermy)].

Overview of epidemiologic research on electric and magnetic fields and cancer.

Perspectives on health effects of electric and magnetic fields.

Physical factors and stress].

Physicians appeals on the dangers of mobile communication--what is the evidence? Assessment of public health data.

Prevalence of depression among electrical workers.

Prevalence of musculoskeletal disorders and related occupational causative factors among electricity linemen: A narrative review.

Problem of studying influence of electric and magnetic fields on human health. Results and prospects].

Provocation of the electromagnetic distress syndrome.

Radiofrequency (RF) sickness in the Lilienfeld Study: an effect of modulated microwaves?

Radiofrequency electromagnetic fields; male infertility and sex ratio of offspring.

Radiofrequency fields, transthyretin, and Alzheimer's disease.

Relationship between amyloid beta protein and melatonin metabolite in a study of electric utility workers.



Relationships between occupational history and serum concentrations of organochlorine compounds in exocrine pancreatic cancer.

Remote effects of occupational and non-occupational exposure to electromagnetic fields of power-line frequency. Epidemiological studies].

Reports on electromagnetic field strength measurements issued for occupational health and safety needs in the opinion of radio communication station users].

Residence near power lines and mortality from neurodegenerative diseases: longitudinal study of the Swiss population.

Residential and occupational exposures to 50-Hz magnetic fields and breast cancer in women: a population-based study.

Residential distance to high-voltage power lines and risk of neurodegenerative diseases: a Danish population-based case-control study.

Review of the epidemiologic literature on EMF and Health.

Risk agents related to work and amyotrophic lateral sclerosis: An occupational medicine focus.

Risk factors for Alzheimer disease: a population-based case-control study in Istanbul, Turkey.

Risk factors, health risks, and risk management for aircraft personnel and frequent flyers.

Risk for leukaemia and brain and breast cancer among Danish utility workers: a second follow-up.

Risk of severe cardiac arrhythmia in male utility workers: a nationwide danish cohort study.

Searching for the perfect wave: the effect of radiofrequency electromagnetic fields on cells.

Setting prudent public health policy for electromagnetic field exposures.

Socioeconomic status, social mobility and cancer occurrence during working life: a case-control study among French electricity and gas workers.

State of peripheral blood of technical personnel exposed to constant magnetic fields].

Symptoms of the musculoskeletal system and exposure to magnetic fields in an aluminium plant.

Systematic analysis of the state of man exposed to radio wave irradiation for a long time].

The effect of various occupational exposures to microwave radiation on the concentrations of immunoglobulins and T lymphocyte subsets].

The evaluation of the consequences of electromagnetic irradiation of hands in operators of high-frequency welding devices].

The evaluation of the exposure of seamstresses to electromagnetic fields, emitted by sewing machines].

The health problems of computer operators].

The possible role of radiofrequency radiation in the development of uveal melanoma.

The potential hazard for the development of leukemia from exposure to electromagnetic radiation (a review of the literature)].

The psychosocial work environment and skin symptoms among visual display terminal workers: a case referent study.

The strategy of targetted health surveillance. II. Genetically determined susceptibility to chemical substances and other issues related to health surveillance.

Trends in nonionizing electromagnetic radiation bioeffects research and related occupational health aspects.

Various psychological parameters in subjects occupationally exposed to radiofrequencies].

Work environment and cardiovascular diseases. A short review of the literature.

Work related etiology of amyotrophic lateral sclerosis (ALS): a meta-analysis.

**FACTOR 10**

Theme - Cerebrovascular disorders

Key MeSH Headings - Cerebrovascular Disorders, Dementia, Migraine Disorders, Tinnitus, Headache, Sleep Wake Disorders, Carotid Artery Diseases, Alzheimer Disease, Dementia, Vascular

**Titles**

A 50-Hz electromagnetic field impairs sleep.

A case-control study on the risk factors of Alzheimer's disease in military elderly men].

A literature review of medical side effects from radio-frequency energy in the human environment: involving cancer, tumors, and problems of the central nervous system.

A study on the biological effects of exposure mobile-phone frequency EMF].

A survey study on some neurological symptoms and sensations experienced by long term users of mobile phones.

Association between exposure to radiofrequency electromagnetic fields assessed by dosimetry and acute symptoms in children and adolescents: a population based cross-sectional study.

Association between overuse of mobile phones on quality of sleep and general health among occupational health and safety students.

Association of mobile phone radiation with fatigue, headache, dizziness, tension and sleep disturbance in Saudi population.

Association of tinnitus and electromagnetic hypersensitivity: hints for a shared pathophysiology?

Cell phones: modern man's nemesis?

Clinical features of headache associated with mobile phone use: a cross-sectional study in university students.

Cohort study on the effects of everyday life radio frequency electromagnetic field exposure on non-specific symptoms and tinnitus.

Dementia and occupational exposure to magnetic fields.

Do mobile phone base stations affect sleep of residents? Results from an experimental double-blind sham-controlled field study.

Effect of stress and intensity of mobile phone using on the health and subjective symptoms in GSM workers].

Effects of 60 Hz electromagnetic field exposure on APP695 transcription levels in differentiating human neuroblastoma cells.

Effects of Millimeter-Wave Electromagnetic Radiation on the Experimental Model of Migraine.

Effects of Sleep Quality on the Association between Problematic Mobile Phone Use and Mental Health Symptoms in Chinese College Students.

Electrical occupations and neurodegenerative disease: analysis of U.S. mortality data.

Electromagnetic hypersensitivity (EHS) and subjective health complaints associated with electromagnetic fields of mobile phone communication--a literature review published between 2000 and 2004.

Electromagnetic pulse exposure induces overexpression of beta amyloid protein in rats.

Elevated risk of Alzheimer's disease among workers with likely electromagnetic field exposure.

Exposure to electromagnetic fields and risk of central nervous system diseases among employees at Danish electric companies].

Fifty Hertz electromagnetic field exposure stimulates secretion of beta-amyloid peptide in cultured human neuroglioma.

Headache and sferics.

Health of workers exposed to electric fields.

Individual variation in temporal relationships between exposure to radiofrequency electromagnetic fields and non-specific physical symptoms: A new approach in studying 'electrosensitivity'.

Investigation of sleep disorders in the vicinity of high frequency transmitters].

Long term and excessive use of 900 MHz radiofrequency radiation alter microRNA expression in brain.

Long-term and frequent cellular phone use and risk of acoustic neuroma.

Magnetic field exposure and neurodegenerative disease mortality among electric utility workers.

Magnetic field exposure and neurodegenerative diseases--recent epidemiological studies.

Microwave antigen retrieval of beta-amyloid precursor protein immunoreactivity.

Microwave sickness: a reappraisal.

Mobile communication: radiobiology problems and evaluation of danger].

Mobile phone headache: a double blind, sham-controlled provocation study.

Mobile phone use and health symptoms in children.

Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults--a prospective cohort study.

Mobile phone use and subjective symptoms. Comparison of symptoms experienced by users of analogue and digital mobile phones.

Mobile Phone Use and The Risk of Headache: A Systematic Review and Meta-analysis of Cross-sectional Studies.

Mobile phone use, school electromagnetic field levels and related symptoms: a cross-sectional survey among 2150 high school students in Izmir.

Natural very-low-frequency sferics and headache.

Neurobehavioral effects among inhabitants around mobile phone base stations.

Neurodegenerative diseases in welders and other workers exposed to high levels of magnetic fields.

Neurodegenerative diseases, suicide and depressive symptoms in relation to EMF.

Neurological changes induced by a mobile phone.

Non-specific physical symptoms and electromagnetic field exposure in the general population: can we get more specific? A systematic review.

Occupational electromagnetic field exposures associated with sleep quality: a cross-sectional study.

Occupational exposure to electromagnetic fields and Alzheimer disease.

Occupational exposure to extremely low frequency electric and magnetic fields and Alzheimer disease: a meta-analysis.

Occupational exposure to extremely low frequency magnetic fields and risk of Alzheimer disease: A systematic review and meta-analysis.

Occupational exposure to low frequency magnetic fields and dementia: a case-control study.

Occupational exposure to magnetic fields in case-referent studies of neurodegenerative diseases.

Occupational Exposures and Neurodegenerative Diseases-A Systematic Literature Review and Meta-Analyses.

Occupational magnetic field exposure and neurodegenerative disease.

Occupational risk factors in Alzheimer's disease: a review assessing the quality of published epidemiological studies.

Occupations with exposure to electromagnetic fields: a possible risk factor for Alzheimer's disease.

Physicians appeals on the dangers of mobile communication--what is the evidence? Assessment of public health data.

Preliminary report: symptoms associated with mobile phone use.

Prevalence of headache among handheld cellular telephone users in Singapore: a community study.

Psychological symptoms and intermittent hypertension following acute microwave exposure.

Radio and microwave frequency radiation and health--an analysis of the literature].

Radiofrequency fields, transthyretin, and Alzheimer's disease.

Relationship between amyloid beta protein and melatonin metabolite in a study of electric utility workers.

Residence near power lines and mortality from neurodegenerative diseases: longitudinal study of the Swiss population.

Residential distance to high-voltage power lines and risk of neurodegenerative diseases: a Danish population-based case-control study.

Risk factors for Alzheimer disease: a population-based case-control study in Istanbul, Turkey.

Role of ultrasonic dopplerography in monitoring the effectiveness of treatment of patients who have sustained a stroke with decimeter-range electromagnetic waves].

Subjective symptoms related to mobile phone use--a pilot study].

Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations.

Survey of mobile phone use and their chronic effects on the hearing of a student population.

Symptom prevalence and worry about high voltage transmission lines.

Symptoms experienced by people in vicinity of base stations: II/ Incidences of age, duration of exposure, location of subjects in relation to the antennas and other electromagnetic factors].

Symptoms of ill health ascribed to electromagnetic field exposure--a questionnaire survey.

Symptoms reported by mobile cellular telephone users].

The association between use of mobile phones after lights out and sleep disturbances among Japanese adolescents: a nationwide cross-sectional survey.

The effects of 884 MHz GSM wireless communication signals on headache and other symptoms: an experimental provocation study.

The prevalence of symptoms attributed to electromagnetic field exposure: a cross-sectional representative survey in Switzerland.

The relationship between adolescents' well-being and their wireless phone use: a cross-sectional study.

The risk of subjective symptoms in mobile phone users in Poland--an epidemiological study.

The role of microwave radiometry in carotid artery disease. Diagnostic and clinical prospective.

Time-dependent hematological changes in workers exposed to electromagnetic fields.

Tinnitus and cell phones: the role of electromagnetic radiofrequency radiation.

Tinnitus and mobile phone use.

**FACTOR 11**

Theme - Congenital abnormalities and glandular-based tumors

Key MeSH Headings - Cleft Lip, Cleft Palate, Fibroadenoma, Adenoma, Calcification, Physiologic, Mammary Neoplasms, Animal, Mammary Neoplasms, Experimental, Adenocarcinoma

**Titles**

A histopathological study on alterations in DMBA-induced mammary carcinogenesis in rats with 50 Hz, 100  $\mu$ T magnetic field exposure.

Acceleration of mammary tumorigenesis by exposure of 7,12-dimethylbenz[a]anthracene-treated female rats in a 50-Hz, 100-microT magnetic field: replication study.

Are microwaves a co-teratogen? Experimental model concept and its verification].

Bioelectromagnetic field effects on cancer cells and mice tumors.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in B6C3F1 mice.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in F344/N rats.

Chronic, low-level (1.0 W/kg) exposure of mice prone to mammary cancer to 2450 MHz microwaves.

Do cocarcinogenic effects of ELF electromagnetic fields require repeated long-term interaction with carcinogens? Characteristics of positive studies using the DMBA breast cancer model in rats.

Effect of 13 week magnetic field exposures on DMBA-initiated mammary gland carcinomas in female Sprague-Dawley rats.

Effect of 26 week magnetic field exposures in a DMBA initiation-promotion mammary gland model in Sprague-Dawley rats.

Effect of a 9 mT pulsed magnetic field on C3H/Bi female mice with mammary carcinoma. A comparison between the 12 Hz and the 460 Hz frequencies.

Effects of 50- or 60-hertz, 100 microT magnetic field exposure in the DMBA mammary cancer model in Sprague-Dawley rats: possible explanations for different results from two laboratories.

Effects of 900 MHz GSM wireless communication signals on DMBA-induced mammary tumors in rats.

Effects of GSM-900 microwaves on DMBA-induced mammary gland tumors in female Sprague-Dawley rats.



Effects of magnetic fields on mammary tumor development induced by 7,12-dimethylbenz(a)anthracene in rats.

Effects of mobile-phone microwave on dimethylbenz (a) anthracene induced mammary carcinoma development in rats].

Effects of weak alternating magnetic fields on nocturnal melatonin production and mammary carcinogenesis in rats.

Evaluation of health risks caused by radio frequency accelerated carcinogenesis: the importance of processes driven by the calcium ion signal.

Evaluation of the potential carcinogenicity of 60 Hz linear sinusoidal continuous-wave magnetic fields in Fischer F344 rats.

Low-frequency electromagnetic radiation enhances the induction of rat mammary tumors by nitrosomethyl urea.

Magnetic fields and mammary cancer in rodents: a critical review and evaluation of published literature.

Male breast tumors in railway engine drivers: investigation of 5 cases].

Microwave absorption by normal and tumor cells.

Modifying effect of light and electromagnetic field on development of mammary tumors induced by N-nitrosomethyl urea in female rats].

Non dietetic environmental risk factors in prostate cancer].

Occupational exposure to magnetic fields in relation to male breast cancer and testicular cancer: a Swedish case-control study.

On the role of the interactions of ions with external magnetic fields in physiologic processes and their importance in chronobiology.

Pulsed magnetic field from video display terminals enhances teratogenic effects of cytosine arabinoside in mice.

Repeated exposure of C3H/HeJ mice to ultra-wideband electromagnetic pulses: lack of effects on mammary tumors.

Search for teratogenic risks with the aid of malformation registries.

Significant differences in the effects of magnetic field exposure on 7,12-dimethylbenz(a)anthracene-induced mammary carcinogenesis in two substrains of Sprague-Dawley rats.

Study on potential effects of "902-MHz GSM-type Wireless Communication Signals" on DMBA-induced mammary tumours in Sprague-Dawley rats.

The effect of low-frequency electromagnetic fields on the development of experimental mammary tumors].

The influence of electromagnetic radiation generated by a mobile phone on the skeletal system of rats.

Transferrin receptors and natural killer cell lysis. A study using Colo 205 cells exposed to 60 Hz electromagnetic fields.

VDT pulse magnetic field enhances teratogenic effect of ara-c in mice].

## FACTOR 12

Theme – Skin neoplasms

Key MeSH Headings - Carcinoma, Basal Cell, Carcinoma, Squamous Cell, Skin Neoplasms, Cocarcinogenesis, Neoplasms, Experimental, Neoplasms, Radiation-Induced, Colonic Neoplasms

### **Titles**

50-Hz electromagnetic environment and the incidence of childhood tumors in Stockholm County.

A case-case study of mobile phone use and acoustic neuroma risk in Japan.

A histopathological study on alterations in DMBA-induced mammary carcinogenesis in rats with 50 Hz, 100  $\mu$ T magnetic field exposure.

A literature review of medical side effects from radio-frequency energy in the human environment: involving cancer, tumors, and problems of the central nervous system.

A pooled analysis of extremely low-frequency magnetic fields and childhood brain tumors.

A population-based case-control study of radiofrequency exposure in relation to childhood neoplasm.

A review of in vitro studies: low-frequency electromagnetic fields.

A study on skin tumour formation in mice with 50 Hz magnetic field exposure.

A three-dimensional point process model for the spatial distribution of disease occurrence in relation to an exposure source.

Acceleration of the development of benzopyrene-induced skin cancer in mice by microwave radiation.

Acoustic neuroma risk in relation to mobile telephone use: results of the INTERPHONE international case-control study.

Adverse cutaneous effects of ionizing and non-ionizing electromagnetic radiation.

Alternative functional relationships between ELF field exposure and possible health effects: report on an expert workshop.

An epidemiological review of mobile telephones and cancer.

Animal carcinogenicity studies on radiofrequency fields related to mobile phones and base stations.

Application criteria of the precautionary principle].

Assessing the potential carcinogenic activity of magnetic fields using animal models.

Assessment of cellular telephone and other radio frequency exposure for epidemiologic research.

Association between radiation from mobile phones and tumour risk in adults].

Bcl-2 and p53 immunoprofile in Kaposi's sarcoma.

Bioeffects of electromagnetic fields--safety limits of each frequency band, especially less than radio one].

Biological effects from electromagnetic field exposure and public exposure standards.

Biological effects of amplitude-modulated radiofrequency radiation.

Biological effects of electromagnetic fields and radiation.

Biological effects of extremely low-frequency electromagnetic fields: in vivo studies.

Biological effects on human health due to radiofrequency/microwave exposure: a synopsis of cohort studies.

Biological indicators in response to radiofrequency/microwave exposure.

Biological interactions and potential health effects of extremely-low-frequency magnetic fields from power lines and other common sources.

Biological responses to electromagnetic fields.

Biomarkers of induced electromagnetic field and cancer.

Biophysical estimation of the environmental importance of electromagnetic fields.

Biophysical mechanisms of electromagnetic fields interaction and health effects].

Brain tumor risk in offspring of men occupationally exposed to electric and magnetic fields.

Cancer in radar technicians exposed to radiofrequency/microwave radiation: sentinel episodes.

Cancer incidence among welders: possible effects of exposure to extremely low frequency electromagnetic radiation (ELF) and to welding fumes.

Cancer incidence and magnetic field exposure in industries using resistance welding in Sweden.

Cancer incidence in California flight attendants (United States).

Cancer incidence vs. FM radio transmitter density.

Cancer morbidity in subjects occupationally exposed to high frequency (radiofrequency and microwave) electromagnetic radiation.

Cancer promotion in a mouse-skin model by a 60-Hz magnetic field: I. Experimental design and exposure system.

Cancer promotion in a mouse-skin model by a 60-Hz magnetic field: II. Tumor development and immune response.

Cancer risks related to low-level RF/MW exposures, including cell phones.

Cancer versus FM radio polarization types.

Carcinogenic risk of extremely-low-frequency electromagnetic fields: state of the art].

Carcinogenicity study of 217 Hz pulsed 900 MHz electromagnetic fields in Pim1 transgenic mice.

Carcinogenicity study of GSM and DCS wireless communication signals in B6C3F1 mice.

Carcinogenicity test in B6C3F1 mice after parental and prenatal exposure to 50 Hz magnetic fields.

Carcinogenicity test of 50 Hz sinusoidal magnetic fields in rats.

Case-control study on uveal melanoma (RIFA): rational and design.

Cell phone radiation exposure on brain and associated biological systems.

Cell phones and cancer: what is the evidence for a connection?

Cellular and cordless telephone use and the association with brain tumors in different age groups.

Childhood cancer and magnetic fields from high-voltage power lines in England and Wales: a case-control study.

Childhood cancer in relation to distance from high voltage power lines in England and Wales: a case-control study.

Childhood cancer in relation to indicators of magnetic fields from ground current sources.

Childhood cancer occurrence in relation to power line configurations: a study of potential selection bias in case-control studies.

Children's health and RF EMF exposure. Views from a risk assessment and risk communication perspective.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in B6C3F1 mice.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in F344/N rats.

Chronic, low-level (1.0 W/kg) exposure of mice prone to mammary cancer to 2450 MHz microwaves.

Comparative health risk assessment of electromagnetic fields.

Concern that "EMF" magnetic fields from power lines cause cancer.

Danger of cellular telephones and their relay stations].

Delayed biological effect of electromagnetic fields action].

Do cocarcinogenic effects of ELF electromagnetic fields require repeated long-term interaction with carcinogens? Characteristics of positive studies using the DMBA breast cancer model in rats.

Do people understand IARC's 2B categorization of RF fields from cell phones?

Ecological study on residences in the vicinity of AM radio broadcasting towers and cancer death: preliminary observations in Korea.

Effect of 13 week magnetic field exposures on DMBA-initiated mammary gland carcinomas in female Sprague-Dawley rats.

Effect of 26 week magnetic field exposures in a DMBA initiation-promotion mammary gland model in Sprague-Dawley rats.

Effect of magnetic field exposure on anchorage-independent growth of a promoter-sensitive mouse epidermal cell line (JB6).

Effect of radiofrequency radiation exposure on mouse skin tumorigenesis initiated by 7,12-dimethylbenz[alpha]anthracene.

Effects of 2.45-GHz microwave radiation and phorbol ester 12-O-tetradecanoylphorbol-13-acetate on dimethylhydrazine-induced colon cancer in mice.

Effects of 2450 MHz electromagnetic fields with a wide range of SARs on methylcholanthrene-induced transformation in C3H10T1/2 cells.

Effects of 900 MHz GSM wireless communication signals on DMBA-induced mammary tumors in rats.

Effects of GSM-900 microwaves on DMBA-induced mammary gland tumors in female Sprague-Dawley rats.

Effects of low level microwave radiation on carcinogenesis in Swiss Albino mice.

Effects of mobile phone radiation on UV-induced skin tumourigenesis in ornithine decarboxylase transgenic and non-transgenic mice.

Electric blanket or mattress cover use and breast cancer incidence in women 50-79 years of age.

Electric Blanket Use and Risk of Thyroid Cancer in the Women's Health Initiative Observational Cohort.

Electrical field exposure and human health. Risk assessment and problems relative to bureaucratic procedures and to the role of institutional organizations in control and prevention].

Electromagnetic fields and cancer risks.

Electromagnetic fields and cancer: the cost of doing nothing.

Electromagnetic fields and cells.

Electromagnetic fields and female breast cancer.

Electromagnetic fields and health effects--epidemiologic studies of cancer, diseases of the central nervous system and arrhythmia-related heart disease.

Electromagnetic fields and public health.

Electromagnetic fields at mobile phone frequency induce apoptosis and inactivation of the multi-chaperone complex in human epidermoid cancer cells.

Electromagnetic fields of mobile telephone systems--thresholds, effects and risks for cochlear implant patients and healthy people].

Electromagnetic fields--effects on health].

Electromagnetic fields: a cancer promoter?

Electromagnetic radiations and cancer. Cause and prevention.

Electromagnetic-field exposure and cancer.

EMF and current cancer concepts.

EMF and health.

Epidemiologic evidence on mobile phones and tumor risk: a review.

Epidemiological studies of human exposures to radiofrequency radiation. A critical review.

Epidemiological studies of radio frequency exposures and human cancer.

Epidemiological study of power lines and childhood cancer in the UK: further analyses.

Estimates of Environmental Exposure to Radiofrequency Electromagnetic Fields and Risk of Lymphoma Subtypes.

Estimating exposure in studies of residential magnetic fields and cancer: importance of short-term variability, time interval between diagnosis and measurement, and distance to power line.

Evaluation of carcinogenic effects of electromagnetic fields (EMF).

Evaluation of potential confounders in planning a study of occupational magnetic field exposure and female breast cancer.

Evaluation of residential exposure to intermediate frequency magnetic fields.

Evaluation of the effects of electric and magnetic fields in humans].

Evaluation of the potential carcinogenicity of 60 Hz linear sinusoidal continuous-wave magnetic fields in Fischer F344 rats.

Evaluation of the potential in vitro antiproliferative effects of millimeter waves at some therapeutic frequencies on RPMI 7932 human skin malignant melanoma cells.

Evidence for microwave carcinogenesis in vitro.

Experimental data on radiofrequency].

Exposure to low electromagnetic fields and the carcinogenesis process].

Exposure to low-intensive superhigh frequency electromagnetic field as a factor of carcinogenesis in experimental animals.

Exposure to power-frequency magnetic fields and the risk of childhood cancer. UK Childhood Cancer Study Investigators.

Exposure to radio-frequency electromagnetic fields from broadcast transmitters and risk of childhood cancer: a census-based cohort study.

Extremely low frequency electromagnetic fields (EMF) and brain cancer in adults and children: review and comment.

Extremely low-frequency electromagnetic fields exposure and female breast cancer risk: a meta-analysis based on 24,338 cases and 60,628 controls.

Follow-up of radio and telegraph operators with exposure to electromagnetic fields and risk of breast cancer.

Further aspects on cellular and cordless telephones and brain tumours.

Future needs of occupational epidemiology of extremely low frequency electric and magnetic fields: review and recommendations.

Genetic, carcinogenic and teratogenic effects of radiofrequency fields.

GSM and DCS wireless communication signals: combined chronic toxicity/carcinogenicity study in the Wistar rat.

Health effects of microwave exposures: a review of the recent (1995-1998) literature.

Health risks from the use of mobile phones.

Health risks of electric and magnetic fields caused by high-voltage systems in Finland.

Health risks of electromagnetic fields. Part I: Evaluation and assessment of electric and magnetic fields.

Health risks of exposure to non-ionizing radiation--myths or science-based evidence.

Health risks of mobile phones].

Hematopoietic neoplasia in C57BL/6 mice exposed to split-dose ionizing radiation and circularly polarized 60 Hz magnetic fields.



High-voltage overhead power lines in epidemiology: patterns of time variations in current load and magnetic fields.

How dangerous are mobile phones, transmission masts, and electricity pylons?

Human disease resulting from exposure to electromagnetic fields.

Immunotropic effects of electromagnetic fields in the range of radio- and microwave frequencies].

Improved classification of evidence for EMF health risks.

In vivo exposure of rats to a weak alternating magnetic field increases ornithine decarboxylase activity in the mammary gland by a similar extent as the carcinogen DMBA.

Incidence of breast cancer in a Norwegian cohort of women with potential workplace exposure to 50 Hz magnetic fields.

Incorporation of epidemiological findings into radiation protection standards.

Increased mortality in amateur radio operators due to lymphatic and hematopoietic malignancies.

Indication of cocarcinogenic potential of chronic UMTS-modulated radiofrequency exposure in an ethylnitrosourea mouse model.

Influence of extremely-low-frequency magnetic field on antioxidative melatonin properties in AT478 murine squamous cell carcinoma culture.

Invited commentary: electromagnetic fields and cancer in railway workers.

Joint actions of environmental nonionizing electromagnetic fields and chemical pollution in cancer promotion.

Leukemia, brain tumors, and exposure to extremely low frequency electromagnetic fields in Swiss railway employees.

Long-term use of cellular phones and brain tumours: increased risk associated with use for  $>$  or  $=10$  years.

Long-term, low-level microwave irradiation of rats.

Lost in laterality: interpreting "preferred side of the head during mobile phone use and risk of brain tumour" associations.

Low frequency electromagnetic fields in the working environment--exposure and health effects. Elevated risk of cancer, reproductive hazards or other unwanted health effects?].

Low-frequency electromagnetic radiation enhances the induction of rat mammary tumors by nitrosomethyl urea.

Low-level exposure to radiofrequency electromagnetic fields: health effects and research needs.

Magnetic fields and breast cancer in Swedish adults residing near high-voltage power lines.

Magnetic fields and childhood cancer--a pooled analysis of two Scandinavian studies.

Magnetic fields and childhood cancer: an epidemiological investigation of the effects of high-voltage underground cables.

Magnetic fields of high voltage power lines and risk of cancer in Finnish adults: nationwide cohort study.

Malignant melanoma of the skin - not a sunshine story!

Medical aspects of radiofrequency radiation overexposure.

Medical exposure to ionising radiation and the risk of brain tumours: Interphone study group, Germany.

Melanoma incidence and frequency modulation (FM) broadcasting.

Melatonin suppression by static and extremely low frequency electromagnetic fields: relationship to the reported increased incidence of cancer.

Meta-analysis of long-term mobile phone use and the association with brain tumours.

Methods used to calculate exposures in two epidemiological studies of power lines in the UK.

Microwave absorption by normal and tumor cells.

Mobile phone base stations and early childhood cancers: case-control study.

Mobile phone radiation and the risk of cancer; a review.

Mobile phone use and acoustic neuroma risk in Japan.

Mobile phone use and brain tumours in the CERENAT case-control study.

Mobile phone use and risk of parotid gland tumor.

Mobile phone use and the risk of skin cancer: a nationwide cohort study in Denmark.

Mobile phone use, exposure to radiofrequency electromagnetic field, and brain tumour: a case-control study.

Mobile phones and brain tumours: a review of epidemiological research.

Mobile phones and head tumours. The discrepancies in cause-effect relationships in the epidemiological studies - how do they arise?

Mobile phones, cordless phones and the risk for brain tumours.

Mobile phones, mobile phone base stations and cancer: a review.

Mortality in workers exposed to electromagnetic fields.

Mortality indices for hemoblastoses in Rivno Province before and after the accident at the Chernobyl Atomic Electric Power Station].

Motivation and significance of IARC classification for mobile phone].

Need for a European approach to the effects of extremely low-frequency electromagnetic fields on cancer. ELF-EMF European Feasibility Study Group.

Non dietetic environmental risk factors in prostate cancer].

Non-ionizing electromagnetic radiation and cancer--is there a relationship?

Non-ionizing electromagnetic radiation: a study of carcinogenic and cancer treatment potential.

Non-ionizing electromagnetic radiations, emitted by a cellular phone, modify cutaneous blood flow.

Non-thermal bioeffects of static and extremely low frequency electromagnetic fields].

Nonionizing electromagnetic fields and cancer: a review.

Normal doses of visible light can cause mutations in skin].

Occupational exposure to electromagnetic fields and sex-differential risk of uveal melanoma.

Occupational exposure to electromagnetic fields and the occurrence of brain tumors. An analysis of possible associations.

Occupational exposure to ionizing and non-ionizing radiation and risk of non-Hodgkin lymphoma.

Occupational exposure to ionizing radiation and electromagnetic fields in relation to the risk of thyroid cancer in Sweden.

Occupational exposure to non-ionizing radiation and an association with heart disease: an exploratory study.

Occupational exposure to power frequency magnetic fields and risk of non-Hodgkin lymphoma.

Overview of epidemiologic research on electric and magnetic fields and cancer.

p53 immunoreactivity in cutaneous PUVA tumors is similar to that in other non-melanoma skin neoplasms.

Pathophysiology of cell phone radiation: oxidative stress and carcinogenesis with focus on male reproductive system.

Physical basis of adverse and therapeutic effects of low intensity microwave radiation.

Possible cocarcinogenic effects of ELF electromagnetic fields may require repeated long-term interaction with known carcinogenic factors.

Possible health hazards from exposure to power-frequency electric and magnetic fields--a COMAR Technical Information Statement.

Primary brain cancer in adults and the use of common household appliances: a case-control study.

Public health and the radio frequency radiation emitted by cellphone technology, smart meters and WiFi.

Radiation exposure, socioeconomic status, and brain tumor risk in the US Air Force: a nested case-control study.

Radio and microwave frequency radiation and health--an analysis of the literature].

Radio frequency electromagnetic fields: cancer, mutagenesis, and genotoxicity.

Radio-frequency radiation exposure from AM radio transmitters and childhood leukemia and brain cancer.

Radiofrequency and microwave radiation in the microelectronics industry.

Radiofrequency electromagnetic fields emitted from base stations of DECT cordless phones and the risk of glioma and meningioma (Interphone Study Group, Germany).

Radiofrequency exposure and mammalian cell toxicity, genotoxicity, and transformation.

Radiofrequency field exposure and cancer: what do the laboratory studies suggest?

Radiofrequency-induced carcinogenesis: cellular calcium homeostasis changes as a triggering factor.

Rate of occurrence of transient magnetic field events in U.S. residences.

Reanalysis of risks of childhood leukaemia with distance from overhead power lines in the UK.

Recent advances in research on radiofrequency fields and health: 2001-2003.

Recent advances in research on radiofrequency fields and health: 2004-2007.

Recent data from the literature on the biological and pathologic effects of electromagnetic radiation, radio waves and stray currents].

Recent experimental data on Extremely Low Frequency (ELF) magnetic field carcinogenic risk: open questions.

Repeated exposure of C3H/HeJ mice to ultra-wideband electromagnetic pulses: lack of effects on mammary tumors.

Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8GHz GSM base station environmental emission.

Residential and occupational exposure to 50 Hz magnetic fields and malignant melanoma: a population based study.

Residential mobility of populations near UK power lines and implications for childhood leukaemia.

Review of possible modulation-dependent biological effects of radiofrequency fields.

Risk of brain tumors from wireless phone use.

Risk of brain tumours in relation to estimated RF dose from mobile phones: results from five Interphone countries.

Risk of cancer among Danish electricity workers. A cohort study].

Risk of neoplastic diseases in conditions of exposure to radio- and microwave fields--epidemiologic investigations].

Selection bias from differential residential mobility as an explanation for associations of wire codes with childhood cancer.

Self-reported electrical appliance use and risk of adult brain tumors.

Short-term exposure to 50 Hz ELF-EMF alters the cisplatin-induced oxidative response in AT478 murine squamous cell carcinoma cells.

Should the threshold limit value for power frequency (60 Hz) magnetic fields be changed? Perceptions among scientists and other risk experts.

Significant differences in the effects of magnetic field exposure on 7,12-dimethylbenz(a)anthracene-induced mammary carcinogenesis in two substrains of Sprague-Dawley rats.

Socioeconomic status, social mobility and cancer occurrence during working life: a case-control study among French electricity and gas workers.

Spontaneous and nitrosourea-induced primary tumors of the central nervous system in Fischer 344 rats chronically exposed to 836 MHz modulated microwaves.

Spontaneous and nitrosourea-induced primary tumors of the central nervous system in Fischer 344 rats exposed to frequency-modulated microwave fields.

Studying the effects of mobile phone use on the auditory system and the central nervous system: a review of the literature and future directions.

Survival and cancer in laboratory mammals exposed to radiofrequency energy.

Systematic review of wireless phone use and brain cancer and other head tumors.

Testing electromagnetic fields for potential carcinogenic activity: a critical review of animal models.

The design, construction and calibration of a carefully controlled source for exposure of mammalian cells to extremely low-frequency electromagnetic fields.

The effect of 60-Hz magnetic fields on co-promotion of chemically induced skin tumors on SENCAR mice: a discussion of three studies.

The effect of chronic exposure to 835.62 MHz FDMA or 847.74 MHz CDMA radiofrequency radiation on the incidence of spontaneous tumors in rats.

The effect of embryonic and fetal exposure to x-ray, microwaves, and ultrasound: counseling the pregnant and nonpregnant patient about these risks.

The effects of 860 MHz radiofrequency radiation on the induction or promotion of brain tumors and other neoplasms in rats.

The effects of embryonic and fetal exposure to x-ray, microwaves, and ultrasound.

The effects of ionizing radiation, microwaves, and ultrasound on the developing embryo: clinical interpretations and applications of the data.

The effects of pulsed 860 MHz radiofrequency radiation on the promotion of neurogenic tumors in rats.

The epidemiology of electric and magnetic field exposures in the power frequency range and reproductive outcomes.

The Intracranial Distribution of Gliomas in Relation to Exposure From Mobile Phones: Analyses From the INTERPHONE Study.

The possible role of contact current in cancer risk associated with residential magnetic fields.

The possible role of radiofrequency radiation in the development of uveal melanoma.

The potential carcinogenic hazards of electromagnetic radiation: a review.

The precautionary principle and electric and magnetic fields.

The probability of developing brain tumours among users of cellular telephones (scientific information to the decision of the International Agency for Research on Cancer (IARC) announced on May 31, 2011)].

The problem of hygienic standardization of commercial electric and magnetic fields in Russia and other countries].

The question of health effects from exposure to electromagnetic fields.

The role of chemical and physical factors in cancer development].

The sensitivity of children to electromagnetic fields.

Time trend in incidence of malignant neoplasms of the central nervous system in relation to mobile phone use among young people in Japan.

Use of cellular and cordless telephones and risk of testicular cancer.

Use of cellular telephones and brain tumour risk in urban and rural areas.

Use of cellular telephones and risk of cancer. A Danish cohort study].

Use of cellular telephones and the risk for brain tumours: A case-control study.

Use of mobile phones and cancer risk.

Use of wireless phones and the risk of salivary gland tumours: a case-control study.

Variable E-cadherin expression in a MNU-induced colon tumor model in rats which exposed with 50 Hz frequency sinusoidal magnetic field.

Variation in cancer risk estimates for exposure to powerline frequency electromagnetic fields: a meta-analysis comparing EMF measurement methods.

Wire codes, magnetic fields, and childhood cancer.

World Health Organization, radiofrequency radiation and health - a hard nut to crack (Review).

## FACTOR 13

Theme - Leukemia

Key MeSH Headings - Leukemia, Myeloid, Acute, Leukemia, Lymphocytic, Chronic, B-Cell, Leukemia, Myelogenous, Chronic, BCR-ABL Positive, Leukemia, Myeloid, Leukemia, Multiple Myeloma, Lymphoma, Leukemia, Radiation-Induced, Acute Disease, Liver Neoplasms, Experimental, Central Nervous System Neoplasms

### **Titles**

60 Hertz magnetic field exposure assessment for an investigation of leukemia in telephone lineworkers.

A Bayesian approach to hazard identification. The case of electromagnetic fields and cancer.

A case-control pilot study of traffic exposures and early childhood leukemia using a geographic information system.

A case-control study of childhood leukemia in southern Ontario, Canada, and exposure to magnetic fields in residences.

A case-control study of risk of leukaemia in relation to mobile phone use.

A literature review of medical side effects from radio-frequency energy in the human environment: involving cancer, tumors, and problems of the central nervous system.

A pooled analysis of magnetic fields and childhood leukaemia.

A pooled analysis of magnetic fields, wire codes, and childhood leukemia. Childhood Leukemia-EMF Study Group.

A population-based case-control study of radiofrequency exposure in relation to childhood neoplasm.

A precautionary public health protection strategy for the possible risk of childhood leukaemia from exposure to power frequency magnetic fields.

Acute childhood leukemias and exposure to magnetic fields generated by high voltage overhead power lines - a risk factor in Iran.

Acute effects of pulsed microwaves and 3-nitropropionic acid on neuronal ultrastructure in the rat caudate-putamen.

Acute leukaemia in workers exposed to electromagnetic fields.

Acute leukemia in electrical workers: a New Zealand case-control study.

Acute nonlymphocytic leukemia and residential exposure to power frequency magnetic fields.

Acute ocular injuries caused by 60-Ghz millimeter-wave exposure.



Adult and childhood leukemia near a high-power radio station in Rome, Italy.

Adult mortality from leukemia, brain cancer, amyotrophic lateral sclerosis and magnetic fields from power lines: a case-control study in Brazil.

Aetiology of childhood leukemia.

Aluminum, calcium ion and radiofrequency synergism in acceleration of lymphomagenesis.

An evaluation of exposure metrics in an epidemiologic study on radio and television broadcast transmitters and the risk of childhood leukemia.

An examination of underlying physical principles. The interaction of power-line electromagnetic fields with the human body.

Animal carcinogenicity studies on radiofrequency fields related to mobile phones and base stations.

Are occupational, hobby, or lifestyle exposures associated with Philadelphia chromosome positive chronic myeloid leukaemia?

Are the stray 60-Hz electromagnetic fields associated with the distribution and use of electric power a significant cause of cancer?

Assessment of cellular telephone and other radio frequency exposure for epidemiologic research.

Assessment of selection bias in the Canadian case-control study of residential magnetic field exposure and childhood leukemia.

Association of childhood cancer with residential traffic density.

Biological effects of environmental electromagnetic fields: molecular mechanisms.

Biophysical mechanisms of electromagnetic fields interaction and health effects].

Can disturbances in the atmospheric electric field created by powerline corona ions disrupt melatonin production in the pineal gland?

Cancer incidence among welders: possible effects of exposure to extremely low frequency electromagnetic radiation (ELF) and to welding fumes.

Cancer incidence and magnetic field exposure in industries using resistance welding in Sweden.

Cancer incidence and mortality and proximity to TV towers.

Cancer incidence near radio and television transmitters in Great Britain. I. Sutton Coldfield transmitter.

Cancer incidence near radio and television transmitters in Great Britain. II. All high power transmitters.

Carcinogenic risk of extremely-low-frequency electromagnetic fields: state of the art].

Carcinogenicity test of 50 Hz sinusoidal magnetic fields in rats.

Case-control study of childhood cancer and exposure to 60-Hz magnetic fields.

Case-only study of interactions between DNA repair genes (hMLH1, APEX1, MGMT, XRCC1 and XPD) and low-frequency electromagnetic fields in childhood acute leukemia.

Cell Phones and Risk of brain and acoustic nerve tumours: the French INTERPHONE case-control study].

Characterization of Children's Exposure to Extremely Low Frequency Magnetic Fields by Stochastic Modeling.

Childhood cancer and exposure to corona ions from power lines: an epidemiological test.

Childhood cancer and magnetic fields from high-voltage power lines in England and Wales: a case-control study.

Childhood cancer and residential proximity to power lines. UK Childhood Cancer Study Investigators.

Childhood cancer in relation to a modified residential wire code.

Childhood cancer in relation to indicators of magnetic fields from ground current sources.

Childhood incidence of acute lymphoblastic leukaemia and exposure to broadcast radiation in Sydney--a second look.

Childhood leukaemia and distance from power lines in California: a population-based case-control study.

Childhood leukaemia close to high-voltage power lines--the Geocap study, 2002-2007.

Childhood leukaemia in a residential area with a high-voltage power line: approach according to the Dutch Community Health Services' guideline 'Cancer Clusters'].

Childhood leukemia and electromagnetic fields: results of a population-based case-control study in Germany.

Childhood leukemia and magnetic fields in infant incubators.

Childhood leukemia and magnetic fields in Japan: a case-control study of childhood leukemia and residential power-frequency magnetic fields in Japan.

Childhood leukemia and personal monitoring of residential exposures to electric and magnetic fields in Ontario, Canada.

Childhood leukemia, electric and magnetic fields, and temporal trends.

Childhood leukemia: electric and magnetic fields as possible risk factors.

Children's exposure to magnetic fields produced by U.S. television sets used for viewing programs and playing video games.

Children's health and RF EMF exposure. Views from a risk assessment and risk communication perspective.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in B6C3F1 mice.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in F344/N rats.

Cohort and nested case-control studies of hematopoietic cancers and brain cancer among electric utility workers.

Combined risk estimates for two German population-based case-control studies on residential magnetic fields and childhood acute leukemia.

Comparative analyses of the studies of magnetic fields and cancer in electric utility workers: studies from France, Canada, and the United States.

Comparative health risk assessment of electromagnetic fields.

Contact voltage measured in residences: implications to the association between magnetic fields and childhood leukemia.

Decreased survival for childhood leukemia in proximity to television towers.

Description of a new computer wire coding method and its application to evaluate potential control selection bias in the Savitz et al. childhood cancer study.

Designs and analyses for exploring the relationship of magnetic fields to childhood leukaemia: a pilot project for the Danish National Birth Cohort.

Determinants of power-frequency magnetic fields in residences located away from overhead power lines.

Developing policy in the face of scientific uncertainty: interpreting 0.3 microT or 0.4 microT cutpoints from EMF epidemiologic studies.

Distance from residence to power line and risk of childhood leukemia: a population-based case-control study in Denmark.

Distance to high-voltage power lines and risk of childhood leukemia--an analysis of confounding by and interaction with other potential risk factors.

Do magnetic fields cause increased risk of childhood leukemia via melatonin disruption?

Do naturally occurring magnetic nanoparticles in the human body mediate increased risk of childhood leukaemia with EMF exposure?

Do power frequency magnetic fields cause leukemia in children?

Do studies of wire code and childhood leukemia point towards or away from magnetic fields as the causal agent?

Effect of pulsed magnetic fields on leukemia-prone AKR mice. No-effect on mortality through five generations.

Effects of centimeter waves on the immune system of mice in endotoxic shock].

Effects of electromagnetic fields on health].

Effects of extremely low-frequency electromagnetic fields (ELF-EMF) exposure on B6C3F1 mice.

Effects of mobile phone type signals on calcium levels within human leukaemic T-cells (Jurkat cells).

Electric and magnetic fields (EMF): what do we know about the health effects?

Electric and magnetic fields and health outcomes--an overview.

Electric and magnetic fields at power frequencies.

Electrical field exposure and human health. Risk assessment and problems relative to bureaucratic procedures and to the role of institutional organizations in control and prevention].

Electrical power lines and childhood leukemia: a study from Greece.

Electromagnetic field exposures and childhood cancers in New Zealand.

Electromagnetic field exposures and childhood leukaemia in New Zealand.

Electromagnetic fields (EMF): do they play a role in children's environmental health (CEH)?

Electromagnetic fields and cancer risks.

Electromagnetic fields from high-voltage installations and cancer in childhood].

Electromagnetic fields--effects on health].

Electromagnetic pollution (electrosmog)--potential hazards of our electromagnetic future].

Electrosmog as a health risk factor: sources of artificial electromagnetic fields, evaluation of health risk, prevention methods].

EMF and health.

EMFs: cutting through the controversy.

Environmental factors and childhood acute leukemias and lymphomas.

Epidemiologic evidence relevant to radar (microwave) effects.

Epidemiologic study of residential proximity to transmission lines and childhood cancer in California: description of design, epidemiologic methods and study population.

Epidemiological appraisal of studies of residential exposure to power frequency magnetic fields and adult cancers.

Epidemiological study of power lines and childhood cancer in the UK: further analyses.

Epidemiology of health effects of radiofrequency exposure.

Estimates of Environmental Exposure to Radiofrequency Electromagnetic Fields and Risk of Lymphoma Subtypes.

Estimating exposure in studies of residential magnetic fields and cancer: importance of short-term variability, time interval between diagnosis and measurement, and distance to power line.

Estimation of population attributable fractions from fitted incidence ratios and exposure survey data, with an application to electromagnetic fields and childhood leukemia.

Ethical values in the regulation of the exposure to electromagnetic fields].

Evaluation of health risks caused by radio frequency accelerated carcinogenesis: the importance of processes driven by the calcium ion signal.

Experimental estimation of thermogenic levels of acute microwave exposure for different animal species].

Exposure of high resolution fetuses in advanced pregnant woman models at different stages of pregnancy to uniform magnetic fields at the frequency of 50 Hz.

Exposure to 50-Hz electric field and incidence of leukemia, brain tumors, and other cancers among French electric utility workers.

Exposure to electromagnetic fields and risk of leukemia.

Exposure to electromagnetic fields and the risk of leukemia.

Exposure to low frequency pulsed electromagnetic fields increases interleukin-1 and interleukin-6 production by human peripheral blood mononuclear cells.

Exposure to low-frequency electromagnetic fields--a health hazard?

Exposure to magnetic fields among electrical workers in relation to leukemia risk in Los Angeles County.

Exposure to magnetic fields and survival after diagnosis of childhood leukemia: a German cohort study.

Exposure to power frequency electric fields and the risk of childhood cancer in the UK.

Exposure to power-frequency magnetic fields and the risk of childhood cancer. UK Childhood Cancer Study Investigators.

Exposure to radio-frequency electromagnetic fields from broadcast transmitters and risk of childhood cancer: a census-based cohort study.

Exposure to residential electric and magnetic fields and risk of childhood leukemia.

Extra low frequency electric and magnetic fields in the bedplace of children diagnosed with leukaemia: a case-control study.

Extremely low frequency electromagnetic fields and cancer: the epidemiologic evidence.

Factors that explain the power line configuration wiring code-childhood leukemia association: what would they look like?

Geomagnetic field variation in early ontogenesis as a risk factor for oncopathology].

Health effects of electromagnetic fields].

Health effects of low-level electromagnetic fields: phantom or not-so-phantom risk?

Hematopoietic neoplasia in C57BL/6 mice exposed to split-dose ionizing radiation and circularly polarized 60 Hz magnetic fields.

High incidence of acute leukemia in the proximity of some industrial facilities in El Bierzo, northwestern Spain.

Hypothesis: the risk of childhood leukemia is related to combinations of power-frequency and static magnetic fields.

In vitro microwave effects on human neutrophil precursor cells (CFU-C).

Incidence of cancer in the vicinity of Korean AM radio transmitters.

Incidence of leukaemia and brain tumours in some "electrical occupations".

Incorporation of epidemiological findings into radiation protection standards.

Increased mortality in amateur radio operators due to lymphatic and hematopoietic malignancies.

Increased ornithine decarboxylase activity in cultured cells exposed to low energy modulated microwave fields and phorbol ester tumor promoters.

Increased risk of childhood acute lymphoblastic leukemia (ALL) by prenatal and postnatal exposure to high voltage power lines: a case control study in Isfahan, Iran.

Induction of macrophage migration inhibitory factor precedes the onset of acute tonsillitis.

Infantile leukemia and exposure to 50/60 Hz magnetic fields: review of epidemiologic evidence in 2000].

Influence of 60-Hertz magnetic fields on leukemia.

Investigation of increased incidence in childhood leukemia near radio towers in Hawaii: preliminary observations.

Investigation of the sources of residential power frequency magnetic field exposure in the UK Childhood Cancer Study.

Knowledge and perceptions of the health effects of environmental hazards in the general population in Italy.

Leukaemia and residence near electricity transmission equipment: a case-control study.

Leukaemia, brain tumours and exposure to extremely low frequency magnetic fields: cohort study of Swiss railway employees.

Leukemia and lymphoma incidence in rodents exposed to low-frequency magnetic fields.

Leukemia and occupational exposure to electromagnetic fields: review of epidemiologic surveys.

Leukemia following occupational exposure to 60-Hz electric and magnetic fields among Ontario electric utility workers.

Leukemia in electric utility workers: the evaluation of alternative indices of exposure to 60 Hz electric and magnetic fields.

Leukemia in telephone linemen.

Leukemia mortality and incidence of infantile leukemia near the Vatican Radio Station of Rome].

Leukemia risk and occupational electric field exposure in Los Angeles County, California.

Leukemia, brain tumors, and exposure to extremely low frequency electromagnetic fields in Swiss railway employees.

Living near overhead high voltage transmission power lines as a risk factor for childhood acute lymphoblastic leukemia: a case-control study.

Lymphoma development in mice chronically exposed to UMTS-modulated radiofrequency electromagnetic fields.

Lymphoma development of simultaneously combined exposure to two radiofrequency signals in AKR/J mice.

Lymphoma induced in mice chronically exposed to very strong low-frequency electromagnetic field.

Magnetic field exposure in relation to leukemia and brain cancer mortality among electric utility workers.

Magnetic fields and acute leukemia in children with Down syndrome.

Magnetic fields and acute lymphoblastic leukemia in children: a systematic review of case-control studies.

Magnetic fields and childhood cancer--a pooled analysis of two Scandinavian studies.

Magnetic fields and leukaemia risks in UK electricity supply workers.

Magnetic fields and leukemia--risk for adults living close to power lines.

Magnetic fields, leukemia, and central nervous system tumors in Swedish adults residing near high-voltage power lines.

Maternal occupational exposure to electromagnetic fields before, during, and after pregnancy in relation to risks of childhood cancers: findings from the Oxford Survey of Childhood Cancers, 1953-1981 deaths.

Meta-analysis and its application in epidemiology].

Mortality among workers in the geothermal power plants at Larderello, Italy.

Mortality from brain cancer and leukaemia among electrical workers.

Mortality in workers exposed to electromagnetic fields.

Mortality indices for hemoblastoses in Rivno Province before and after the accident at the Chernobyl Atomic Electric Power Station].

Mortality of people residing near electric power supply line with voltage of 500 kV].

Mortality of persons resident in the vicinity of electricity transmission facilities.

Myelogenous leukemia and electric blanket use.

Myeloid leukemias and myelodysplastic syndromes: chemical exposure, histologic subtype and cytogenetics in a case-control study.

Nighttime exposure to electromagnetic fields and childhood leukemia: an extended pooled analysis.

Occupation and malignant lymphoma: a population based case control study in Germany.

Occupational and residential exposure to electric and magnetic field and its relationship on acute myeloid leukemia in adults - A Meta-analysis].

Occupational and residential magnetic field exposure and leukemia and central nervous system tumors.

Occupational electric and magnetic field exposure and brain cancer: a meta-analysis.

Occupational electric and magnetic field exposure and leukemia. A meta-analysis.

Occupational exposure to electromagnetic fields and acute leukaemia: analysis of a case-control study.

Occupational exposure to electromagnetic fields and its health effects in electric energy workers].



Occupational exposure to electromagnetic fields of extremely low frequency (with particular regard to power plants) and the health status of workers, based on a literature review].

Occupational magnetic field exposure and myocardial infarction incidence.

Occupational risk factors for acute leukaemia: a case-control study.

Occupational risk factors for cancer of the central nervous system: a case-control study on death certificates from 24 U.S. states.

Overhead electricity power lines and childhood leukemia: a registry-based, case-control study.

Parental occupational exposure to magnetic fields and childhood cancer (Sweden).

Pharmacological correction of the acute effects of microwave irradiation in an experiment].

Pooled analysis of recent studies on magnetic fields and childhood leukaemia.

Potential motion related bias in the worn dosimeter measurements of two childhood leukemia studies.

Power lines and the geomagnetic field.

Power-frequency electric and magnetic fields and risk of childhood leukemia in Canada.

Probing lymphoma infiltration in spleen of AKR/J mice chronically exposed to electromagnetic fields for risk assessment--toward noninvasive modeling.

Proximity to overhead power lines and childhood leukaemia: an international pooled analysis.

Radio and microwave frequency radiation and health--an analysis of the literature].

Radio-frequency radiation exposure from AM radio transmitters and childhood leukemia and brain cancer.

Radiofrequency exposure and mortality from cancer of the brain and lymphatic/hematopoietic systems.

Reanalysis of risks of childhood leukaemia with distance from overhead power lines in the UK.

Recent data from the literature on the biological and pathologic effects of electromagnetic radiation, radio waves and stray currents].

Refinements in magnetic field exposure assignment for a case-cohort study of electrical utility workers.

Remote effects of occupational and non-occupational exposure to electromagnetic fields of power-line frequency. Epidemiological studies].

Residence close to high-tension electric power lines and its association with leukemia in children].

Residential electric consumption and childhood cancer in Canada (1971-1986)

Residential EMF exposure and childhood leukemia: meta-analysis and population attributable risk.

Residential exposure to 60-Hertz magnetic fields and adult cancers in Taiwan.

Residential exposure to electromagnetic fields and childhood leukaemia: a meta-analysis.

Residential exposure to magnetic fields and risk of canine lymphoma.

Residential magnetic fields and childhood leukemia: a meta-analysis.

Residential magnetic fields as a risk factor for childhood acute leukaemia: results from a German population-based case-control study.

Residential magnetic fields predicted from wiring configurations: I. Exposure model.

Residential magnetic fields predicted from wiring configurations: II. Relationships To childhood leukemia.

Residential magnetic fields, contact voltage and their relationship: the effects of distribution unbalance and residential proximity to a transmission line.

Residential mobility and childhood leukemia.

Residential mobility of populations near UK power lines and implications for childhood leukaemia.

Residential proximity to electricity transmission and distribution equipment and risk of childhood leukemia, childhood lymphoma, and childhood nervous system tumors: systematic review, evaluation, and meta-analysis.

Residential wire codes: reproducibility and relation with measured magnetic fields.

Review of the epidemiologic literature on EMF and Health.

Risk factors for leukemia in Thailand.

Risk for leukaemia and brain and breast cancer among Danish utility workers: a second follow-up.

Risk of childhood leukemia and environmental exposure to ELF electromagnetic fields].

Risk of childhood leukemia in areas passed by high power lines.

Risk of leukemia in children living near high-voltage transmission lines.

Risk of major lymphoma subtypes and use of mobile phones].

Risk of neoplastic diseases in conditions of exposure to power magnetic fields--epidemiologic investigations].

Risk of neoplastic diseases in conditions of exposure to radio- and microwave fields--epidemiologic investigations].

Risks of leukaemia among residents close to high voltage transmission electric lines.

Selection bias and its implications for case-control studies: a case study of magnetic field exposure and childhood leukaemia.

Setting prudent public health policy for electromagnetic field exposures.

Should the threshold limit value for power frequency (60 Hz) magnetic fields be changed? Perceptions among scientists and other risk experts.

Spontaneous and nitrosourea-induced primary tumors of the central nervous system in Fischer 344 rats chronically exposed to 836 MHz modulated microwaves.

Study of extremely low frequency electromagnetic fields in infant incubators.

Suggestion of concomitant changes of electric power consumption and childhood leukemia in Greece.

Synthesis of the epidemiological evidence concerning childhood leukemia in relation to exposure to 50 Hz. electric and magnetic fields].

Teratogenic effect of broad-band electromagnetic field on neonatal mice (*Mus musculus*).

The Bernal Lecture 2004 Are low-frequency electromagnetic fields a health hazard?

The determinants of Canadian children's personal exposures to magnetic fields.

The effect of chronic exposure to 835.62 MHz FDMA or 847.74 MHz CDMA radiofrequency radiation on the incidence of spontaneous tumors in rats.

The effects of low-energy 60-Hz environmental electromagnetic fields upon the growth-related enzyme ornithine decarboxylase.

The epidemiology of exposure to electromagnetic fields: an overview of the recent literature.

The possible role of contact current in cancer risk associated with residential magnetic fields.

The potential hazard for the development of leukemia from exposure to electromagnetic radiation (a review of the literature)].

The potential impact of bias in studies of residential exposure to magnetic fields and childhood leukemia.

The precautionary principle and electric and magnetic fields.

The sensitivity of children to electromagnetic fields.

Time trend in incidence of malignant neoplasms of the central nervous system in relation to mobile phone use among young people in Japan.

Variation in cancer risk estimates for exposure to powerline frequency electromagnetic fields: a meta-analysis comparing EMF measurement methods.

Viral contacts confound studies of childhood leukemia and high-voltage transmission lines.

Wire codes, magnetic fields, and childhood cancer.

**FACTOR 14**

Theme – Precancerous conditions

Key MeSH Headings - Atrophy, Precancerous Conditions, Hyperplasia, Hypersensitivity, Delayed, Thymus Gland, Capillary Permeability, Lymphoma

**Titles**

A histopathological study on alterations in DMBA-induced mammary carcinogenesis in rats with 50 Hz, 100 muT magnetic field exposure.

A study on skin tumour formation in mice with 50 Hz magnetic field exposure.

Aluminum, calcium ion and radiofrequency synergism in acceleration of lymphomagenesis.

Animal carcinogenicity studies on radiofrequency fields related to mobile phones and base stations.

Calreticulin protects rat microvascular endothelial cells against microwave radiation-induced injury by attenuating endoplasmic reticulum stress.

Case-control study of childhood cancer and exposure to 60-Hz magnetic fields.

Cerebrovascular permeability to 86Rb in the rat after exposure to pulsed microwaves.

Childhood cancer in relation to a modified residential wire code.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in B6C3F1 mice.

Cohort and nested case-control studies of hematopoietic cancers and brain cancer among electric utility workers.

Dependence of microwave effect on the secondary structure of DNA on molecular weight of polynucleotide].

Detrimental effect of electromagnetic pulse exposure on permeability of in vitro blood-brain-barrier model.

Differential response of the permeability of the rat liver canalicular membrane to sucrose and mannitol following in vivo acute single and multiple exposures to microwave radiation (2.45 GHz) and radiant-energy thermal stress.

Effect of electromagnetic pulse exposure on brain micro vascular permeability in rats.

Effect of electromagnetic radiation of millimetric wave band on genome of somatic cells].

Effect of extremely high frequency electromagnetic radiation of low intensity on parameters of humoral immunity in healthy mice].

Effect of extremely low frequency electromagnetic radiation and ultra-violet radiation on aggregation of thymocytes and erythrocytes].

Effect of global system for mobile communication (GSM) microwave exposure on blood-brain barrier permeability in rat.

Effect of global system for mobile communication (gsm)-like radiofrequency fields on vascular permeability in mouse brain.

Effect of long-term mobile communication microwave exposure on vascular permeability in mouse brain.

Effect of microwaves on the expression by thymocytes of various surface membrane markers].

Effect of millimeter waves on cyclophosphamide induced suppression of the immune system.

Effect of pulsed magnetic fields on leukemia-prone AKR mice. No-effect on mortality through five generations.

Effects of electromagnetic pulse on blood-brain barrier permeability and tight junction proteins in rats].

Effects of extremely high-frequency electromagnetic radiation on the immune system and systemic regulation of homeostasis].

Effects of GSM-modulated 900 MHz radiofrequency electromagnetic fields on the hematopoietic potential of mouse bone marrow cells.

Effects of low level microwave radiation on carcinogenesis in Swiss Albino mice.

Effects of low-intensity extremely high frequency electromagnetic radiation on chromatin structure of lymphoid cells in vivo and in vitro].

Effects of microwave radiation on thymocytes in mice at different power densities].

Electromagnetic fields from high-voltage installations and cancer in childhood].

Environmental factors and childhood acute leukemias and lymphomas.

Estimates of Environmental Exposure to Radiofrequency Electromagnetic Fields and Risk of Lymphoma Subtypes.

Evaluation of health risks caused by radio frequency accelerated carcinogenesis: the importance of processes driven by the calcium ion signal.

Geomagnetic field variation in early ontogenesis as a risk factor for oncopathology].

Hematopoietic neoplasia in C57BL/6 mice exposed to split-dose ionizing radiation and circularly polarized 60 Hz magnetic fields.

Immune function and host defense in rodents exposed to 60-Hz magnetic fields.

Immunomorphologic changes in the testes upon exposure to a microwave electromagnetic field].

Increased mortality in amateur radio operators due to lymphatic and hematopoietic malignancies.

Increased sensitivity of the non-human primate eye to microwave radiation following ophthalmic drug pretreatment.

Inhibitory effects of low doses of melatonin on induction of preneoplastic liver lesions in a medium-term liver bioassay in F344 rats: relation to the influence of electromagnetic near field exposure.

Japanese encephalitis virus (JEV): potentiation of lethality in mice by microwave radiation.

Leukemia and lymphoma incidence in rodents exposed to low-frequency magnetic fields.

Lymphoma development in mice chronically exposed to UMTS-modulated radiofrequency electromagnetic fields.

Lymphoma development of simultaneously combined exposure to two radiofrequency signals in AKR/J mice.

Lymphoma induced in mice chronically exposed to very strong low-frequency electromagnetic field.

Magnetic fields and childhood cancer--a pooled analysis of two Scandinavian studies.

Melatonin protects rat thymus against oxidative stress caused by exposure to microwaves and modulates proliferation/apoptosis of thymocytes.

Metabolic and ultrastructural adaptation mechanisms during the primary prophylactic action of low-intensity electromagnetic radiation under normal and radiation conditions].

Microwave alteration of the blood-brain barrier system of rats.

Microwave irradiation of rats at 2.45 GHz activates pinocytotic-like uptake of tracer by capillary endothelial cells of cerebral cortex.

Modulation of cell death in the rat thymus. Light and electron microscopic investigations.

Modulation of natural killer cell function after exposure to 60 Hz magnetic fields: confirmation of the effect in mature B6C3F1 mice.

Mortality in workers exposed to electromagnetic fields.

Mortality indices for hemoblastoses in Rivno Province before and after the accident at the Chernobyl Atomic Electric Power Station].

Nonlinear determinism in the immune system. In vivo influence of electromagnetic fields on different functions of murine lymphocyte subpopulations.

Nonlinear dynamical law governs magnetic field induced changes in lymphoid phenotype.

Occupation and malignant lymphoma: a population based case control study in Germany.

Odontologic survey of referred patients with symptoms allegedly caused by electricity or visual display units.

Permeability of the blood-brain barrier induced by 915 MHz electromagnetic radiation, continuous wave and modulated at 8, 16, 50, and 200 Hz.

Prenatal exposure to radiofrequencies: effects of WiFi signals on thymocyte development and peripheral T cell compartment in an animal model.

Probing lymphoma infiltration in spleen of AKR/J mice chronically exposed to electromagnetic fields for risk assessment--toward noninvasive modeling.

Radiofrequency exposure and mammalian cell toxicity, genotoxicity, and transformation.

Radiofrequency exposure and mortality from cancer of the brain and lymphatic/hematopoietic systems.

Residential electric consumption and childhood cancer in Canada (1971-1986)

Residential exposure to magnetic fields and risk of canine lymphoma.

Residential proximity to electricity transmission and distribution equipment and risk of childhood leukemia, childhood lymphoma, and childhood nervous system tumors: systematic review, evaluation, and meta-analysis.

Retinal damage experimentally induced by microwave radiation at 55 mW/cm<sup>2</sup>.

Reversible microwave effects on the blood-brain barrier.

Risk of major lymphoma subtypes and use of mobile phones].

Risk of neoplastic diseases in conditions of exposure to power magnetic fields--epidemiologic investigations].

Risk of neoplastic diseases in conditions of exposure to radio- and microwave fields--epidemiologic investigations].

Teratogenic effect of broad-band electromagnetic field on neonatal mice (*Mus musculus*).

The effect of chronic exposure to 835.62 MHz FDMA or 847.74 MHz CDMA radiofrequency radiation on the incidence of spontaneous tumors in rats.

The effect of ultrahigh-frequency radiation on adaptation thresholds and the damages to blood system cells].

The effect on rat thymocytes of the simultaneous in vivo exposure to 50-Hz electric and magnetic field and to continuous light.

The effects of low-energy 60-Hz environmental electromagnetic fields upon the growth-related enzyme ornithine decarboxylase.



The efficiency and direction of thymus changes after whole-body exposure of mice to the weak electromagnetic field are determined by the initial status of the thymus].

The functional state of thymus cells following microwave exposure of endocrine glands.

The immunological and hormonal effects of combined exposure to a bitemporal ultrahigh-frequency electrical field and to decimeter waves at different sites].

The immunological mechanism of the modulation of IgE antibody formation during microwave irradiation of the thymus].

The role of fatty acids in anti-inflammatory effects of low-intensity extremely high-frequency electromagnetic radiation.

**FACTOR 15**

Theme - Circadian Rhythm

Key MeSH Headings - Melatonin, Circadian Rhythm, Pineal Gland

**Titles**

900-MHz microwave radiation promotes oxidation in rat brain.

A 0.5 G, 60 Hz magnetic field suppresses melatonin production in pinealocytes.

A 50-Hz electromagnetic field impairs sleep.

Acceleration of mammary tumorigenesis by exposure of 7,12-dimethylbenz[a]anthracene-treated female rats in a 50-Hz, 100-microT magnetic field: replication study.

Acute exposure to 50 Hz magnetic fields with harmonics and transient components: lack of effects on nighttime hormonal secretion in men.

Age-dependent association of exposure to television screen with children's urinary melatonin excretion?

Anatomical localization of human detection of weak electromagnetic radiation: experiments with dowsers.

Anxiogenic effect of chronic exposure to extremely low frequency magnetic field in adult rats.

Biological effects of continuous exposure of embryos and young chickens to electromagnetic fields emitted by video display units.

Biological effects of extremely low-frequency electromagnetic fields: in vivo studies.

Biological effects of non-ionizing electromagnetic radiation].

Biological effects produced by the influence of low frequency electromagnetic fields on hormone secretion].

Biological influences of electromagnetic fields].

Biologically based epidemiological studies of electric power and cancer.

Breast cancer and electric power.

Can disturbances in the atmospheric electric field created by powerline corona ions disrupt melatonin production in the pineal gland?

Cardiac autonomic control mechanisms in power-frequency magnetic fields: a multistudy analysis.

Cardiovascular diseases and the work environment. A critical review of the epidemiologic literature on nonchemical factors.

Chronic exposure to 2.9 mT, 40 Hz magnetic field reduces melatonin concentrations in humans.

Chronic exposure to ELF fields may induce depression.

Chronic exposure to ELF magnetic fields during night sleep with electric sheet: effects on diurnal melatonin rhythms in men.

Chronotoxicity of 1800 MHz microwave radiation on sex hormones and spermatogenesis in male mice].

Circadian locomotor activity of *Musca* flies: recording method and effects of 10 Hz square-wave electric fields.

Circadian rhythmicity of antioxidant markers in rats exposed to 1.8 GHz radiofrequency fields.

Designing EMF experiments: what is required to characterize "exposure"?

Direct suppressive effects of weak magnetic fields (50 Hz and 16 2/3 Hz) on melatonin synthesis in the pineal gland of Djungarian hamsters (*Phodopus sungorus*).

Do magnetic fields cause increased risk of childhood leukemia via melatonin disruption?

Does evening exposure to mobile phone radiation affect subsequent melatonin production?

Earthing: health implications of reconnecting the human body to the Earth's surface electrons.

Effect of occupational EMF exposure from radar at two different frequency bands on plasma melatonin and serotonin levels.

Effects of 1800-MHz radiofrequency fields on circadian rhythm of plasma melatonin and testosterone in male rats.

Effects of 60-Hz magnetic field exposure on nocturnal 6-sulfatoxymelatonin, estrogens, luteinizing hormone, and follicle-stimulating hormone in healthy reproductive-age women: results of a crossover trial.

Effects of electric and magnetic fields from high-power lines on female urinary excretion of 6-sulfatoxymelatonin.

Effects of electric and magnetic fields on nocturnal melatonin concentrations in dairy cows.

Effects of electromagnetic fields exposure on plasma hormonal and inflammatory pathway biomarkers in male workers of a power plant.

Effects of electromagnetic fields on photophasic circulating melatonin levels in American kestrels.

Effects of electromagnetic radiation from 3G mobile phone on heart rate, blood pressure and ECG parameters in rats.

Effects of exposure to 16.7 Hz magnetic fields on urinary 6-hydroxymelatonin sulfate excretion of Swiss railway workers.

Effects of melatonin on Wi-Fi-induced oxidative stress in lens of rats.

Effects of mobile phone electromagnetic fields at nonthermal SAR values on melatonin and body weight of Djungarian hamsters (*Phodopus sungorus*).

Effects of mobile phone radiation on UV-induced skin tumourigenesis in ornithine decarboxylase transgenic and non-transgenic mice.

Effects of static electromagnetic fields on chick embryo pineal gland development.

Effects of weak alternating magnetic fields on nocturnal melatonin production and mammary carcinogenesis in rats.

Electric blanket or mattress cover use and breast cancer incidence in women 50-79 years of age.

Electric power, pineal function, and the risk of breast cancer.

Endocrine functions in young men exposed for one night to a 50-Hz magnetic field. A circadian study of pituitary, thyroid and adrenocortical hormones.

Evaluation in humans of the effects of radiocellular telephones on the circadian patterns of melatonin secretion, a chronobiological rhythm marker.

Evaluation of the nocturnal levels of urinary biogenic amines in men exposed overnight to 50-Hz magnetic field.

Evidence of oxidative stress in American kestrels exposed to electromagnetic fields.

Exacerbation of hypertension and disturbances of the geomagnetic field].

Examination of the melatonin hypothesis in women exposed at night to EMF or bright light.

Exposure to 1800 MHz radiofrequency radiation induces oxidative damage to mitochondrial DNA in primary cultured neurons.

Exposure to electromagnetic fields and suicide among electric utility workers: a nested case-control study.

Extremely low frequency electromagnetic fields (EMF) and brain cancer in adults and children: review and comment.

Geomagnetic activity and human melatonin metabolite excretion.

Geomagnetic disturbances are associated with reduced nocturnal excretion of a melatonin metabolite in humans.

Human melatonin during continuous magnetic field exposure.

Immune markers and ornithine decarboxylase activity among electric utility workers.

Impact of microwave at X-band in the aetiology of male infertility.

Incidence of micronuclei in human peripheral blood lymphocytes exposed to modulated and unmodulated 2450 MHz radiofrequency fields.

Increases in geomagnetic activity are associated with increases in thyroxine levels in a single patient: implications for melatonin levels.

Influence of electromagnetic fields emitted by GSM-900 cellular telephones on the circadian patterns of gonadal, adrenal and pituitary hormones in men.

Influence of extremely-low-frequency magnetic field on antioxidative melatonin properties in AT478 murine squamous cell carcinoma culture.

Influence of light and electromagnetic radiation of Sun on circadian rhythms of the total antioxidant capacity of human saliva in the North].

Inhibitory effects of low doses of melatonin on induction of preneoplastic liver lesions in a medium-term liver bioassay in F344 rats: relation to the influence of electromagnetic near field exposure.

Interaction of static and extremely low frequency electric and magnetic fields with living systems: health effects and research needs.

Is melatonin the hormonal missing link between magnetic field effects and human diseases?

Is newborn melatonin production influenced by magnetic fields produced by incubators?

Is problematic mobile phone use explained by chronotype and personality?

Magnetic fields and pineal function in humans: evaluation of nocturnal acute exposure to extremely low frequency magnetic fields on serum melatonin and urinary 6-sulfatoxymelatonin circadian rhythms.

Magnetic storm effect on the circulation of rabbits.

Melatonin and a spin-trap compound block radiofrequency electromagnetic radiation-induced DNA strand breaks in rat brain cells.

Melatonin and magnetic fields.

Melatonin attenuates radiofrequency radiation (900 MHz)-induced oxidative stress, DNA damage and cell cycle arrest in germ cells of male Swiss albino mice.

Melatonin metabolite levels in workers exposed to 60-Hz magnetic fields: work in substations and with 3-phase conductors.

Melatonin modulates 900 Mhz microwave-induced lipid peroxidation changes in rat brain.

Melatonin protects rat cerebellar granule cells against electromagnetic field-induced increases in Na(+) currents through intracellular Ca(2+) release.

Melatonin protects rat thymus against oxidative stress caused by exposure to microwaves and modulates proliferation/apoptosis of thymocytes.

Melatonin reduces oxidative stress induced by chronic exposure of microwave radiation from mobile phones in rat brain.

Melatonin suppression by static and extremely low frequency electromagnetic fields: relationship to the reported increased incidence of cancer.

Mobile phone radiation induces mode-dependent DNA damage in a mouse spermatocyte-derived cell line: a protective role of melatonin.

Mobile phones and health: a literature overview.

Modifying effect of light and electromagnetic field on development of mammary tumors induced by N-nitrosomethyl urea in female rats].

Modulation of wireless (2.45 GHz)-induced oxidative toxicity in laryngotracheal mucosa of rat by melatonin.

Morphometric and structural study of the pineal gland of the Wistar rat subjected to the pulse action of a 52 Gauss, (50 Hz) magnetic field. Evolutive analysis over 21 days.

Multi-night exposure to 60 Hz magnetic fields: effects on melatonin and its enzymatic metabolite.

Neuroprotective effects of melatonin and omega-3 on hippocampal cells prenatally exposed to 900 MHz electromagnetic fields.

Nighttime exposure to electromagnetic fields and childhood leukemia: an extended pooled analysis.

Nocturnal 6-hydroxymelatonin sulfate excretion in female workers exposed to magnetic fields.

Nocturnal excretion of a urinary melatonin metabolite among electric utility workers.

Nocturnal exposure to intermittent 60 Hz magnetic fields alters human cardiac rhythm.

Non-thermal biomarkers of exposure to radiofrequency/microwave radiation.

Nonionizing electromagnetic fields and cancer: a review.

Oxidative stress-mediated skin damage in an experimental mobile phone model can be prevented by melatonin.

Pathophysiology of microwave radiation: effect on rat brain.

Prevention of mobile phone induced skin tissue changes by melatonin in rat: an experimental study.

Protective effect of melatonin and vitamin E against prooxidative action of iron ions and static magnetic field].

Rapid-onset/offset, variably scheduled 60 Hz electric and magnetic field exposure reduces nocturnal serum melatonin concentration in nonhuman primates.

Rate of occurrence of transient magnetic field events in U.S. residences.

Reduced excretion of a melatonin metabolite in workers exposed to 60 Hz magnetic fields.

Relationship between amyloid beta protein and melatonin metabolite in a study of electric utility workers.

Residential magnetic fields and the risk of breast cancer.

Risk factors, health risks, and risk management for aircraft personnel and frequent flyers.

Role of melatonin on electromagnetic radiation-induced oxidative stress and Ca<sup>2+</sup> signaling molecular pathways in breast cancer.

Serum-thyroxine levels in microwave-exposed rats.

Shift work, light at night, and breast cancer on Long Island, New York.

Temporal trends and misclassification in residential 60 Hz magnetic field measurements.

The effect of melatonin on body mass and behaviour of rats during an exposure to microwave radiation from mobile phone.

The effect of melatonin on the liver of rats exposed to microwave radiation.

The Effects of Electromagnetic Field on the Endocrine System in Children and Adolescents.

The effects of electromagnetic radiation (2450 MHz wireless devices) on the heart and blood tissue: role of melatonin.

The effects of extremely low-frequency magnetic fields on melatonin and cortisol, two marker rhythms of the circadian system.

The Effects of Melatonin on Oxidative Stress Parameters and DNA Fragmentation in Testicular Tissue of Rats Exposed to Microwave Radiation.

The excretion of 6-hydroxymelatonin sulfate in healthy young men exposed to electromagnetic fields emitted by cellular phone -- an experimental study.

The impact of electromagnetic field at a frequency of 50 Hz and a magnetic induction of 2.5 mT on viability of pineal cells in vitro.

The influence of long-term exposure of mice to randomly varied power frequency magnetic fields on their nocturnal melatonin secretion patterns.

The melatonin hypothesis: electric power and breast cancer.

The relationship between electromagnetic field and light exposures to melatonin and breast cancer risk: a review of the relevant literature.

The therapeutic effect of a pulsed electromagnetic field on the reproductive patterns of male Wistar rats exposed to a 2.45-GHz microwave field.

Therapeutic approaches of melatonin in microwave radiations-induced oxidative stress-mediated toxicity on male fertility pattern of Wistar rats.

Understanding the effects of electromagnetic field emissions from Marine Renewable Energy Devices (MREDs) on the commercially important edible crab, *Cancer pagurus* (L.).

Urinary 6-sulphatoxymelatonin excretion is increased in rats after 24 hours of exposure to vertical 50 Hz, 100 microT magnetic field.

Variations of melatonin and stress hormones under extended shifts and radiofrequency electromagnetic radiation.



**FACTOR 16**

Theme - Eye diseases

Key MeSH Headings - Eye Diseases, Cataract, Vision Disorders, Sensation Disorders, Neurotic Disorders, Lens, Crystalline, Corneal Diseases, Edema, Hematologic Diseases

**Titles**

A quantitative study on early changes in rabbit lens capsule epithelium induced by low power density microwave radiation].

Acute microwave irradiation and cataract formation in rabbits and monkeys.

Acute ocular lesions after exposure to electromagnetic radiation of ultrahigh frequency (an experimental study)].

Age-Related Modulations of AQP4 and Caveolin-1 in the Hippocampus Predispose the Toxic Effect of Phoneutria nigriventer Spider Venom.

Ascorbic acid changes in cultured rabbit lenses after microwave irradiation.

Biologic effects and hygienic regulation of electromagnetic fields caused by mobile communication devices].

Blocking 1800 MHz mobile phone radiation-induced reactive oxygen species production and DNA damage in lens epithelial cells by noise magnetic fields].

Cataracts induced by microwave and ionizing radiation.

Changes in gap junctional intercellular communication in rabbits lens epithelial cells induced by low power density microwave radiation.

Combined microwave energy and fixative agent for cataract induction in pig eyes.

Comments on Frey's "Data analysis reveals significant microwave-induced eye damage in humans".

Data analysis reveals significant microwave-induced eye damage in humans.

Dependence of anti-inflammatory effects of high peak-power pulsed electromagnetic radiation of extremely high frequency on exposure parameters].

DNA damage and repair induced by acute exposure of microwave from mobile phone on cultured human lens epithelial cells].

Dosimetric study of microwave cataractogenesis.

Effect of acute exposure to microwave from mobile phone on DNA damage and repair of cultured human lens epithelial cells in vitro].

Effect of high-power density microwave irradiation on the soluble proteins of the rabbit lens.

Effect of long-term power frequency electromagnetic field exposure on proliferation and apoptosis of SRA01/04 cells].

Effect of low-intensity microwave radiation on proliferation of cultured epithelial cells of rabbit lens].

Effect of superposed electromagnetic noise on DNA damage of lens epithelial cells induced by microwave radiation.

Effects of different dose microwave radiation on protein components of cultured rabbit lens].

Effects of exposure to microwaves: problems and perspectives.

Effects of Long-Term Exposure to 60 GHz Millimeter-Wavelength Radiation on the Genotoxicity and Heat Shock Protein (Hsp) Expression of Cells Derived from Human Eye.

Effects of melatonin on Wi-Fi-induced oxidative stress in lens of rats.

Effects of microwave radiation on the eye: the occupational health perspective.

Effects of microwave radiation on the lens epithelium in the rabbit eye.

Effects of mobile phones and radar radiofrequencies on the eye].

Effects of mobile phones on oxidant/antioxidant balance in cornea and lens of rats.

Effects of repeated microwave irradiations to the albino rabbit eye.

Electrical properties of lens material at microwave frequencies.

Electromagnetic noise inhibits radiofrequency radiation-induced DNA damage and reactive oxygen species increase in human lens epithelial cells.

Epidemiologic studies of the effect of microwaves (neurophysiologic, hematologic and ophthalmologic aspects)].

Epidemiological studies of human exposures to radiofrequency radiation. A critical review.

Evaluation of lens transparency in persons exposed to electromagnetic radiation of 27--30 MHz frequency].

Evaluation of possible microwave-induced lens changes in the United States Air Force.

Experimental studies on the influence of millimeter radiation on light transmission through the lens].

Features of anti-inflammatory effects of modulated extremely high-frequency electromagnetic radiation.

Glutathione concentration and peptidase activity in the lens after exposure to microwaves.

Hazards of radio frequency magnetic field and their prevention and control].

Health problems among workers of iron welding machines: an effect of electromagnetic fields.

In vitro studies of microwave-induced cataract. II. Comparison of damage observed for continuous wave and pulsed microwaves.

In vitro studies of microwave-induced cataract: reciprocity between exposure duration and dose rate for pulsed microwaves.

Increased occurrence of nuclear cataract in the calf after erection of a mobile phone base station].

Inducing cataract in postmortem pig eyes for cataract surgery training purposes.

Localized effects of microwave radiation on the intact eye lens in culture conditions.

Low power density microwave radiation induced early changes in rabbit lens epithelial cells.

Low power microwave radiation inhibits the proliferation of rabbit lens epithelial cells by upregulating P27Kip1 expression.

Low-intensity microwave blocks cell cycle and regulate cell cycle related gene expression in rabbit lens epithelial cells].

Microwave cataract and litigation: a case study.

Microwave cyclodestruction: evaluation on human eyes.

Microwave lens effects in humans. II. Results of five-year survey.

Microwave radiation-induced chromosomal aberrations in corneal epithelium of Chinese hamsters.

Microwaves and the visual analyzer].

Millimeter wave absorption in the nonhuman primate eye at 35 GHz and 94 GHz.

Mobile Phone Radiation: Physiological & Pathophysiological Considerations.

Neurotic disturbances, depression and anxiety disorders in the population living in the vicinity of overhead high-voltage transmission line 400 kV. Epidemiological pilot study].

Non-thermal cellular effects of lowpower microwave radiation on the lens and lens epithelial cells.

Observation of microwave-induced eye lens surface motion in vitro.

Ocular effects of radiofrequency energy.

Odontologic survey of referred patients with symptoms allegedly caused by electricity or visual display units.

On the microwave exposure.

Phantom vibration and phantom ringing among mobile phone users: A systematic review of literature.

Post-mortem histologic evaluation of microwave lesions after epicardial pulmonary vein isolation for atrial fibrillation.

Prevalence of nuclear cataract in Swiss veal calves and its possible association with mobile telephone antenna base stations.

Proteomic analysis of human lens epithelial cells exposed to microwaves.

Radiofrequency and microwave radiation in the microelectronics industry.

Some ocular symptoms and sensations experienced by long term users of mobile phones.

Some ocular symptoms experienced by users of mobile phones.

State of peripheral blood of technical personnel exposed to constant magnetic fields].

The effect of extremely low frequency magnetic field on the conjunctiva and goblet cells.

The effects of cell phone use on peripheral vision.

The effects of ionizing radiation, microwaves, and ultrasound on the developing embryo: clinical interpretations and applications of the data.

The ocular effects of microwaves on hypothermic rabbits: a study of microwave cataractogenic mechanisms.

Thermal cataract formation in rabbits.

Thresholds for lenticular damage in the rabbit eye due to single exposure to CW microwave radiation: an analysis of the experimental information at a frequency of 2.45 GHz.

Ultrastructural change of rabbit lens epithelial cells induced by low power level microwave radiation].

Ultrastructural changes in the rabbit lens induced by microwave radiation.

Video display terminals: risk of electromagnetic radiation.

**FACTOR 17**

Theme - Electromagnetic interference in implanted electronic devices

Key MeSH Headings - Tachycardia, Ventricular, Ventricular Fibrillation, Death, Sudden, Cardiac, Arrhythmias, Cardiac

**Titles**

AANA Journal Course: update for nurse anesthetists. Arrhythmia management devices and electromagnetic interference.

Accidental deaths caused by electricity in Sweden, 1975-2000.

Are patients with cardiac implants protected against electromagnetic interference in daily life and occupational environment?

Avoidance behaviors in patients with implantable cardioverter defibrillators.

Cardiac autonomic control mechanisms in power-frequency magnetic fields: a multistudy analysis.

Deaths associated with implantable cardioverter defibrillator failure and deactivation reported in the United States Food and Drug Administration Manufacturer and User Facility Device Experience Database.

Detection of refrigerator-associated 60 Hz alternating current as ventricular fibrillation by an implantable defibrillator.

Disturbances in the function of cardiac pacemaker caused by short wave and microwave diathermies and pulsed high frequency current.

Do airport metal detectors interfere with implantable pacemakers or cardioverter-defibrillators?

Do media players cause interference with pacemakers?

Do mobile telephones have adverse effects on the functions of implantable cardioverter defibrillators?].

ECG changes caused by the effect of static magnetic fields of nuclear magnetic resonance tomography using magnets with a field power of 0.5 to 4.0 Tesla].

Effects of 900 MHz electromagnetic field emitted by cellular phones on electrocardiograms of guinea pigs.

Electromagnetic fields and health effects--epidemiologic studies of cancer, diseases of the central nervous system and arrhythmia-related heart disease.

Electromagnetic Interference (EMI) and arrhythmic events in ICD patients undergoing gastrointestinal procedures.

Electromagnetic interference in cardiac rhythm management devices.

Electromagnetic interference in implantable cardioverter defibrillators: present but rare.

Electromagnetic interference of cardiac rhythmic monitoring devices to radio frequency identification: analytical analysis and mitigation methodology.

Electromagnetic interference with cardiac pacemakers and implantable cardioverter-defibrillators from low-frequency electromagnetic fields in vivo.

Electromagnetic interference with implantable cardioverter-defibrillators at power frequency: an in vivo study.

Fine structural alterations in radiofrequency energy-induced lesions in dog hearts: possible basis for reduced arrhythmic complications.

Implantable cardioverter defibrillators and cellular telephones: is there any interference?

Implanted devices and electromagnetic interference: case presentations and review.

Induction ovens and electromagnetic interference: what is the risk for patients with implantable cardioverter defibrillators?

Induction ovens and electromagnetic interference: what is the risk for patients with implanted pacemakers?

Influence of 50 Hz electric and magnetic fields on the human heart.

Influence of digital and analogue cellular telephones on implanted pacemakers.

Interference of electrical dental equipment with implantable cardioverter-defibrillators.

Interference with cardiac pacemakers by cellular telephones.

Interference with cardiac pacing.

Is there any risk interaction between electromagnetic field generated by mobile phones and artificial pacemakers].

Magnetic field exposure and arrhythmic risk: evaluation in railway drivers.

Magnetism and cardiac arrhythmias.

Microwave effects on isolated chick embryo hearts.

Modifications in ventricular fibrillation and capture capacity induced by a linear radiofrequency lesion.

Risk of severe cardiac arrhythmia in male utility workers: a nationwide danish cohort study.

Selective interference with pacemaker activity by electrical dental devices.

Studies on microwaves in medicine and biology: from snails to humans.

The effect of power frequency high intensity electric fields on implanted cardiac pacemakers.

Ventricular fibrillation induced by radiofrequency energy delivery for premature ventricular contractions arising from the right ventricular outflow tract: is implantable cardioverter defibrillator indicated?

**FACTOR 18**

Theme – Liver Neoplasms

Key MeSH Headings - Liver Neoplasms, Carcinoma, Hepatocellular, Neoplasm Recurrence, Local, Lymphatic Metastasis

**Titles**

40 GHz RF biosensor based on microwave coplanar waveguide transmission line for cancer cells (HepG2) dielectric characterization.

A case of hepatocellular carcinoma rupturing after angiography.

A case of recurring hepatocellular carcinoma with a solitary Virchow's lymph node metastasis.

A case report of primary hepatic carcinoid with lymph node metastasis--treatment of hepatic arterial infusion to post-reoperative liver and radiation to metastasis of para-aortic lymph nodes].

Construction and clinical significance of a predictive system for prognosis of hepatocellular carcinoma.

Effects of extremely low-frequency electromagnetic fields (ELF-EMF) exposure on B6C3F1 mice.

Geomagnetic field variation in early ontogenesis as a risk factor for oncopathology].

Inhibitory effects of low doses of melatonin on induction of preneoplastic liver lesions in a medium-term liver bioassay in F344 rats: relation to the influence of electromagnetic near field exposure.

Lymphoma development of simultaneously combined exposure to two radiofrequency signals in AKR/J mice.

Mobile phone radiation alters proliferation of hepatocarcinoma cells.

MoS2 nanosheets encapsulated in sodium alginate microcapsules as microwave embolization agents for large orthotopic transplantation tumor therapy.

Multimodal treatment of hepatocellular carcinoma.

Non-resection approaches for colorectal liver metastases.

Rat liver foci study on coexposure with 50 Hz magnetic fields and known carcinogens.



**FACTOR 19**

Theme – Symptoms of discomfort

Key MeSH Headings - Headache, Dizziness, Fatigue, Depression, Anxiety, Tremor, Sleep Wake Disorders, Neurotic Disorders, Stress, Psychological, Anxiety Disorders, Nervous System Diseases

**Titles**

A 50-Hz electromagnetic field impairs sleep.

A literature review of medical side effects from radio-frequency energy in the human environment: involving cancer, tumors, and problems of the central nervous system.

A study on the biological effects of exposure mobile-phone frequency EMF].

A survey study on some neurological symptoms and sensations experienced by long term users of mobile phones.

Altered cortical excitability in subjectively electrosensitive patients: results of a pilot study.

An analysis of the impact of cell phone use on depressive symptoms among Japanese elders.

Anxiety-like behavioural effects of extremely low-frequency electromagnetic field in rats.

Anxiogenic effect of chronic exposure to extremely low frequency magnetic field in adult rats.

Are media reports able to cause somatic symptoms attributed to WiFi radiation? An experimental test of the negative expectation hypothesis.

Association between Excessive Use of Mobile Phone and Insomnia and Depression among Japanese Adolescents.

Association between exposure to radiofrequency electromagnetic fields assessed by dosimetry and acute symptoms in children and adolescents: a population based cross-sectional study.

Association between mobile phone use and depressed mood in Japanese adolescents: a cross-sectional study.

Association between overuse of mobile phones on quality of sleep and general health among occupational health and safety students.

Association between problematic cellular phone use and suicide: the moderating effect of family function and depression.

Association of low job control with a decrease in memory (CD4+ CD45RO+) T lymphocytes in Japanese middle-aged male workers in an electric power plant.

Association of mobile phone radiation with fatigue, headache, dizziness, tension and sleep disturbance in Saudi population.

Association of tinnitus and electromagnetic hypersensitivity: hints for a shared pathophysiology?

Associations between problematic mobile phone use and psychological parameters in young adults.

Avoidance behaviors in patients with implantable cardioverter defibrillators.

Bedtime mobile phone use and sleep in adults.

Behavior and memory evaluation of Wistar rats exposed to 1.8 GHz radiofrequency electromagnetic radiation.

Can exposure to a terrestrial trunked radio (TETRA)-like signal cause symptoms? A randomised double-blind provocation study.

Cancer incidence and magnetic field exposure in industries using resistance welding in Sweden.

Cell phones: modern man's nemesis?

Cellular phones for reducing battlefield stress: rationale and a preliminary research.

Cerebral radiofrequency exposures during adolescence: Impact on astrocytes and brain functions in healthy and pathologic rat models.

Chronic exposure to an extremely low-frequency magnetic field induces depression-like behavior and corticosterone secretion without enhancement of the hypothalamic-pituitary-adrenal axis in mice.

Chronic exposure to ELF fields may induce depression.

Clinical features of headache associated with mobile phone use: a cross-sectional study in university students.

Cohort study on the effects of everyday life radio frequency electromagnetic field exposure on non-specific symptoms and tinnitus.

Contribution of physical factors to the complex anthropogenic load in an industrial town].

Coping and self-image in patients with visual display terminal-related skin symptoms and perceived hypersensitivity to electricity.

Correction of microcirculatory disturbances with terahertz electromagnetic radiation at nitric oxide frequencies in albino rats under conditions of acute stress.

Delayed biological effect of electromagnetic fields action].

Depression in high voltage power line workers.

Determinants and stability over time of perception of health risks related to mobile phone base stations.

Development of a problematic mobile phone use scale for Turkish adolescents.

Do mobile phone base stations affect sleep of residents? Results from an experimental double-blind sham-controlled field study.

Does short-term exposure to mobile phone base station signals increase symptoms in individuals who report sensitivity to electromagnetic fields? A double-blind randomized provocation study.

Effect of hypokinetic stress and low intensity electromagnetic field of extremely high frequency on changes of cytokine concentration in rat blood].

Effect of short-term 50 Hz electromagnetic field exposure on the behavior of rats.

Effect of stress and intensity of mobile phone using on the health and subjective symptoms in GSM workers].

Effective methods of protection from technogenic electromagnetic irradiation and information-wave diagnostic means].

Effects of acute exposure to ultrahigh radiofrequency radiation on three antenna engineers.

Effects of chronic exposure of power frequency magnetic field on neurobehavior in rats].

Effects of electromagnetic fields from mobile phones on depression and anxiety after titanium mesh cranioplasty among patients with traumatic brain injury.

Effects of exposure to microwaves: problems and perspectives.

Effects of extremely low frequency electromagnetic fields (100μT) on behaviors in rats.

Effects of GSM-900 microwaves on the experimental allergic encephalomyelitis (EAE) rat model of multiple sclerosis.

Effects of GSM-Frequency Electromagnetic Radiation on Some Physiological and Biochemical Parameters in Rats.

Effects of information and 50 Hz magnetic fields on cognitive performance and reported symptoms.

Effects of mobile phone radiation (900 MHz radiofrequency) on structure and functions of rat brain.

Effects of Sleep Quality on the Association between Problematic Mobile Phone Use and Mental Health Symptoms in Chinese College Students.

Electromagnetic field effect or simply stress? Effects of UMTS exposure on hippocampal longterm plasticity in the context of procedure related hormone release.

Electromagnetic fields and health outcomes.

Electromagnetic fields at a mobile phone frequency (900 MHz) trigger the onset of general stress response along with DNA modifications in *Eisenia fetida* earthworms.

Electromagnetic fields hypersensitivity].

Electromagnetic fields: damage to health due to the nocebo effect].

Electromagnetic hypersensitivity (EHS) and subjective health complaints associated with electromagnetic fields of mobile phone communication--a literature review published between 2000 and 2004.

Electromagnetic hypersensitivity: evidence for a novel neurological syndrome.

Endocrine mechanism of placental circulatory disturbances induced by microwave in pregnant rats].

Enhancement of allergic skin wheal responses in patients with atopic eczema/dermatitis syndrome by playing video games or by a frequently ringing mobile phone.

Environmental illness: fatigue and cholinesterase activity in patients reporting hypersensitivity to electricity.

Enzymatic activity of some tissues and blood serum from animals and humans exposed to microwaves and hypothesis on the possible role of free radical processes in the nonlinear effects and modification of emotional behavior of animals].

Epidemiologic studies of the effect of microwaves (neurophysiologic, hematologic and ophthalmologic aspects)].

Epidemiological risk assessment of pathology development in occupational exposure to radiofrequency electromagnetic fields].

EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses.

Exposure to electromagnetic fields and suicide among electric utility workers: a nested case-control study.

Exposure to mobile phone electromagnetic field radiation, ringtone and vibration affects anxiety-like behaviour and oxidative stress biomarkers in albino wistar rats.

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**FACTOR 20****Theme - Neoplasms**

Key MeSH Headings - Lung Neoplasms, Ovarian Neoplasms, Pituitary Neoplasms, Lymphoma, Prostatic Neoplasms, Colonic Neoplasms, Carcinoma, Breast Neoplasms, Hematologic Neoplasms, Neoplasms, Liver Neoplasms, Cell Transformation, Neoplastic, Nervous System Neoplasms

**Titles**

2-GHz band CW and W-CDMA modulated radiofrequency fields have no significant effect on cell proliferation and gene expression profile in human cells.

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Transmission electron microscopy study of the effects produced by wide-band low-power millimeter waves on MCF-7 human breast cancer cells in culture.

Use of cellular telephones and risk of cancer. A Danish cohort study].

Use of electric bedding devices and risk of breast cancer in African-American women.

Use of electric blankets and risk of postmenopausal breast cancer.

Validation of self-reported cellular phone use.

Variable E-cadherin expression in a MNU-induced colon tumor model in rats which exposed with 50 Hz frequency sinusoidal magnetic field.



## **Appendix 4 – Hierarchical Text Clustering Taxonomy of Adverse EMF Effects Database**

### **A4-A. Cluster Themes**

A query to retrieve Medline records showing adverse health effects of wireless radiation was generated. The query was entered into the Medline search engine, and ~15,000 records were retrieved. Filtering was applied to the retrieval to remove records not associated with adverse health effects of wireless radiation, and 5311 records remained. Further filtering was not done, and more records showing no adverse effects, examining ELF frequencies, and exceeding the FCC exposure limits, were included compared to the filtered database in Appendix 2. The partially filtered records were imported into the CLUTO software, and a 48-cluster hierarchical text clustering of titles/abstracts was performed.

The following tables ([A4-1](#), [A4-2](#)) show the categories in the taxonomy. The first table shows hierarchical Levels 2 and 4, and the second table shows Level 4 and its associated leaf (lowest level) clusters. For each cluster in both tables, the number of associated records is shown in parentheses, followed by the cluster theme. Following the tables, each leaf cluster is shown, including numbers of records, theme, and associated record titles. The Level 4 clusters in the second table are hyperlinked to their positions in the list of titles. Because of the filtering process limitations, most, but not all, records are associated with adverse effects of wireless radiation. To access the full record, insert the titles of interest into Pubmed or other Medline search engine.

Main adverse effects identified at the cluster theme level include cancer, brain tumors, mammary cancer, childhood cancer, childhood leukemia, breast cancer, acoustic neuromas, neurodegenerative diseases, cognitive function, neural function, oxidative stress, genotoxic, DNA damage, chromosome damage, gene expression alterations, implanted electronic device malfunction, sleep, melatonin secretion, embryos, cataracts, hearing, electrohypersensitivity.

**Table A4-1 - CLUTO-Based Text Clustering Taxonomy – Top Levels**

<b>SECOND LEVEL</b>	<b>FOURTH LEVEL</b>
Cluster 92 (2561) – Adverse effects of wireless radiation at cellular level, including radiation absorption at different frequencies	Cluster 78 (912) – Adverse impacts of wireless radiation, especially on cataracts, cells, and cognitive functions
	Cluster 79 (428) – Microwave radiation absorption at different frequencies
	Cluster 82 (529) – Adverse effects of mobile phone radiation, especially oxidative stress
	Cluster 84 (692) – Genotoxic effects of radiofrequency radiation
Cluster 93 (2750) – Adverse health effects of EMF on humans, especially cancer and neurodegenerative diseases, and on implanted electronic devices	Cluster 81 (673) – Adverse impacts of power-line EMF
	Cluster 85 (540) – Adverse impacts of low-frequency EMF, emphasizing cancer and neurodegenerative diseases
	Cluster 83 (668) – Adverse effects of mobile phone use, especially brain tumors, and brain and neural function
	Cluster 89 (869) – Human health risks from electromagnetic radiation, including adverse effects on implanted electronic devices, and possible protections

Table A4-2. CLUTO-Based Text Clustering Taxonomy - Bottom Levels

FOURTH LEVEL	LEAF (LOWEST) LEVEL
<a href="#">Cluster 78 (912)</a> – Adverse impacts of wireless radiation, especially on cataracts, cells, and cognitive functions	Cluster 46 (331) – Adverse effects of microwave radiation, mainly on rats
	Cluster 3 (39) – Adverse impact of wireless radiation on eye lens
	Cluster 35 (107) – Adverse impacts of microwave radiation on cells and cognitive functions
	Cluster 39 (211) – Adverse effects from microwave radiation
	Cluster 29 (94) – Adverse effects of microwave radiation, especially pulsed microwave
	Cluster 31 (130) – Adverse effects of microwave exposures on rats, especially at WiFi frequencies
<a href="#">Cluster 79 (428)</a> – Microwave radiation absorption at different frequencies	Cluster 10 (75) – Dielectric properties of tissue at different microwave frequencies
	Cluster 23 (88) – Specific absorption rate in human body models
	Cluster 21 (63) – Adverse effects of millimeter-wave exposures on biological systems
	Cluster 44 (95) – Adverse effects of microwave resonances in biological systems
	Cluster 47 (107) – Adverse biological effects of decimeter waves
<a href="#">Cluster 82 (529)</a> – Adverse effects of mobile phone radiation, especially oxidative stress	Cluster 22 (127) – Effects of radiofrequency radiation, especially from mobile phones, on rats
	Cluster 26 (129) - Oxidative stress effects from mobile phone radiofrequency radiation
	Cluster 37 (140) – Effect of radiofrequency exposure, especially prenatal exposure, on rats
	Cluster 38 (133) – Effect of radiofrequency radiation on rat brain
<a href="#">Cluster 84 (692)</a> – Genotoxic effects of radiofrequency radiation	Cluster 20 (126) – DNA damage after microwave radiation
	Cluster 28 (100) – Chromosome damage in lymphocytes exposed to radiofrequency radiation
	Cluster 45 (179) – Adverse effects of low-frequency EMF on cells
	Cluster 24 (111) – Gene expression alterations following radiofrequency exposure
	Cluster 11 (51) – Adverse impacts of radiofrequency fields on sleep
	Cluster 41 (125) – Adverse effects of radiofrequency fields on cells
<a href="#">Cluster 81 (673)</a> – Adverse impacts of power-line EMF	Cluster 9 (43) – Adverse effects of ELF magnetic field exposures
	Cluster 17 (55) – Adverse impacts of EMF on mammary cancer development
	Cluster 6 (67) – Adverse health effects of magnetic fields associated with magnetic resonance imaging
	Cluster 32 (139) – Health risks of power-line electromagnetic fields on humans
	Cluster 34 (188) – Adverse effects of low-frequency electromagnetic fields on humans

	Cluster 40 (116) – Adverse effects of low-frequency magnetic fields on rodents
	Cluster 2 (27) – Effects of electromagnetic fields on chicken embryos
	Cluster 12 (38) – Impact of static and low-frequency magnetic fields on melatonin secretion
<a href="#">Cluster 85 (540)</a> – Adverse impacts of low-frequency EMF, emphasizing cancer and neurodegenerative diseases	Cluster 4 (97) – Exposure to power lines and risk of childhood cancer
	Cluster 15 (131) – Residential magnetic fields and childhood leukemia
	Cluster 13 (113) – Electromagnetic fields and cancer, especially breast cancer
	Cluster 18 (62) – Mortality studies of electrical utility workers, focusing on electromagnetic field exposures
	Cluster 27 (137) – Occupational exposure to electromagnetic fields, emphasizing neurodegenerative disease and cancer
<a href="#">Cluster 83 (668)</a> – Adverse effects of mobile phone use, especially brain tumors, and brain and neural function	Cluster 30 (321) – Adverse health symptoms from mobile phone use
	Cluster 1 (36) – Effects of mobile phones on brain and neural function
	Cluster 25 (68) – Effects of cell phone radiation on cognitive function and hearing
	Cluster 14 (93) – Myriad adverse health effects from cellphones
	Cluster 7 (44) – Risks from cell phone use, especially brain tumors
	Cluster 8 (106) – Risk of brain tumors/acoustic neuromas from mobile phone use
<a href="#">Cluster 89 (869)</a> – Human health risks from electromagnetic radiation, including adverse effects on implanted electronic devices, and possible protections	Cluster 0 (63) – Electromagnetic interference with cardiac pacemakers
	Cluster 16 (103) – Electromagnetic interference on implanted cardiac devices
	Cluster 5 (120) – Health risks from mobile phone base stations
	Cluster 19 (84) – Electromagnetic hypersensitivity
	Cluster 43 (202) – Health risks from low-frequency electromagnetic fields
	Cluster 33 (91) – Health risks to workers in different occupations
	Cluster 36 (84) – Precautionary measures to reduce potential EMF health risks
	Cluster 42 (122) - Regulatory protections against electromagnetic fields

A4-B. Cluster Record Titles**Fourth Level Cluster 78 (912)**

Theme - Adverse impacts of wireless radiation, especially on cataracts, cells, and cognitive functions

**--Leaf Cluster 46 (331)**

Theme - Adverse effects of microwave radiation, mainly on rats

Titles

Recent advances in the effects of microwave radiation on brains.

Microwave radiation absorption: behavioral effects.

Behavioral thermoregulation with microwave radiation of albino rats.

[Effect of microwave irradiation on biological systems].

[Microwave radiation sources requiring periodic or sporadic hygienic control].

Microwave radiation (2.45 GHz)-induced oxidative stress: Whole-body exposure effect on histopathology of Wistar rats.

Low intensity microwave radiation induced oxidative stress, inflammatory response and DNA damage in rat brain.

Mechanism of low-level microwave radiation effect on nervous system.

Apoptosis of Lewis Lung Carcinoma Cells Induced by Microwave via p53 and Proapoptotic Proteins In vivo.

Studies on the interaction of microwave radiation with cholinesterase.

A system for studying effects of microwaves on cells in culture.

Enzymatic alterations in developing rat brain cells exposed to a low-intensity 16.5 GHz microwave radiation.

Bioeffects of microwave--a brief review.

Behavioral effects of chlorpromazine and diazepam combined with low-level microwaves.

Microwave radiation induced oxidative stress, cognitive impairment and inflammation in brain of Fischer rats.

Interaction of microwave radiation with turkey sperm.

Effect of Low Level Subchronic Microwave Radiation on Rat Brain.

Acceleration of the development of benzopyrene-induced skin cancer in mice by microwave radiation.

Effect of 2.45 GHz microwave radiation on the fertility pattern in male mice.

Alterations in activity at auditory nuclei of the rat induced by exposure to microwave radiation: autoradiographic evidence using [ $^{14}\text{C}$ ]2-deoxy-D-glucose.

[Effect of microwave radiation on the rat hematopoietic system].

The effect of exposure of acetylcholinesterase to 2,450-MHz microwave radiation.

[The impact of electromagnetic radiation at microwave frequency (9.8 HhZ) on the embryonic and postembryonic development of the tick *Hyalomma asiaticum* (Acarina, Ixodidae)].

[Structural and metabolic analysis of the reaction of the central nervous system to the combined action of microwave and ionizing radiations].

[Mechanism of the effect of nonionizing radiation on animals at the level of sensory systems].

Effects of microwaves on membranes of hematopoietic cells in their structural and functional organization.

Microwave radiation and chlordiazepoxide: synergistic effects on fixed-interval behavior.

Behavioral effects of microwaves.

[Long-term exposure to low intensity microwave radiation affects male reproductivity].

[Effect of microwave radiation on cellular immunity indices in conditions of chronic exposure].

[Long-term microwave radiation affects male reproduction in rats].

Results of our 15-year study into the biological effects of microwave exposure.

Effect of whole-body 1800MHz GSM-like microwave exposure on testicular steroidogenesis and histology in mice.

Genotoxic Effects in Human Fibroblasts Exposed to Microwave Radiation.

[The effect of microwave radiation on the levels of MDA and the activity of SOD of nasopharyngeal carcinoma cells].

The effects of low-level radiofrequency and microwave radiation on brain tissue and animal behaviour.

Physiological changes in rats after exposure to low levels of microwaves.

The influence of prenatal 10 GHz microwave radiation exposure on a developing mice brain.

[The phenomenon of adaptive immunity in exposure to nonionizing microwave radiation].

Non-thermal effects of 500MHz - 900MHz microwave radiation on enzyme kinetics.

Activation of TLR signalling regulates microwave radiation-mediated impairment of spermatogenesis in rat testis.

Effect of 2.45 GHz microwave radiation on permeability of unilamellar liposomes to 5(6)-carboxyfluorescein. Evidence of non-thermal leakage.

Spatial memory and learning performance and its relationship to protein synthesis of Swiss albino mice exposed to 10 GHz microwaves.

[Effects of the microwave radiation from the cellular phones on humans and animals].

Cognitive impairment and neurogenotoxic effects in rats exposed to low-intensity microwave radiation.

Microwave hearing: evidence for thermoacoustic auditory stimulation by pulsed microwaves.

Effects of 2.45 GHz microwave radiation and heat on mouse spermatogenic epithelium.

Studies of the induction of dominant lethals and translocations in male mice after chronic exposure to microwave radiation.

Effect of Low-Intensity Microwave Radiation on Monoamine Neurotransmitters and Their Key Regulating Enzymes in Rat Brain.

Fluorescence depolarization studies of red cell membrane fluidity. The effect of exposure to 1.0-GHz microwave radiation.

[Effects of microwave radiation on the content of five elements in mice bone tissue].

Research on the neurological effects of nonionizing radiation at the University of Washington.

Cellular neoplastic transformation induced by 916 MHz microwave radiation.

Radiofrequency and microwave radiation in the microelectronics industry.

Reduced exposure to microwave radiation by rats: frequency specific effects.

[Reaction of the brain receptor system to the effect of low intensity microwaves].

Ten gigahertz microwave radiation impairs spatial memory, enzymes activity, and histopathology of developing mice brain.

Cytogenetic effects of 18.0 and 16.5 GHz microwave radiation on human lymphocytes in vitro.

Influence of microwave exposure on fertility of male rats.

Health aspects of radio and microwave radiation.

Japanese encephalitis virus (JEV): potentiation of lethality in mice by microwave radiation.

Microwave exposure induces Hsp70 and confers protection against hypoxia in chick embryos.

Potentially hazardous microwave radiation source--a review.

Behavioral effects of microwave reinforcement schedules and variations in microwave intensity on albino rats.

[Metabolic changes in cells under electromagnetic radiation of mobile communication systems].

Effect of microwave radiation on inactivation of *Clostridium sporogenes* (PA 3679) spores.

A circular dichroism study of human erythrocyte ghost proteins during exposure to 2450 MHz microwave radiation.

[Evaluation of bone density in rats after hydrocortisone and microwave radiation].

[Chronotoxicity of 1800 MHz microwave radiation on sex hormones and spermatogenesis in male mice].

Radiation hazard assessment of pulsed microwave radars.

Results of a United States and Soviet Union joint project on nervous system effects of microwave radiation.

Non-thermal microwave effects on protein dynamics? An X-ray diffraction study on tetragonal lysozyme crystals.

Effect of microwave radiation on permeability of liposomes. Evidence against non-thermal leakage.

Assessment of cytogenetic damage and oxidative stress in personnel occupationally exposed to the pulsed microwave radiation of marine radar equipment.

[Modification of the effects of microwave irradiation on biochemical processes by using foreign protein].

Some behavioral effects of short-term exposure of rats to 2.45 GHz microwave radiation.

[5-HT contents change in peripheral blood of workers exposed to microwave and high frequency radiation].

Microwave radiation effects on the thermally driven oxidase of erythrocytes.

Effects of microwave radiation (340 and 900 MHz) on different structural levels of erythrocyte membranes.

Environmental radiation hazards.

[Radiation protection and possible mechanisms for low intensity microwave].

Effects of low level microwave radiation on carcinogenesis in Swiss Albino mice.

Effects of pulsed 2.856 GHz microwave exposure on BM-MSCs isolated from C57BL/6 mice.

[Effect of pulse electromagnetic radiation on erythrocyte ghosts].



[Experimental modeling of autoimmune reactions as affected by nonionizing microwave radiation].

Biologic effects of microwave exposure. II. Studies on the mechanisms controlling susceptibility to microwave-induced increases in complement receptor-positive spleen cells.

Hearing of microwave pulses by humans and animals: effects, mechanism, and thresholds.

Individual responsiveness to induction of micronuclei in human lymphocytes after exposure in vitro to 1800-MHz microwave radiation.

Immunologic and hematopoietic alterations by 2,450-MHz electromagnetic radiation.

Exposure of cultured astroglial and microglial brain cells to 900 MHz microwave radiation.

Influence of microwave exposure on chlordiazepoxide effects in the mouse staircase test.

Activation of endoplasmic reticulum stress in rat brain following low-intensity microwave exposure.

Non-thermal effects of microwaves on proteins: thermophilic enzymes as model system.

[*Morinda officinalis* how extract improves microwave-induced reproductive impairment in male rats].

Reception of microwaves by the brain.

Interaction of radiofrequency and microwave radiation with living systems. A review of mechanisms.

Effect on the immune system of mice exposed chronically to 50 Hz amplitude-modulated 2.45 GHz microwaves.

Selective changes in locomotor activity in mice due to low-intensity microwaves amplitude modulated in the EEG spectral domain.

Physical basis of adverse and therapeutic effects of low intensity microwave radiation.

Resonance effect of microwaves on the genome conformational state of *E. coli* cells.

Induction of micronuclei in human lymphocytes exposed in vitro to microwave radiation.

Biological effects of electromagnetic fields--mechanisms for the effects of pulsed microwave radiation on protein conformation.

The influence of microwave radiation on transdermal delivery systems.

Parametric mechanism of excitation of the electroencephalographic rhythms by modulated microwave radiation.

[Cytogenetic changes induced by low-intensity microwaves in the species *Triticum aestivum*].

High-frequency electromagnetic radiation injury to the upper extremity: local and systemic effects.

Effect of chronic microwave radiation on T cell-mediated immunity in the rabbit.

Prenatal microwave exposure and behavior.

[The state of receptor-dependent signal pathways in the agranulocytes from the peripheral blood of the reconvalescent patients following community-acquired pneumonia under the influence of microwave radiation].

Effects of 2.45 GHz microwaves on meiotic chromosomes of male CBA/CAY mice.

Inhibitory Effects of Microwave Radiation on LPS-Induced NFkappaB Expression in THP-1 Monocytes.

The relation of dose rate of microwave radiation to the time of death and total absorbed dose in the mouse.

Differential damage in bacterial cells by microwave radiation on the basis of cell wall structure.

Effect of 7, 14 and 21 Hz modulated 450 MHz microwave radiation on human electroencephalographic rhythms.

Immunotropic influence of 900 MHz microwave GSM signal on human blood immune cells activated in vitro.

[Are microwaves a co-teratogen? Experimental model concept and its verification].

Studies on microwaves in medicine and biology: from snails to humans.

Changes in human EEG caused by low level modulated microwave stimulation.

Electromagnetic radiations and cancer. Cause and prevention.

Microwave elution of red cell antibodies.

Influence of low intensity 2,450 MHz microwave radiation upon the growth of various micro-organisms and their sensitivity towards chemical inactivation.

Low power microwave interaction with phospholipase C and D signal transduction pathways in myogenic cells.

[Antagonistic effect of microwave on hematopoietic damage of mice induced by gamma-ray irradiation].

Acid resistance and verocytotoxin productivity of enterohemorrhagic Escherichia coli O157:H7 exposed to microwave.

The relationship between colony-forming ability, chromosome aberrations and incidence of micronuclei in V79 Chinese hamster cells exposed to microwave radiation.

Effects of differently polarized microwave radiation on the microscopic structure of the nuclei in human fibroblasts.

The correlation between the frequency of micronuclei and specific chromosome aberrations in human lymphocytes exposed to microwave radiation in vitro.

A search for nonthermal effects of 434 MHz microwave radiation on whole human blood.

Review of the specific effects of microwave radiation on bacterial cells.

Microwave dissociation of antigen-antibody complexes: a new elution technique to permit phenotyping of antibody-coated red cells.

[Nature of the changes in the morphofunctional and cytochemical indices of blood leukocytes as affected by low-intensity microwaves].

Effects of 2.45-GHz microwave radiation and phorbol ester 12-O-tetradecanoylphorbol-13-acetate on dimethylhydrazine-induced colon cancer in mice.

Effects of X-band microwave exposure on rabbit erythrocytes.

Transgenic nematodes as biomonitors of microwave-induced stress.

The effects of microwave radiation on avian dominance behavior.

Dominant lethal studies in male mice after exposure to 2.45 GHz microwave radiation.

[Action of UHF microwaves on the germ and somatic cells of mammals].

Sperm count and sperm abnormality in male mice after exposure to 2.45 GHz microwave radiation.

Effect of microwaves (2450-MHz) on the immune system in mice: studies of nucleic acid and protein synthesis.

The influence of differently polarised microwave radiation on chromatin in human cells.

Effects of 10-GHz microwaves on hematological parameters in Swiss albino mice and their modulation by *Prunus avium*.

Effects of fetal microwave radiation exposure on offspring behavior in mice.

Ibuprofen effects on behavioral thermoregulation with microwave radiation in albino rats.

Microwave and man: the direct and indirect hazards, and the precautions.

Biomarkers in volunteers exposed to mobile phone radiation.

Effects of 900-MHz microwave radiation on gamma-ray-induced damage to mouse hematopoietic system.

Detection of probable effects of microwave exposure of blood parameters of RBC, PCV and Hb in rat.

Effects of microwaves on the colony-forming capacity of haemopoietic stem cells in mice.

2.45-GHz microwave irradiation adversely affects reproductive function in male mouse, *Mus musculus* by inducing oxidative and nitrosative stress.

Adaptation of human brain bioelectrical activity to low-level microwave.

Biochemical changes in rat brain exposed to low intensity 9.9 GHz microwave radiation.

Effect of microwave radiation on the permeability of carbonic anhydrase loaded unilamellar liposomes.

Effects on the nervous system by exposure to electromagnetic fields: experimental and clinical studies.

Microwave effect on diffusion: a possible mechanism for non-thermal effect.

Teratology, survival, and reversal learning after fetal irradiation of mice by 2450-MHz microwave energy.

[Changes in drug pharmacokinetics and pharmacodynamics under the influence of microwaves of different ranges].

Increase in the frequency of Fc receptor (FcR) bearing cells in the mouse spleen following a single exposure of mice to 2450 MHz microwaves.

Modification of membrane fluidity in melanin-containing cells by low-level microwave radiation.

Effects of low level microwave radiation on the digestive transit of the rat.

Microwave-stimulated drug release from liposomes.

[Changes in immunobiological reactivity under the combined action of microwave, infrasonic and gamma irradiation].

Behavioral and cognitive effects of microwave exposure.

The effect of microwave radiation on the cell genome.

Neurological effects of microwave exposure related to mobile communication.

Microwave effects on plasmid DNA.

Differential response of the permeability of the rat liver canalicular membrane to sucrose and mannitol following in vivo acute single and multiple exposures to microwave radiation (2.45 GHz) and radiant-energy thermal stress.

Effects of microwave radiation and strychnine on cerebral biopotentials in narcotized rats.

[Some biochemical indexes in white rabbit's blood affected by acute high intensity microwave].

Long-term exposure to microwave radiation provokes cancer growth: evidences from radars and mobile communication systems.

Effect of low power microwave on the mouse genome: a direct DNA analysis.

Fluorescence depolarization studies of the phase transition in multilamellar phospholipid vesicles exposed to 1.0-GHz microwave radiation.

Effect of low frequency modulated microwave exposure on human EEG: individual sensitivity.

A negative test for mutagenic action of microwave radiation in *Drosophila melanogaster*.

[Non-thermal microwave effect on nerve fiber function].

Influence of microwaves on different types of receptors and the role of peroxidation of lipids on receptor-protein shedding.

[Effect of nonionizing microwave radiation on autoimmune reactions and antigenic structure of serum proteins].

Effects of 9.4 GHz microwave exposure on meiosis in mice.

[Two-step exposure of biological objects to infrared laser and microwave radiation].

Influence of in vitro microwave radiation on the fertilizing capacity of turkey sperm.

Measure of enzymatic activity coincident with 2450 MHz microwave exposure.

Effect of microwave radiation on redissolving precipitated matter in fluorouracil injection.

[Germ reduction by microwaves--microwave specific effects].

Effects of microwave (2.45 GHz) irradiation on some biological characters of *Salmonella typhimurium*.

The relation of sex, age, and weight of mice to microwave radiation sensitivity.

The origins of U.S. safety standards for microwave radiation.

Pathophysiology of microwave radiation: effect on rat brain.

Influence of CW microwave radiation on in vitro release of enzymes from retinol- treated hepatic lysosomes.

Cytological effects of microwave radiation in Chinese hamster cells in vitro.

Ouabain inhibition of kidney ATPase is altered by 9.14 GHz radiation.

Cytogenetic investigations on microwaves emitted by a 455.7 MHz car phone.

[The reaction of the tick *Hyalomma asiaticum* (Acarina, Ixodidae) to 1- to 4-GHz microwaves].

Microwave effects on the central nervous system--a study of radar mechanics.

[The characteristics of the reactions of excitable tissue to combined exposure to microwaves and low-intensity ultrasound].

[Cumulated biological effects of microwaves and their reflection in behavior, work capacity, growth of body mass and state of brain neurons].

[Quantitative patterns in the cytogenetic action of microwaves].

[The action of microwave radiation on potassium ion transport and oxygen consumption in the perfused rat liver].

The effects of low level microwaves on the fluidity of photoreceptor cell membrane.

Insensitivity of cardiovascular function to low power cm-/mm-microwaves.

[Ultracytochemical changes in the brain and liver in exposure to low-intensity nonionizing microwave radiation].

Microwave effect on camphor binding to rat olfactory epithelium.

In vitro effects of microwave radiation on rat liver mitochondria.

Induction of neoplastic transformation in C3H/10T1/2 cells by 2.45-GHz microwaves and phorbol ester.

Evidence for microwave carcinogenesis in vitro.

Microwave radiation injury.

Effect of microwave radiation on human EEG at two different levels of exposure.

Effects of nonionizing radiation on the central nervous system, behavior, and blood: a progress report.

Brain enzyme histochemistry following stabilization by microwave irradiation.

Poly ADP ribosylation as a possible mechanism of microwave--biointeraction.

Investigation of an acute microwave-oven hand injury.

Rat lymphocytes in cell culture exposed to 2450 MHz (CW) microwave radiation.

Effect of electromagnetic microwave radiation on the growth of Ehrlich ascites carcinoma.

Effects of 36.6 GHz and static magnetic field on degree of endoreduplication in *Drosophila melanogaster* polytene chromosomes.

Extremely low-level microwaves attenuate immune imbalance induced by inhalation exposure to low-level toluene in mice.

[The effect of microwaves on the neuronal activity of the hyperstriatum in chick embryos at the critical developmental period].

Psychological symptoms and intermittent hypertension following acute microwave exposure.

Very new waves in very old meridians: quantum medical physics of the living.

[The effect of various occupational exposures to microwave radiation on the concentrations of immunoglobulins and T lymphocyte subsets].

Microwave effect upon chlorpromazine-inhibited kidney ATPase.

Evidence for genetic control of microwave-induced augmentation of complement receptor-bearing B lymphocytes.

[The combined action of microwave radiation and hydrogen peroxide on the viability and ultrastructure of *Pseudomonas aeruginosa* cells].

A demonstration of athermal effects of continuous microwave irradiation on the growth and antibiotic sensitivity of *Pseudomonas aeruginosa* PAO1.

Influence of low power cm-/mm-microwaves on cardiovascular function.

Local cerebral blood flow after microwave exposure.

The properties of bird feathers as converse piezoelectric transducers and as receptors of microwave radiation. II. Bird feathers as dielectric receptors of microwave radiation.

Different methods for evaluating the effects of microwave radiation exposure on the nervous system.

Microwave cell death: Immunohistochemical and enzyme histochemical evaluation.

Study of nonionizing microwave radiation effects upon the central nervous system and behavior reactions.

[Cellular effects of microwaves of thermal intensity].

Microwave induced stimulation of  $^{32}\text{P}$ i incorporation into phosphoinositides of rat brain synaptosomes.

Laser doppler flowmetry as a method for evaluating the microwave radiation effect on cutaneous microcirculation.

Microwave effects on acetylcholine-induced channels in cultured chick myotubes.

[The participation of thyroid hormones in modifying the mutagenic effect of microwaves].

Investigation of the effects of continuous-wave, pulse- and amplitude-modulated microwaves on single excitable cells of *Chara corallina*.

Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression.

[Effect of centimeter microwaves on the antibody production in mice].

[Effect of electromagnetic SHF-radiation on the morphofunctional status of early mouse embryos].

The effect of acute far field exposure at 2.45 GHz on the mouse testis.

[Pharmacological correction of the acute effects of microwave irradiation in an experiment].

Effects of exposure to microwaves: problems and perspectives.

Semen analysis of military personnel associated with military duty assignments.

Setting exposure limits for radiofrequency radiation and microwaves in China.

Effect of exposure to operant-controlled microwaves on certain blood and immunological parameters in the young chick.

In vitro cytogenetic effects of 2450 MHz waves on human peripheral blood lymphocytes.

[Microwaves and blood-brain barrier].

Microwave radiation: an epidemiologic assessment.

[The dynamics of the immunobiological effects in transcerebral microwave exposures].

Microwave absorption by normal and tumor cells.

Microwaves induce an increase in the frequency of complement receptor-bearing lymphoid spleen cells in mice.

Microwave radiation-induced calcium ion efflux from human neuroblastoma cells in culture.

Studies on possible genetic effects of microwaves in procaryotic and eucaryotic cells.

Middle-ear structures contribute little to auditory perception of microwaves.

[Effect of long wave pre-illumination on the kinetic characteristics of microwave photoconductivity signals in Chlorella cells and the Emerson effect].

Non-thermal effects of 2.45 GHz microwaves on spindle assembly, mitotic cells and viability of Chinese hamster V-79 cells.

Microwave diathermy: the invisible healer.

[Biological effects of microwave radiation of low nonthermal intensity (regarding the maximal admissible values)].

[Effect of electromagnetic radiation of radio frequency (340 and 800 MHz) on liposomes from dimyristoyl lecithin].

[A comparative analysis of the biological action of microwaves and laser radiation].

[Studies on the microwave leakage of the interphone].

Effect of microwave radiation on the stability of frozen cefoxitin sodium solution in plastic bags.



[The role of TLR4 receptor in the stress response of lymphocytes].

Febrile convulsions induced by microwaves and the alteration in behavior of albino mouse OF1.

[Immunobiological effect of bitemporal exposure of rabbits to microwaves].

Thermal effects of 2450 MHz microwave exposure near a titanium alloy plate implanted in rabbit limbs.

[The role of protein kinase SAPK/JNK in cell responses to low-intensity nonionizing radiation].

[Activity of cytochromes P-450p and P-450h in liver microsomes and blood corticosteroid levels in experimental animals under the action of physical factors].

The effect of high intensity microwave exposure on enucleation of murine erythroid cells in vitro.

Microwave-evoked brainstem potentials in cats.

Tight junctional changes upon microwave and x-ray irradiation.

The analysis of animal bioelectric brain activity influenced by microwaves or by the introduction of strychnine.

[The characteristics of the effect of centimeter-range microwaves on drug pharmacokinetics in the body of experimental animals].

[Effect of centimeter microwaves and the combined magnetic field on the tumor necrosis factor production in cells of mice with experimental tumors].

[Enzymatic activity of some tissues and blood serum from animals and humans exposed to microwaves and hypothesis on the possible role of free radical processes in the nonlinear effects and modification of emotional behavior of animals].

Non-thermal effects in the microwave induced unfolding of proteins observed by chaperone binding.

[Study of bioeffects of ship-borne microwave navigation radar in chronic experiments].

[Combined effect of microwaves and gamma-rays on the imprinting of chickens, irradiated in early embryogenesis].

Effects of nonionizing radiation on birds.

[The effect of electromagnetic radiation on the membranes of the sarcoplasmic reticulum].

[The combined action of microwave irradiation and hypoxia on the biogenic amine content of the blood in guinea pigs in anaphylactic shock].

Possible humoral mechanism of 2450-MHz microwave-induced increase in complement receptor positive cells.

[Synaptic transmission in the frog spinal cord exposed to intensive microwave radiation].

Microwave-enhanced folding and denaturation of globular proteins.

[Hematologic changes in workers exposed to radio wave radiation].

[The reaction of glia in visual centers during the whole body effect of combined microwaves and x-rays].

Elimination of microwave effects on the vitality of nerves after blockage of active transport.

Low frequency amplitude modulated microwave fields change calcium efflux rates from synaptosomes.

Study of effects of low level microwave field by method of face masking.

Association of microwaves and ionizing radiation: potentiation of teratogenic effects in the rat.

[The use of microwave for immunohistochemical technology in forensic pathology].

[The effect of microwaves on the bioelectric brain activity].

MoS<sub>2</sub> nanosheets encapsulated in sodium alginate microcapsules as microwave embolization agents for large orthotopic transplantation tumor therapy.

Microwave drying of microorganisms: I. Influence of the microwave energy and of the sample thickness on the drying of yeast.

Effect of non-ionising radiation on body weight and growth of the gastro-intestinal tract in broilers.

[The role of the thyroid hormones in regulating chromosomal resistance to microwave exposure].

[Analysis of ECG on the staffs exposed to microwave in the radio calling signal station].

Cochlear microphonics generated by microwave pulses.

Holographic assessment of a hypothesized microwave hearing mechanism.

Enhancement of allergic skin wheal responses by microwave radiation from mobile phones in patients with atopic eczema/dermatitis syndrome.

Microwave antigen retrieval blocks endogenous peroxidase activity in immunohistochemistry.

[Increase in the immunogenicity of cancer cells exposed to microwaves].

Aspirin (acetylsalicylic acid) effects on behavioral thermoregulation with microwave radiation.

[The effect of microwaves on lipid peroxidation and on lipid and mineral metabolism in warm-blooded animals (experimental research)].

Effects of microwave radiation on house dust mites, *Dermatophagoides pteronyssinus* and *Dermatophagoides farinae* (Astigmata: Pyroglyphidae).

The effect of non ionising electromagnetic radiation on RAAF personnel during World War II.

[Action of millimeter-range electromagnetic radiation on the Ca pump of sarcoplasmic reticulum].

After-effect induced by microwave radiation in human electroencephalographic signal: a feasibility study.

Superconductivity--a possible mechanism for non-thermal biological effects of microwaves.

Microwaving for double indirect immunofluorescence with primary antibodies from the same species and for staining of mouse tissues with mouse monoclonal antibodies.

[Accelerated decalcification using microwaves].

Influence of chopper and mixer speeds and microwave power level during the high-shear granulation process on the final granule characteristics.

[Effects of prolonged low-intensity radiofrequency radiation in cm-range on the development of subcutaneously grafted Ehrlich's adenocarcinoma].

The effects of irradiation intensity on the microwave-enhanced advanced oxidation process.

The role of coherence time in the effect of microwaves on ornithine decarboxylase activity.

[Effect of microwaves over *Staphylococcus aureus* and *Salmonella* spp. inoculated into frozen minced meat].

Microwave decalcification of human temporal bones.

An EM radiation safety controller.

Electrosmog and autoimmune disease.

Capability of Thai Mission grass (*Pennisetum polystachyon*) as a new weedy lignocellulosic feedstock for production of monomeric sugar.

A novel autonomic activation measurement method for stress monitoring: non-contact measurement of heart rate variability using a compact microwave radar.

Late heat damage in normal swine rectum: a comparison of thermosensitivity of rectum and oesophagus.

[Effect of UHF and ionizing radiation on the Na-K-ATPase activity of Ehrlich ascitic carcinoma cells].

Acute multiple mononeuropathy after accidental exposure to oven microwaves.

Microwave enhanced ion exchange of cationic and anionic clays.

[New mechanisms of biological effects of electromagnetic fields].

Non-contact determination of parasympathetic activation induced by a full stomach using microwave radar.

Immunohistochemistry and microwave decalcification of human temporal bones.

Monitoring of lung edema by microwave reflectometry during lung ischemia-reperfusion injury in vivo.

Joint effects of microwave and chromium trioxide on root tip cells of *Vicia faba*.

An alternative approach to the treatment of mammary duct fistulas: a combination of microwave and ultrasound.

[Body's reaction to weakened geomagnetic field (the effect of magnetic deprivation)].

Influence of radar radiation on breeding biology of tits (*Parus* sp.).

[Effect of short-term exposure to ash from electric power plants on histochemical reactions of succinate dehydrogenase and lactate dehydrogenase in the lungs of experimental animals].

--Leaf Cluster 3 (39)

Theme - Adverse impact of wireless radiation on eye lens

Titles

[Effect of low-intensity microwave radiation on proliferation of cultured epithelial cells of rabbit lens].

Localized effects of microwave radiation on the intact eye lens in culture conditions.

[Effects of different dose microwave radiation on protein components of cultured rabbit lens].

Non-thermal electromagnetic radiation damage to lens epithelium.

Non-thermal cellular effects of lowpower microwave radiation on the lens and lens epithelial cells.

[A quantitative study on early changes in rabbit lens capsule epithelium induced by low power density microwave radiation].

[Ultrastructural change of rabbit lens epithelial cells induced by low power level microwave radiation].

Cataracts induced by microwave and ionizing radiation.

Ultrastructural changes in the rabbit lens induced by microwave radiation.

Low power density microwave radiation induced early changes in rabbit lens epithelial cells.

Effects of microwave radiation on the eye: the occupational health perspective.

[Experimental studies on the influence of millimeter radiation on light transmission through the lens].

Glutathione concentration and peptidase activity in the lens after exposure to microwaves.

Low power microwave radiation inhibits the proliferation of rabbit lens epithelial cells by upregulating P27Kip1 expression.

Microwave lens effects in humans. II. Results of five-year survey.

Changes in gap junctional intercellular communication in rabbits lens epithelial cells induced by low power density microwave radiation.

Combined microwave energy and fixative agent for cataract induction in pig eyes.

[Evaluation of lens transparency in persons exposed to electromagnetic radiation of 27--30 MHz frequency].

[Low-intensity microwave blockes cell cycle and regulate cell cycle related gene expression in rabbit lens epithelial cells].

Thermal cataract formation in rabbits.

Effects of microwave radiation on the lens epithelium in the rabbit eye.

On the microwave exposure.

Observation of microwave-induced eye lens surface motion in vitro.

Data analysis reveals significant microwave-induced eye damage in humans.

Microwave irradiation and soft contact lens parameters.

Inducing cataract in postmortem pig eyes for cataract surgery training purposes.

Dosimetric study of microwave cataractogenesis.

Evaluation of possible microwave-induced lens changes in the United States Air Force.

[Acute ocular lesions after exposure to electromagnetic radiation of ultrahigh frequency (an experimental study)].

Microwave radiation-induced chromosomal aberrations in corneal epithelium of Chinese hamsters.

The ocular effects of microwaves on hypothermic rabbits: a study of microwave cataractogenic mechanisms.

Microwave cataract and litigation: a case study.

[Biologic effects and hygienic regulation of electromagnetic fields caused by mobile communication devices].

Comments on Frey's "Data analysis reveals significant microwave-induced eye damage in humans".

Microwave-induced retinal destruction with sparing of sclera and choriocapillaris.

[The effect of chronic irradiation with intermittent unmodulated microwaves on the functional status of the rabbit].

[Hazardous health effects of microwaves and radio waves].

Microwave cyclodestruction: evaluation on human eyes.

Effects of radiofrequency radiation on rabbit kidney: a morphological and immunological study.

--Leaf Cluster 35 (107)

Theme - Adverse impacts of microwave radiation on cells and cognitive functions

Titles

[A aquaporin 4 expression and effects in rat hippocampus after microwave radiation].

Impairment of long-term potentiation induction is essential for the disruption of spatial memory after microwave exposure.

[Changes of apoptosis, mitochondrion membrane potential and  $\text{Ca}^{2+}$  of hypothalamic neurons induced by high power microwave].

Upregulation of HIF-1alpha via activation of ERK and PI3K pathway mediated protective response to microwave-induced mitochondrial injury in neuron-like cells.

[Microwave radiation induces injury to GC-2spd cells].

The relationship between NMDA receptors and microwave-induced learning and memory impairment: a long-term observation on Wistar rats.

Apoptosis induced by microwave radiation in pancreatic cancer JF305 cells.

[The cardiac injury effect of microwave radiation on rabbit and its mechanism].

[The injury effects of microwave exposure on visual performance and retinal ganglion cells (RGCs) in rats].

[Inhibitory effect of microwave radiation on proliferation of human pancreatic cancer JF305 cells and its mechanism].

Study on dose-dependent, frequency-dependent, and accumulative effects of 1.5 GHz and 2.856 GHz microwave on cognitive functions in Wistar rats.

Microwave induces apoptosis in A549 human lung carcinoma cell line.

Acute effects of pulsed microwaves and 3-nitropropionic acid on neuronal ultrastructure in the rat caudate-putamen.

[Influence of microwave radiation on synaptic structure and function of hippocampus in Wistar rats].

Microwave-induced Apoptosis and Cytotoxicity of NK Cells through ERK1/2 Signaling.

Identification of a Novel Rat NR2B Subunit Gene Promoter Region Variant and Its Association with Microwave-Induced Neuron Impairment.

Microwave exposure impairs synaptic plasticity in the rat hippocampus and PC12 cells through over-activation of the NMDA receptor signaling pathway.

iTRAQ quantitatively proteomic analysis of the hippocampus in a rat model of accumulative microwave-induced cognitive impairment.

The apoptotic effect and the plausible mechanism of microwave radiation on rat myocardial cells.

Neural cell apoptosis induced by microwave exposure through mitochondria-dependent caspase-3 pathway.

The effect of 2450 MHz microwave radiation on the ultrastructure of snail neurons.

Relationship between cognition function and hippocampus structure after long-term microwave exposure.

2.45 GHz Microwave Radiation Impairs Learning and Spatial Memory via Oxidative/Nitrosative Stress Induced p53-Dependent/Independent Hippocampal Apoptosis: Molecular Basis and Underlying Mechanism.

Real-time Microwave Exposure Induces Calcium Efflux in Primary Hippocampal Neurons and Primary Cardiomyocytes.

AduoLa Fuzhenglin down-regulates microwave-induced expression of beta1-adrenergic receptor and muscarinic type 2 acetylcholine receptor in myocardial cells of rats.

Alterations of cognitive function and 5-HT system in rats after long term microwave exposure.

Extracellular calcium and microwave enhancement of membrane conductance in snail neurons.

[Effect of handportable mobiletelephone microwave radiation on rat central neuron apoptosis].

[Effect of electromagnetic radiation in a decimeter wave-length range on the calcium current of molluscan neurons].

[Effects of microwave radiation on thymocytes in mice at different power densities].

Long term impairment of cognitive functions and alterations of NMDAR subunits after continuous microwave exposure.

Reduction of phosphorylated synapsin I (ser-553) leads to spatial memory impairment by attenuating GABA release after microwave exposure in Wistar rats.

Retinal damage experimentally induced by microwave radiation at 55 mW/cm<sup>2</sup>.

[Microwave radiation decreases the expressions of occludin and JAM-1 in rats].

[Changes of the expression of beta1-adrenergic receptor and M2-muscarinic acetylcholine receptor in rat hearts after high power microwave radiation].

[Effect of qindan fuzheng capsule on ultrastructure of microwave radiation injured cardiomyocytes and hepatocytes in rats].

From the Cover: 2.45-GHz Microwave Radiation Impairs Hippocampal Learning and Spatial Memory: Involvement of Local Stress Mechanism-Induced Suppression of iGluR/ERK/CREB Signaling.

[Influence of microwave radiation on synapsin I expression in PC12 cells and its mechanism].

[Effect of vitamin E on morphological variation of retinal ganglion cells after microwave radiation].

[Effect of microwave radiation on primary cultured Sertoli cells].

Chronic exposure to GSM 1800-MHz microwaves reduces excitatory synaptic activity in cultured hippocampal neurons.

Microwave radiation leading to shrinkage of dendritic spines in hippocampal neurons mediated by SNK-SPAR pathway.

Activation of VEGF/Flk-1-ERK Pathway Induced Blood-Brain Barrier Injury After Microwave Exposure.

The study of retinal ganglion cell apoptosis induced by different intensities of microwave irradiation.

The effects of high-power microwaves on the ultrastructure of *Bacillus subtilis*.

The effect of microwave radiation on passive membrane properties of snail neurons.

[Effect of 900MHz electromagnetic fields on energy metabolism of cerebral cortical neurons in postnatal rat].

Effects of GSM 1800 MHz on dendritic development of cultured hippocampal neurons.

Low intensity microwave radiation effects on the ultrastructure of Chang liver cells.

[Effect of 900Mhz electromagnetic fields on energy metabolism in postnatal rat cerebral cortical neurons].

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Protective Role of NMDAR for Microwave-Induced Synaptic Plasticity Injuries in Primary Hippocampal Neurons.

Abnormality of synaptic vesicular associated proteins in cerebral cortex and hippocampus after microwave exposure.

RKIP Regulates Neural Cell Apoptosis Induced by Exposure to Microwave Radiation Partly Through the MEK/ERK/CREB Pathway.

[The protective effects of Aduola Fuzhenglin on the heart injury induced by microwave exposure in rats].

Differentiation of murine erythroleukemic cells during exposure to microwave radiation.

Cytokines produced by microwave-radiated Sertoli cells interfere with spermatogenesis in rat testis.

[Effect of 900 MHz electromagnetic fields on the expression of GABA receptor of cerebral cortical neurons in postnatal rats].

[Effects of high power microwave exposure on cholinergic neurotrophic factors protein in rabbit retina].

[Neuroeffects of prolonged exposure to microwaves: systemic, neuronal and electron microscope study].

Microwave enhancement of membrane conductance: calmodulin hypothesis.

[Influence of electromagnetic radiation on raf kinase inhibitor protein and its related proteins of hippocampus].

2.45 GHz microwave radiation induced oxidative and nitrosative stress mediated testicular apoptosis: Involvement of a p53 dependent bax-caspase-3 mediated pathway.

Microwave effects on input resistance and action potential firing of snail neurons.

MicroRNAs: Novel Mechanism Involved in the Pathogenesis of Microwave Exposure on Rats' Hippocampus.

The Screening of Genes Sensitive to Long-Term, Low-Level Microwave Exposure and Bioinformatic Analysis of Potential Correlations to Learning and Memory.

[Pathological study of testicular injury induced by high power microwave radiation in rats].

Noise-modulated-microwave-induced response in snail neurons.

[Early ultrastructural reactions in various parts of the visual analyzer in guinea pigs after thermogenic microwave irradiation].

[Changes of rat testicular germ cell apoptosis after high power microwave radiation].

The transmission of reflexes in the spinal cord of cats during direct irradiation with microwaves.

[Lipid peroxide damage in retinal ganglion cells induced by microwave].

Calreticulin attenuated microwave radiation-induced human microvascular endothelial cell injury through promoting actin acetylation and polymerization.

[Reaction of the ultrastructure of the rat spinal ganglion to exposure to a pulsed electromagnetic field].

Specific electromagnetic effects of microwave radiation on *Escherichia coli*.

Microwave enhancement of membrane conductance: effects of EDTA, caffeine and tetracaine.

[Effect of Qidan Granule on PMC Derived Peptide Content and Structure of Hippocampal CA1 Region in Microwave Radiated Rats].

[The microarray study on the stress gene transcription profile in human retina pigment epithelial cells exposed to microwave radiation].

[The electroporation effects of high power pulse microwave and electromagnetic pulse irradiation on the membranes of cardiomyocyte cells and the mechanism therein involved].

Non-thermal effects of continuous 2.45 GHz microwaves on Fas-induced apoptosis in human Jurkat T-cell line.

[Zinc protective effects on pig retinal pigment epithelial cell damage of lipid peroxide induced by 2450 MHz microwave].

Pathological changes in the sinoatrial node tissues of rats caused by pulsed microwave exposure.

[High power microwave radiation damages blood-testis barrier in rats].

[Experimental analysis of biological effects of microwaves: their systemic, ultrastructural and neuronal mechanisms].

[Relationship between activation of microglia and Jaks phosphorylation induced by microwave irradiation].

Ultrastructural changes following treatment with a microwave pulse in the oocyst of *Eimeria magna* Perard, 1925.

The functional state of thymus cells following microwave exposure of endocrine glands.

Non-thermal effects of electromagnetic fields at mobile phone frequency on the refolding of an intracellular protein: myoglobin.

[Effect of microwaves on the expression by thymocytes of various surface membrane markers].

[Dynamics of morphological changes in the spinal cord following exposure to non-ionizing microwave radiation].

Immunoreactivity of normal rabbit serum with epinephrine (E) cells of the rat adrenal medulla after microwave antigen retrieval.

[Changes in response of neurons in visual area of cerebral cortex of rabbits to flashes of light under the influence of low-intensity physical factors of non-ionizing nature].

Ultrastructural studies of alterations induced by microwaves in *Toxocara canis* eggs: prophylactic interest.

Morphological changes in the liver after microwave destruction.

Studies of childhood brain tumors using immunohistochemistry and microwave technology: methodological considerations.

Cell attachment and viability on micro-arc-oxidation (MAO) microwave/hydrothermal treated titanium surface.

The role of the NF-kappaB, SAPK/JNK, and TLR4 signalling pathways in the responses of RAW 264.7 cells to extremely low-intensity microwaves.

Calreticulin stabilizes F-actin by acetylating actin and protects microvascular endothelial cells against microwave radiation.

Dual effects of microwaves on single Ca(2+)-activated K<sup>+</sup> channels in cultured kidney cells Vero.

Microwave antigen retrieval of beta-amyloid precursor protein immunoreactivity.

Nerve agent exposure elicits site-specific changes in protein phosphorylation in mouse brain.

Cyclic AMP-dependent signaling system is a primary metabolic target for non-thermal effect of microwaves on heart muscle hydration.

[Microwaves and the visual analyzer].

Evaluation of immunohistochemical staining of human duodenal endocrine cells after microwave antigen retrieval.

[Quantitative histologic changes of the glioneuronal complex in the central and intermediate parts of the visual analyzer exposed to microwaves of thermogenic intensity].

Study of interlaboratory reliability and reproducibility of estrogen and progesterone receptor assays in Europe. Documentation of poor reliability and identification of insufficient microwave antigen retrieval time as a major contributory element of unreliable assays.

Structural changes in abdominal aorta and vena cava inferior after experimental microwave destruction.

--Leaf Cluster 39 (211)

Theme - Adverse effects from microwave radiation

Titles

[Effect of quinacrine on inflammatory reaction of blood system induced by microwave irradiation].

Cumulative effect in microwave irradiation.

[Protective effects of Genistein on human renal tubular epithelial cells damage of microwave radiation].

[Effects of occupational microwave irradiation on heat shock protein 70 expressions in rat hippocampus].

Effects of radiation on frozen lactate dehydrogenase.

Effect of microwave energy on the metabolism of Enterobacteriaceae.

[Analysis of pulsed bioelectric activity of rabbit cerebral cortex in response to low-intensity microwave radiation].

[Pro- and antioxidant effect of electromagnetic fields of extremely high frequency (460 MHz) on brain tissues in experiment].

[Pulse flows of neuronal populations of the cerebral cortex exposed to low intensity microwaves].

[Recovery responses in the bodies of rats following irradiation with microwaves (2400 MHz)].

Microwave irradiation induces neurite outgrowth in PC12m3 cells via the p38 mitogen-activated protein kinase pathway.

Application of high-powered microwave irradiation for acetylcholine analysis in mouse brain.

Effect of microwave irradiation on brain tissue structure and catecholamine distribution.

[Effect of microwave irradiation on neurocyte mitochondrial ultrastructure and mtTFA mRNA expression in rats cerebral cortex and hippocampus].

[Development of the Chlamydomonas actinochloris culture after microwave irradiation].

Reduced weight in mice offspring after in utero exposure to 2450-MHz (CW) microwaves.

[Changes in body weight of rats during irradiation with microwaves of nonthermal intensity].

[Dependence of changes in summary bioelectric activity of the brain on low-intensity microwave irradiation from density of flow energy].

Microwave facilitation of domperidone antagonism of apomorphine-induced stereotypic climbing in mice.

[Experimental data on reaction of neurons of the brain to low-intensity package-pulsing microwave irradiation].

Growth and development of mice offspring after irradiation in utero with 2,450-MHz microwaves.

[Traumatic ulcer following microwave irradiation and local anesthesia].

Behavioral evaluation of microwave irradiation.

[Survival and physical development of progeny of Swiss mice after 2450 Mhz microwave irradiation during pregnancy].

[Effects of injuring and restoring the body of mice with microwave (2400 MHz) irradiation].

Effect of microwave irradiation on monoamine metabolism in dissected rat brain.

Effects of microwave irradiation on rat hepatic tissue evaluated by enzyme histochemistry for acid phosphatase.

The effects of microwave radiation from mobile telephones on humans and animals.

Increase of brain ammonia after microwave irradiation and its mechanism.

[Behavioral effects of the combined chronic action of 9375 and 1765 MHz microwaves].

[Effect of the agents of general anesthesia on mice after microwave irradiation].

[Effects of microwave irradiation and electrostatic field on the survival, growth and reproduction of *Moina mongolica* Daday].

Incidence of low-level microwave irradiation on intestinal myoelectrical activity in the rat.

Multinucleated giant cell appearance after whole body microwave irradiation of rats.

[The pathogenesis of central nervous system functional disorders after exposure to microwave radiation].

Comparison of native and microwave irradiated DNA.

Effect of high-power density microwave irradiation on the soluble proteins of the rabbit lens.

Microwave radiation (2450-MHz) potentiates the lethal effect of endotoxin in mice.

Pulse activity of populations of cortical neurons under microwave exposures of different intensity.

Changes in the blood count of growing rats irradiated with a microwave pulse field.

[Effect of continuous low-intensity microwave irradiation on the behavior of albino rats].

Microwave irradiation and cross-linking of collagen.

[Combined effect of microwave and ionizing radiation].

Reproduction of Japanese quail after microwave irradiation (2.45 GHz CW) during embryogeny.

Psychoactive-drug response is affected by acute low-level microwave irradiation.

Microwaves and cellular immunity. I. Effect of whole body microwave irradiation on tumor necrosis factor production in mouse cells.

Radio and microwave radiation and experimental atherosclerosis.

Biosynthesis of acetylcholine in different brain regions in vivo following alternative methods of sacrifice by microwave irradiation.

Microwaves and cellular immunity. II. Immunostimulating effects of microwaves and naturally occurring antioxidant nutrients.

Effects of microwave irradiation on blood flow in the dog hindlimb.

Tissue structure of rat brain after microwave irradiation using maximum magnetic field component.

[Experimental study of the effects of acute uneven microwave irradiation].

Microwave accelerated transglycosylation of rutin by cyclodextrin glucanotransferase from *Bacillus* sp. SK13.002.

The effect of 2.45 GHz microwave irradiation on human peripheral lymphocytes.

[Motor activity of rabbits in conditions of chronic low-intensity pulse microwave irradiation].

Autoradiographic analysis of protein synthesis and measurements of nuclear volume in WISH cell cultures irradiated with 3 GHz electromagnetic radiation.

Leukocyte numbers during the humoral and cell-mediated immune response of Japanese quail after microwave irradiation in ovo.

The respiratory response to microwaves.

Aversion/attraction of blue jays to microwave irradiation.

Low-level microwave irradiation attenuates naloxone-induced withdrawal syndrome in morphine-dependent rats.

Response of *Aspergillus nidulans* and *Physarum polycephalum* to microwave irradiation.

[Combined action of gamma and UHF radiation on conditioned reflex behavior of rats].

Ethanol-induced hypothermia and ethanol consumption in the rat are affected by low-level microwave irradiation.

Inhibitory action of microwave radiation on gamma-glutamyl transpeptidase activity in liver of rats treated with hydrocortisone.

Effect of low-level microwave irradiation on the duodenal electrical activity of the unanesthetized rat.

Behavioral sensitivity to microwave irradiation.

In vitro microwave effects on human neutrophil precursor cells (CFU-C).

The effect of microwave irradiation on vasopressin in plasma and hypothalamo-neurohypophyseal system.

Karyometric observations of WISH cell cultures irradiated with 3 GHz microwaves.

[Effects of injuring and restoring the body of rats with microwave (2400 MHz) irradiation].

[Spontaneous electrical activity of the rat cerebral cortex during microwave irradiation].

[The immune and hormonal effects of the local action of microwaves of different intensities].

[Effects of microwave irradiation on ATPase activity and voltage dependent ion channel of rat hippocampus cell membrane].

Assessment of immune function development in mice irradiated in utero with 2450-MHz microwaves.

[Response of neurons of the sensomotor region of the cerebral cortex to low-intensity pulsed ultra-high frequency irradiation].

Effects of modulated microwave and X-ray irradiation on the activity and distribution of  $\text{Ca}^{2+}$ -ATPase in small intestine epithelial cells.

[Cross-correlation analysis of the interconnection in neuronal pulses in living sections of the neocortex under the effect of microwave irradiation].

[Total bioelectric activity of various structures of the brain in low-intensity microwave irradiation].

Effects of microwave irradiation on some membrane-related processes in bacteria.

Effects of modulated and continuous microwave irradiation on the morphology and cell surface negative charge of 3T3 fibroblasts.

Microwave facilitation of methylatropine antagonism of central cholinomimetic drug effects.

[Effects of microwave acute irradiation on biomechanic properties of rabbit tissues].

Search for millimeter microwave effects on enzyme or protein functions.

[The effect of microwave irradiation on the status of the thyroid gland].

Study of the use of the microwave magnetic field for the rapid inactivation of brain enzymes.

Serum enzymes in hemorrhaged Japanese quail after microwave irradiation during embryogeny.

[Effect of acute exposure to microwave from mobile phone on DNA damage and repair of cultured human lens epithelial cells in vitro].

[An effect of delayed behavioral activation during a single exposure to microwaves].

[The status of the higher nervous activity in animals exposed to microwaves in conditions simulating the intermittent work of radiolocators].

[Effect of microwave irradiation on expression of heat shock proteins family in primary cultured rat hippocampal neurons].

Cytogenetic consequences of microwave irradiation on mammalian cells incubated in vitro.

[Pulse flows of populations of cortical neurons under microwave radiation: the number of burst activity].

Photic cuing of escape by rats from an intense microwave field.

Effect of microwaves on the activity of murine macrophages in vitro.

Determination of a thermal equivalent of millimeter microwaves in living cells.

Ascorbic acid changes in cultured rabbit lenses after microwave irradiation.

The response of the 22A strain of scrapie agent to microwave irradiation compared with boiling.

[Tactical behavior of rats when choosing among negative stimuli: pain or exposure to an electromagnetic field].

[Pulse flows of populations of cortical neurons under low-intensity pulsed microwave: interspike intervals].

[Pulse flows of cortical neuron populations exposed to microwaves: interspike intervals].

[Changes in the activity and conditioned-reflex behavior of white rats during and after chronic microwave irradiation].

Analysis of the effects of microwave energy on enzymatic activity of lactate dehydrogenase (LDH).

Changes of amino acid gradients in brain tissues induced by microwave irradiation and other means.

Plasma and red cell volumes of microwave irradiated mice tissues.

A comparison between microwave irradiation and decapitation: basal levels of dynorphin and enkephalin and the effect of chronic morphine treatment on dynorphin peptides.

Microwaves (2,450 MHz) suppress murine natural killer cell activity.

[Effect of impulse-intermittent ultrahigh frequency irradiation on synthesis of nucleic acids in tumor cells].

The effect of microwave irradiation on the vitality of various dermatophytes.



Focused microwave irradiation of the brain preserves in vivo protein phosphorylation: comparison with other methods of sacrifice and analysis of multiple phosphoproteins.

Brain regional levels of adenosine and adenosine nucleotides in rats killed by high-energy focused microwave irradiation.

The effect of 2450 MHz microwave radiation on histamine secretion by rat peritoneal mast cells.

Microwave-induced hearing: some preliminary theoretical observations.

[Effect of microwave radiation on regional blood flow and tissue oxygenation in the brain].

The effect of electromagnetic radiation on the hematopoietic stem cells of mice.

Reversible irritative effect of acute 2.45GHz microwave exposure on rabbit eyes--a preliminary evaluation.

Acute microwave irradiation and cataract formation in rabbits and monkeys.

Chronic non-thermal exposure of modulated 2450 MHz microwave radiation alters thyroid hormones and behavior of male rats.

Microwave-mediated enzymatic modifications of DNA.

Excellent acceleration of the Diels-Alder reaction by microwave irradiation for the synthesis of new fluorine-substituted ligands of NMDA receptor.

[Effect of 2450 MHz microwaves on the fertility of Swiss female mice].

[Myelokaryocyte mitotic activity during microwave irradiation (2375 MHz)].

Anesthesia as an effective agent against the production of congenital anomalies in mouse fetuses exposed to electromagnetic radiation.

[Stimulation of production of tumor necrosis factor by murine macrophages when exposed in vivo and in vitro to weak electromagnetic waves in the centimeter range].

[Evaluation of changes in electrophysiological and hormonal parameters in rabbits resulting from short-term low-intensity ultra-high-frequency irradiation].

[The effect of millimeter-range electromagnetic and of ionizing radiation on the body and thymocytes of mice and rats].

Effect of microwave irradiation on the blow fly *Chrysomya megacephala* (F.) (Diptera: Calliphoridae).

Leukocyte numbers in hemorrhaged Japanese quail after microwave irradiation in ovo.

The effect of repeated microwave irradiation on the frequency of sex-linked recessive lethal mutations in *Drosophila melanogaster*.

[The epididymal adipose tissue of mice after nanosecond pulse-periodic microwave irradiation].

A method for dissection of discrete regions of rat brain following microwave irradiation.

Effect of microwave irradiation (2450 MHz) on murine cytotoxic lymphocyte and natural killer (NK) cells.

Dynamics of Metabolic Parameters in Rats during Repeated Exposure to Modulated Low-Intensity UHF Radiation.

[The effect of superhigh-frequency electromagnetic radiation on the course of *Helicobacter pylori*-associated peptic ulcer].

Effect of microwave electromagnetic field on skeletal muscle fibre activity.

[Effects of microwaves on the cellular immune response of Swiss mice].

[The effect of ultrahigh-frequency electromagnetic radiation on learning and memory processes].

Does microwave irradiation have other than thermal effects on glutaraldehyde crosslinking of collagen?

The tissue content of cyclic AMP in rats after microwave irradiation in vivo.

[Effects of microwave irradiation on NMDA receptor subunits mRNA expressions in rat hippocampus].

Plasma corticosterone in hemorrhaged Japanese quail after microwave irradiation in ovo.

[Electron microscopic analysis of the effect of modulated microwave radiation on isolated rat olfactory mucosa].

Animal study on electromagnetic field biological potency.

[The effect of low-intensity prolonged impulse electromagnetic irradiation in the UHF range on the testes and the appendages of the testis in rats].

Germ cell degeneration in normal and microwave-irradiated rats: potential sperm production rates at different developmental steps in spermatogenesis.

[Experimental research on the biological action of the pulse-modulated microwave radiation created by shipboard radar stations].

Cell-density dependent effects of low-dose ionizing radiation on *E. coli* cells.

[Effects of electromagnetic irradiation on glucocorticoid in serum and its receptor expression in rat hippocampus].

[The effect of microwave irradiation on the peroxide modification of low density lipoproteins in human blood serum].

[Stimulation of murine natural killer cells by weak electromagnetic waves in the centimeter range].

Use of 300-msec microwave irradiation for enzyme inactivation: a study of effects of sodium pentobarbital on acetylcholine concentration in mouse brain regions.

[Studies on the screening high yield acid protease producing strain L336 by combining microwave irradiation with chemical inducing].

[Effect of super-high electromagnetic radiation and hormones on the osmotic resistance of mouse erythrocytes].

Effects of 2.45 GHz microwave exposures on the peroxidation status in Wistar rats.

[Effect of electromagnetic waves in the centimeter range on the production of tumor necrosis factor and interleukin-3 in immunized mice].

Radiation-induced lung toxicity in mice irradiated in a strong magnetic field.

Nonthermal effect of microwave irradiation in nonaqueous enzymatic esterification.

[Role of the thyroid gland in developing the genetic effects of microwaves of nonthermal intensity].

Regional levels of cyclic AMP in rat brain: pitfalls of microwave inactivation.

[Effect of electromagnetic radiation on discharge activity of neurons in the hippocampus CA1 in rats].

Effects of repeated microwave irradiations to the albino rabbit eye.

Inactivation of kallikrein and kininases and stabilization of whole rat brain kinin levels following focused microwave irradiation.

Fragmentation of genomic DNA using microwave irradiation.

[Modifying effect of low-intensive electromagnetic radiation on the irradiated cells].

Intraoperative peritoneal washing cytology with the rapid immunoperoxidase method using microwave irradiation.

[Effect of SHF-radiation on spontaneous impulse activity of cerebral cortex slices in vitro].

[The effect of millimeter-band radiation of nonthermal intensity on sensitivity of *Staphylococcus* to various antibiotics].

[Infrared spectra of erythrocyte shadows in the region of the amide I and amide II bands following microwave irradiation].

[The immunological mechanism of the modulation of IgE antibody formation during microwave irradiation of the thymus].

Microwave irradiation influences on the state of human cell nuclei.

Acetylcholine: oscillation of levels in mouse brain following electroshock.

[The inhibiting action of superhigh-frequency millimeter waves on adenovirus (author's transl)].

Slow potentials and spike unit activity of the cerebral cortex of rabbits exposed to microwaves.

[The immunostimulating properties of erythrocytes subjected to the action of ultraviolet irradiation and electromagnetic radiation during vibration exposure].

GSM 900 MHz microwave radiation affects embryo development of Japanese quails.

[Immunomodulating effect of electromagnetic waves on production of tumor necrosis factor in mice with various rates of neoplasm growth].

[Clinical significance of tonsillar provocation test in diagnosis of tonsillar focal infection--by indirect irradiation of ultra-micro waves].

[The immunomodulating action of microwaves in the induction of an immune response to Vi antigen].

[A comparison of conditioned avoidance reflex in rabbits formed under the influence of permanent magnetic fields, ultra-high-frequency irradiation, light and sound].

Physiological measurements during radio-frequency irradiation.

Microwave-induced formation of oligomeric amyloid aggregates.

[Biological oxidation in cells exposed to microwaves in the millimeter range].

Brain amino acid concentrations in rats killed by decapitation and microwave irradiation.

[The effect of electromagnetic waves of very high frequency of molecular spectra of radiation and absorption of nitric oxide on the functional activity of platelets].

Exposure to low-intensive superhigh frequency electromagnetic field as a factor of carcinogenesis in experimental animals.

[Effects of centimeter waves on the immune system of mice in endotoxic shock].

Effect of continuous irradiation with terahertz electromagnetic waves of the NO frequency range on behavioral reactions of male albino rats under stress conditions.

[The effect of electromagnetic radiation with extremely high frequency and low intensity on cytotoxic activity of human natural killer cells].

Exocytosis sensitivity to growth hormone-releasing hormone in subsets of GH cells in rats under different corticosterone conditions. Ultrastructural study using microwave irradiation for fixation and immunocytochemistry.

[Effect of extremely high frequency electromagnetic radiation of low intensity on parameters of humoral immunity in healthy mice].

[The electrical activity of symmetrical areas of the rat cerebral cortex during the use of a low-intensity UHF field].

[Effect of local SHF-irradiation of the rat foot on impulse activity in the tibial nerve].

[Effect of radiofrequency of electromagnetic radiation on yeast sensitivity to fungicide antibiotics].

Effects of acute and chronic ethanol administration on thromboxane and prostacyclin levels and release in rat brain cortex.

[Effect of microwave on the dentin of root canal wall].

[Constant direct action of the magnetic field on the brain fabric].

[Functional activity and metabolism of blood neutrophils exposed to low-intensity microwaves].

[Effect of weak electromagnetic radiation on regeneration of the pharynx in *Dugesia tigrina planaria*].

[Effects of hypogeomagnetic fields on the structural-functional activity of rat cerebral cortex].

[Effect of microwaves of nonthermal intensity on the number of aberrant hepatocytes in rats].

[Stimulation of the defenses of trypanosomic mice by a combination of magnetic field and electromagnetic wave radiation].

Visual abnormalities associated with high-energy microwave exposure.

[Changes in the proteinase-inhibitor system of rats with hyperlipoproteinemia during transcerebral exposures to a 100-Hz-frequency pulse current and to an ultrahigh-frequency field].

Hypothalamic cholinergic and noradrenergic neurons in hyperglycemia induced by 2-deoxyglucose.

[A mathematical modelling study of the respiratory system during exposure to a low-intensity UHF field].

[Heterogeneity of neurocytes of different brain regions to repeated superhigh-frequency irradiation].

Effects of electro-acupuncture and physical exercise on regional concentrations of neuropeptides in rat brain.

Continuous microwave enhances the healing process of septic and aseptic wounds in rabbits.

[Effect of weak electromagnetic radiation on larva development and metamorphosis of grain beetle *Tenebrio molitor*].

[Effects of low-intensity EHF-radiation on peripheral sections of the nervous system].

[The influence of electromagnetic field on active avoidance reaction, biogenic amines and amino acids in brain of rats in spite of background of food-stuff addition serotonin].

Visualization of in vivo metabolic flows reveals accelerated utilization of glucose and lactate in penumbra of ischemic heart.

--Leaf Cluster 29 (94)

Theme - Adverse effects of microwave radiation, especially pulsed microwave

Titles

Physiological effects of 2.8 GHz radio-frequency radiation: a comparison of pulsed and continuous-wave radiation.

Abnormal cardiovascular responses induced by localized high power microwave exposure.

Thermoregulatory responses of rats exposed to 9.3-GHz radiofrequency radiation.

Microwave alteration of the blood-brain barrier system of rats.

Blood-brain barrier permeation in the rat during exposure to low-power 1.7-GHz microwave radiation.

Low-level microwave irradiations affect central cholinergic activity in the rat.

Cerebrovascular permeability to  $^{86}\text{Rb}$  in the rat after exposure to pulsed microwaves.

Effects of pulsed microwave radiation on the contractile rate of isolated frog hearts.

High-peak-power microwave pulses: effects on heart rate and blood pressure in unanesthetized rats.

Microwave-induced lethal heat stress: effects of phentolamine, prazosin and metoprolol.

Low-level microwave irradiation and central cholinergic activity: a dose-response study.

Cardiorespiratory changes during microwave-induced lethal heat stress and beta-adrenergic blockade.

Tolazoline decreases survival time during microwave-induced lethal heat stress in anesthetized rats.

Studies on blood-brain barrier permeability after microwave-radiation.

Low-level microwave irradiation and central cholinergic systems.

Heart rate changes due to 5.6-GHz radiofrequency radiation: relation to average power density.

Effects of 2.8-GHz microwaves on restrained and ketamine-anesthetized rats.

Effect of 2450 MHz microwave energy on the blood-brain barrier to hydrophilic molecules. C. Effect on the permeability to  $[^{14}\text{C}]$ sucrose.

Increased sensitivity of the non-human primate eye to microwave radiation following ophthalmic drug pretreatment.

Circulating antibody response of mice exposed to 9-GHz pulsed microwave radiation.

Immediate post-exposure effects of high-peak-power microwave pulses on operant behavior of Wistar rats.

Permeability of the blood-brain barrier to mannitol in the rat following 2450 MHz microwave irradiation.

Effects of esmolol on 35 GHz microwave-induced lethal heat stress.

Studies on microwave and blood-brain barrier interaction.

Effects of 2.45-GHz microwaves on primate corneal endothelium.

Corticotropin-releasing factor antagonist blocks microwave-induced decreases in high-affinity choline uptake in the rat brain.

Cardiovascular and thermal effects of microwave irradiation at 1 and/or 10 GHz in anesthetized rats.

Effect of 2450 MHz microwave energy on the blood-brain barrier to hydrophilic molecules. B. Effect on the permeability to HRP.

Microwave influence on the isolated heart function: II. Combined effect of radiation and some drugs.

Acute low-level microwave exposure and central cholinergic activity: studies on irradiation parameters.

Microwave irradiation of rats at 2.45 GHz activates pinocytotic-like uptake of tracer by capillary endothelial cells of cerebral cortex.

Microwave influence on the isolated heart function: I. Effect of modulation.

Permeability of the blood-brain barrier induced by 915 MHz electromagnetic radiation, continuous wave and modulated at 8, 16, 50, and 200 Hz.

Rhesus monkey behavior during exposure to high-peak-power 5.62-GHz microwave pulses.

The insensitivity of frog heart rate to pulse modulated microwave energy.

Effects of low-level microwave irradiation on hippocampal and frontal cortical choline uptake are classically conditionable.

[Comparative estimation of the effects of continuous and intermittent cyclical microwave radiation on the behavior of rats in the extraordinary situation].

In vitro studies of microwave-induced cataract: reciprocity between exposure duration and dose rate for pulsed microwaves.

Effect of 2450 MHz microwave energy on the blood-brain barrier to hydrophilic molecules. A. Effect on the permeability to sodium fluorescein.

Absorption of microwave radiation by the anesthetized rat: electromagnetic and thermal hotspots in body and tail.

Opioid receptor subtypes that mediate a microwave-induced decrease in central cholinergic activity in the rat.

Cardiovascular changes in unanesthetized and ketamine-anesthetized Sprague-Dawley rats exposed to 2.8-GHz radiofrequency radiation.

Auditory unit responses to single-pulse and twin-pulse microwave stimuli.

Naltrexone pretreatment blocks microwave-induced changes in central cholinergic receptors.

Microwave effects on isolated chick embryo hearts.

Comparative effects of extremely high power microwave pulses and a brief CW irradiation on pacemaker function in isolated frog heart slices.

Temporal bisection in rats: the effects of high-peak-power pulsed microwave irradiation.

[Effects of 2375 MHz pulse-modulated microwave radiation on ATPase activity of the rat muscle actomyosin].

Influence of microwaves on the beating rate of isolated rat hearts.

Microwave radiation and heart-beat rate of rabbits.

Effects of continuous-wave, pulsed, and sinusoidal-amplitude-modulated microwaves on brain energy metabolism.

In vitro studies of microwave-induced cataract. II. Comparison of damage observed for continuous wave and pulsed microwaves.

Antibody responses of mice exposed to low-power microwaves under combined, pulse-and-amplitude modulation.

[Proposed exposure levels of pulse-modulated electromagnetic fields].

Characteristics of microwave evoked body movements in mice.

The effect of pulsed microwaves on passive electrical properties and interspike intervals of snail neurons.

[Effect of low-intensity pulse-modulated microwave on human blood aspartate aminotransferase activity].

Effect of global system for mobile communication (GSM) microwave exposure on blood-brain barrier permeability in rat.

Slow and rapid responses to CW and pulsed microwave radiation by individual Aplysia pacemakers.



Effects of continuous and pulsed 2450-MHz radiation on spontaneous lymphoblastoid transformation of human lymphocytes in vitro.

Effects of high power microwave pulses on synaptic transmission and long term potentiation in hippocampus.

Bursting responses of Lymnea neurons to microwave radiation.

Influence of acute microwave radiation on cardiac function in normal and myocardial ischemic cats.

NF-kappaB DNA-binding activity after high peak power pulsed microwave (8.2 GHz) exposure of normal human monocytes.

Measurement of blood-brain barrier permeation in rats during exposure to 2450-MHz microwaves.

Single vs. repeated microwave exposure: effects on benzodiazepine receptors in the brain of the rat.

In vitro study of microwave effects on calcium efflux in rat brain tissue.

Thermoregulatory responses of rats exposed to 9.3-GHz microwaves: a comparison of E and H orientation.

Modification of acoustic startle by microwave pulses in the rat: a preliminary report.

Effects of high peak power microwaves on the retina of the rhesus monkey.

Alteration of circulating antibody response of mice exposed to 9-GHz pulsed microwaves.

Effect of 9.6-GHz pulsed microwaves on the orb web spinning ability of the cross spider (*Araneus diadematus*).

Environmental-health aspects of pulse-modulated microwaves.

[The effect of pulsed cyclical microwave radiation on the conditioned behavior of rats].

[Effects of electromagnetic radiation of various modes on heart activity (in experiments)].

Modification of acoustic and tactile startle by single microwave pulses.

Effect of short electromagnetic pulses on brain acetylcholine content and spontaneous motor activity of mice.

Microwave auditory effect- a comparison of some possible transduction mechanisms.

Increased susceptibility to radiofrequency radiation due to pharmacological agents.

Microwave irradiation affects radial-arm maze performance in the rat.

[Changes in serum alkaline phosphatase activity during in vitro exposure to amplitude-modulated electromagnetic field of ultrahigh frequency (2375 MHz) in guinea pigs].

Reversible microwave effects on the blood-brain barrier.

Effect of microwave radiation on the beating rate of isolated frog hearts.

Amino acid concentrations in hypothalamic and caudate nuclei during microwave-induced thermal stress: analysis by microdialysis.

Character of the effect of microwave on conduction velocity of frog ventricular muscle.

Inter-beat intervals of cardiac-cell aggregates during exposure to 2.45 GHz CW, pulsed, and square-wave-modulated microwaves.

[The efficiency and direction of thymus changes after whole-body exposure of mice to the weak electromagnetic field are determined by the initial status of the thymus].

Alterations in alpha-adrenergic and muscarinic cholinergic receptor binding in rat brain following nonionizing radiation.

[Dependence of microwave effect on the secondary structure of DNA on molecular weight of polynucleotide].

Effects of weak amplitude-modulated microwave fields on calcium efflux from awake cat cerebral cortex.

In vivo exposure of rats to GSM-modulated microwaves: flow cytometry analysis of lymphocyte subpopulations and of mitogen stimulation.

[Microwave method of determining cerebral blood flow].

[Effects of unmodulated electromagnetic radiation of decimetric diapason on the morphogenesis of *Drosophila*].

Pulsed magnetic field induced "analgesia" in the land snail, *Cepaea nemoralis*, and the effects of mu, delta, and kappa opioid receptor agonists/antagonists.

--Leaf Cluster 31 (130)

Theme - Adverse effects of microwave exposures on rats, especially at WiFi frequencies

Titles

Behavioral effects of chronic exposure to 0.5 mW/cm<sup>2</sup> of 2,450-MHz microwaves.

Effects of 2.45 GHz CW microwave radiation on embryofetal development in mice.

Decreased body weight in fetal rats after irradiation with 2450-MHz (CW) microwaves.

Observations of rat fetuses after irradiation with 2450-MHz (CW) microwaves.

Teratogenic, biochemical, and histological studies with mice prenatally exposed to 2.45-GHz microwave radiation.

Intermittent exposure of rats to 2450 MHz microwaves at 2.5 mW cm<sup>2</sup>: behavioral and physiological effects.

Behavioral and physiological effects of chronic 2,450-MHz microwave irradiation of the rat at 0.5 mW/cm<sup>2</sup>.

Effect of nonionizing radiation on the Purkinje cells of the rat cerebellum.

Physiological and behavioral effects of prolonged exposure to 915 MHz microwaves.

Physiological and behavioral effects of chronic exposure to 2450-MHz microwaves.

Behavioral thermoregulation in the squirrel monkey: adaptation processes during prolonged microwave exposure.

Microwave radiation (2450 MHz) alters the endotoxin-induced hypothermic response of rats.

Cardiovascular, hematologic, and biochemical effects of acute ventral exposure of conscious rats to 2450-MHz (CW) microwave radiation.

Tests of mutagenesis and reproduction in male rats exposed to 2,450-MHz (CW) microwaves.

Observations of Syrian hamster fetuses after exposure to 2450-MHz microwaves.

Nonthermal effects of mobile-phone frequency microwaves on uteroplacental functions in pregnant rats.

Serum-thyroxine levels in microwave-exposed rats.

Blood-forming system in rats after whole-body microwave exposure; reference to the lymphocytes.

The in vivo effects of 2.45 GHz microwave radiation of rabbit serum components and sleeping times.

Hematologic and immunologic effects of pulsed microwaves in mice.

Microwave-induced increase of water and conductivity in submaxillary salivary gland of rats.

Effects of whole body microwave exposure on the rat brain contents of biogenic amines.

Effects of microwave exposure in utero on embryonal, fetal and postnatal development of mice.

Effect of continuous-wave and amplitude-modulated 2.45 GHz microwave radiation on the liver and brain aminoacyl-transfer RNA synthetases of in utero exposed mice.

Influence of 2.45-GHz CW microwave radiation on spontaneously beating rat atria.

Alteration of life span of mice chronically exposed to 2.45 GHz CW microwaves.

Studies on the hematologic effects of long-term, low-dose microwave exposure.

[Development of murine embryos and fetuses after irradiation with 2450 MHz microwaves].

Thermoregulatory adjustments in squirrel monkeys exposed to microwaves at high power densities.

[Effects of microwave radiation on lipid peroxidation and the content of neurotransmitters in mice].

An evaluation of the teratogenic potential of protracted exposure of pregnant rats to 2450-MHz microwave radiation: I. Morphologic analysis at term.

[Effects of microwave radiation on conditioned behavior of rats].

Increased serum enzyme activity in microwave-exposed rats.

Long-term, low-level microwave irradiation of rats.

Microwaves modify thermoregulatory behavior in squirrel monkey.

Testicular function of rats following exposure to microwave radiation.

Uteroplacental circulatory disturbance mediated by prostaglandin f2alpha in rats exposed to microwaves. hiro-n@po.incl.ne.jp.

Effects of microwaves on three different strains of rats.

The effect of melatonin on body mass and behaviour of rats during an exposure to microwave radiation from mobile phone.

Thermoregulatory, metabolic, and cardiovascular response of rats to microwaves.

Modification of the repeated acquisition of response sequences in rats by low-level microwave exposure.

Preliminary investigations of the effects of low-level microwave radiation on spontaneous motor activity in rats.

Delineating acute neuroendocrine responses in microwave-exposed rats.

Acute exposure to pulsed 2450-MHz microwaves affects water-maze performance of rats.

Quantitative changes in potassium, sodium, and calcium in the submaxillary salivary gland and blood serum of rats exposed to 2880-MHz microwave radiation.

Effects of hypophysectomy and dexamethasone on rat adrenal response to microwaves.

Simultaneous response of brain electrical activity (EEG) and cerebral circulation (REG) to microwave exposure in rats.

[Effects of whole-body microwave exposure on the plasma adrenocorticotrophic hormone, thyroid-stimulating hormone and thyroid hormones in rats].

An evaluation of the teratogenic potential of protracted exposure of pregnant rats to 2450-MHz microwave radiation. II. Postnatal psychophysiologic analysis.

Effects of 2.45-GHz microwave radiation on embryonic quail hearts.

Chronic exposure of rabbits to 0.5 and 5 mW/cm<sup>2</sup> 2450-MHz CW microwave radiation.

Effect of 2,450 MHz microwave radiation on the development of the rat brain.

In utero exposure to microwave radiation and rat brain development.

Thermoregulatory responses of the immature rat following repeated postnatal exposures to 2,450-MHz microwaves.

Studies of the teratogenic potential of exposure of rats to 6000-MHz microwave radiation. I. Morphologic analysis at term.

Effects of acute low-level microwaves on pentobarbital-induced hypothermia depend on exposure orientation.

Adjustments in metabolic heat production by squirrel monkeys exposed to microwaves.

Effect of 2450 MHz microwave radiation on hematopoiesis of pregnant mice.

Natural killer cell activity reduced by microwave exposure during pregnancy is mediated by opioid systems.

Interaction of microwaves and a temporally incoherent magnetic field on spatial learning in the rat.

Effects of exposure to microwaves on cellular immunity and placental steroids in pregnant rats.

Acute, whole-body microwave exposure and testicular function of rats.

Reproduction in male Japanese quail exposed to microwave radiation during embryogeny.

Repeated exposure to low-level extremely low frequency-modulated microwaves affects baseline and scopolamine-modified electroencephalograms in freely moving rats.

Microwaves: effect on thermoregulatory behavior in rats.

Effects of microwaves on the adrenal cortex.

[Effects of whole-body microwave exposure on the plasma corticosterone, glucose, uric acid and allantoin levels in rats].

Effects of microwave exposure on the hamster immune system. IV. Spleen cell IgM hemolytic plaque formation.

Microwave irradiation and instrumental behavior in rats: unitized irradiation and behavioral evaluation facility.

Cytogenetic effects of microwave irradiation on male germ cells of the mouse.

Effect of microwave irradiation (2.45 GHz, CW) on egg weight loss, egg hatchability, and hatchling growth of the Coturnix quail.

Microwave effects on energy metabolism of rat brain.

[Experimental estimation of thermogenic levels of acute microwave exposure for different animal species].

Lethality in mice and rats exposed to 2450 MHz circularly polarized microwaves as a function of exposure duration and environmental factors.

Heat-dissipation rate of mice after microwave irradiation.

Studies of the teratogenic potential of exposure of rats to 6000-MHz microwave radiation. II. Postnatal psychophysiologic evaluations.

Effects of 2450 MHz microwave radiation during the gestational period on the postnatal hematology of rats.

Effects of 2.45 GHz microwave radiation on the development of Japanese quail cerebellum.

Repeated exposure to low-level extremely low frequency-modulated microwaves affects cortex-hypothalamus interplay in freely moving rats: EEG study.

Comparative effects of pulsed and continuous-wave 2.8-GHz microwaves on temporally defined behavior.

[Endocrine mechanism of placental circulatory disturbances induced by microwave in pregnant rats].

Response of Japanese quail to hemorrhagic stress after exposure to microwave radiation during embryogeny.

Exposure of fertile chicken eggs to microwave radiation (2.45 GHz, CW) during incubation: technique and evaluation.

B16 melanoma development in black mice exposed to low-level microwave radiation.

Complement receptor positive spleen cells in microwave (2450-MHz)-irradiated mice.

Prolonged microwave irradiation of rats: effects on concurrent operant behavior.

Effects of microwave exposure on the hamster immune system. II. Peritoneal macrophage function.

Space efficient system for small animal, whole body microwave exposure at 1.6 GHz.

[Animal death after exposure to ultra-high frequency waves in the dependence of power flux density and specific absorption rate].

Effects of microwave exposure on the hamster immune system. I. Natural killer cell activity.

Influence of pre- and postnatal exposure of rats to 2.45-GHz microwave radiation on neurobehavioral function.

Morphological changes in cerebellum of neonatal rats exposed to 2.45 GHz microwaves.

Effect of nonionizing radiation on the Purkinje cells of the uvula in squirrel monkey cerebellum.

Pulse modulated and continuous wave microwave radiation yield equivalent changes in operant behavior of rodents.

Effects of postnatal microwave exposure on thyrotropin level in the adult male rat.

The effects of single and repeated exposure to 2.45 GHz radiofrequency fields on c-Fos protein expression in the paraventricular nucleus of rat hypothalamus.

Miniature anechoic chamber for chronic exposure of small animals to plane-wave microwave fields.

Microwaves induce peripheral vasodilation squirrel monkeys.

Some effects of exposure of the Japanese quail embryo to 2.45-GHz microwave radiation.

Protein kinase C activity in developing rat brain cells exposed to 2.45 GHz radiation.

Longevity and food consumption of microwave-treated (2.45 GHz CW) honeybees in the laboratory.

Age-dependent effect of long-term microwave radiation on postnatal neurogenesis in rats: morphological and behavioral study.

Radial arm maze performance of rats following repeated low level microwave radiation exposure.

Microwave radiation enhances teratogenic effect of cytosine arabinoside in mice.

Effects of microwaves (900 MHz) on the cochlear receptor: exposure systems and preliminary results.

Effects of GSM-900 microwaves on the experimental allergic encephalomyelitis (EAE) rat model of multiple sclerosis.

Transbilayer movement of  $^{24}\text{Na}$  in sonicated phosphatidylcholine vesicles exposed to frequency-modulated microwave radiation.

Antipruritic effect of millimeter waves in mice: evidence for opioid involvement.

Effects on energy absorption of orientation and size of animals exposed to 2.45-GHz microwave radiation.

Biological studies with continuous-wave radiofrequency (28 MHz) radiation.

Flight, orientation, and homing abilities of honeybees following exposure to 2.45-GHz CW microwaves.

Age-related changes in the noradrenergic pattern and receptor responses of the rat cardiovascular system after repeated microwave exposure.

Failure of rats to escape from a potentially lethal microwave field.

Humoral and cell-mediated immune function in adult Japanese Quail following exposure to 2.45-GHz microwave radiation during embryogeny.

[Which neurophysiologic effects at low level 2.45 GHz RF exposure?].

[Effects of 2450 MHz microwave on long-term potentiation of hippocampus and lipofuscin contents in rat brain].

The effect of microwave radiation on the primary IgM response to sheep red blood cells in mice.

[Effects of electromagnetic field of thermal intensity on the hypophysis-thyroid unit of the neuroendocrine system].

[Action of a UHF field on GABA-ergic and acetylcholinergic systems in synaptic transmission].

Noradrenergic innervation and receptor responses of cardiovascular tissues from young and aged rats after acute microwave exposure.

Effects of weak microwave fields amplitude modulated at ELF on EEG of symmetric brain areas in rats.

Erythropoietic dynamic equilibrium in rats maintained after microwave irradiation.

Glucose administration attenuates spatial memory deficits induced by chronic low-power-density microwave exposure.

Behavioral Abnormality along with NMDAR-related CREB Suppression in Rat Hippocampus after Shortwave Exposure.

Effects of microwave exposure on the hamster immune system. III. Macrophage resistance to vesicular stomatitis virus infection.

Retrograde amnesia: effects of handling and microwave radiation.

[Effect of high frequency electromagnetic fields on the processes of transamination in the liver and small intestine tissues of rats].

Influence of postnatal exposition to microwaves on brain and hypothalamo-pituitary monoamines in the adult male rat.

Electric power induction through an isolated intestinal pouch.

[Effect of microwaves on the spike activity of cerebellar Purkinje cells in the cat].

Fourth Level Cluster 79 (428)

Theme - Microwave radiation absorption at different frequencies



--Leaf Cluster 10 (75)

Theme - Dielectric properties of tissue at different microwave frequencies

Titles

The UHF and microwave dielectric properties of normal and tumour tissues: variation in dielectric properties with tissue water content.

Changes in the dielectric properties of rat tissue as a function of age at microwave frequencies.

Dielectric properties of muscle and liver from 500 MHz-40 GHz.

Dielectric properties of tissues; variation with age and their relevance in exposure of children to electromagnetic fields; state of knowledge.

A large-scale study of the ultrawideband microwave dielectric properties of normal, benign and malignant breast tissues obtained from cancer surgeries.

A quick accurate method for measuring the microwave dielectric properties of small tissue samples.

A method for in vivo detection of abnormal subepidermal tissues based on dielectric properties.

Microwave method for determining dielectric parameters of living biological objects I.

Microwave dielectric studies on proteins, tissues, and heterogeneous suspensions.

Dielectric properties of porcine brain tissue in the transition from life to death at frequencies from 800 to 1900 MHz.

A large-scale study of the ultrawideband microwave dielectric properties of normal breast tissue obtained from reduction surgeries.

Dielectric property measurement of ocular tissues up to 110 GHz using 1 mm coaxial sensor.

Radio-frequency and microwave dielectric properties of insects.

Dielectric properties of Co-gamma-irradiated and microwave-heated rat tumour and skin measured in vivo between 0.2 and 2.4 GHz.

Microwave dielectric relaxation in muscle. A second look.

Dielectric properties of animal tissues in vivo at radio and microwave frequencies: comparison between species.

Dielectric properties of rat embryo and foetus as a function of gestation.

Dielectric properties of porcine cerebrospinal tissues at microwave frequencies: in vivo, in vitro and systematic variation with age.

Dielectric properties of insect tissues.

Development of anatomically realistic numerical breast phantoms with accurate dielectric properties for modeling microwave interactions with the human breast.

Dielectric properties at microwave frequencies studied in partially filled cylindrical TE<sub>011</sub> cavities.

Dielectric properties of human brain tissue measured less than 10 h postmortem at frequencies from 800 to 2450 MHz.

[Dielectric properties of human sweat fluid in the microwave range].

Dielectric behavior of DNA solution at radio and microwave frequencies (at 20 degrees C).

A heterogeneous breast phantom for microwave breast imaging.

Dielectric properties of supersaturated alpha-D-glucose aqueous solutions at 2450 MHz.

Variation of the dielectric properties of tissues with age: the effect on the values of SAR in children when exposed to walkie-talkie devices.

Microwave dielectric properties of tissue. Some comments on the rotational mobility of tissue water.

Monitoring water content of rat lung tissue in vivo using microwave reflectometry.

Microwave dielectric properties and thermochemical characteristics of the mixtures of walnut shell and manganese ore.

Microwave-induced thermal imaging of tissue dielectric properties.

Dielectrical model of cellular structures in radio frequency and microwave spectrum. Electrically interacting versus noninteracting cells.

Average dielectric property analysis of complex breast tissue with microwave transmission measurements.

Modeling of the dielectric properties of trabecular bone samples at microwave frequency.

Dielectric properties for non-invasive detection of normal, benign, and malignant breast tissues using microwave theories.

Microwave dielectric measurements (0.8-70 GHz) on *Artemia* cysts at variable water content.

An evaluation of the mutagenic, carcinogenic and teratogenic potential of microwaves.

Microwave dielectric analysis of human stratum corneum in vivo.

Dielectric properties of human ovary follicular fluid at 9.2 GHz.

A macroscopic model of lungs and a material simulating their properties at radio and microwave frequencies.

Microwave dielectric measurements and tissue characteristics of the human brain: potential in localizing intracranial tissues.

Theoretical evaluation of dielectric absorption of microwave energy at the scale of nucleic acids.

40 GHz RF biosensor based on microwave coplanar waveguide transmission line for cancer cells (HepG2) dielectric characterization.

Modeling of noninvasive microwave characterization of breast tumors.

Cole-Cole parameters for the dielectric properties of porcine tissues as a function of age at microwave frequencies.

The dielectric properties of normal and tumour mouse tissue between 50 MHz and 10 GHz.

Dielectric Properties for Differentiating Normal and Malignant Thyroid Tissues.

The dielectric properties of the cerebellum, cerebrum and brain stem of mouse brain at radiowave and microwave frequencies.

Effect of ultraviolet light on the dielectric behavior of bone at microwave frequencies.

Microwave dielectric measurements of erythrocyte suspensions.

Electrical properties of lens material at microwave frequencies.

A semi-automatic method for developing an anthropomorphic numerical model of dielectric anatomy by MRI.

Microwave absorption in aqueous solutions of DNA.

The measured electrical properties of normal and malignant human tissues from 50 to 900 MHz.

Numerical assessment of the reduction of specific absorption rate by adding high dielectric materials for fetus MRI at 3 T.

Non-invasive and continuous monitoring of the sol-gel phase transition of supramolecular gels using a fast (open-ended coaxial) microwave sensor.

Carbon-coated CoFe-CoFe<sub>2</sub>O<sub>4</sub> composite particles with high and dual-band electromagnetic wave absorbing properties.

A microwave radiometric method for the study of the semiconductor properties of living tissue: its potential application to tumour location.

Theoretical evaluation of the distributed power dissipation in biological cells exposed to electric fields.

[Mechanism of microwave radiation absorption by biological membranes].

A generalized model for the interaction of microwave radiation with bound water in biological material.

Understanding physical mechanism of low-level microwave radiation effect.

Analytical approximations in multiple scattering of electromagnetic waves by aligned dielectric spheroids.

A novel discrete particle swarm optimization algorithm for estimating dielectric constants of tissue.

Multi-physics modeling to study the influence of tissue compression and cold stress on enhancing breast tumor detection using microwave radiometry.

Microwave facilities for welding thermoplastic composites and preliminary results.

Biological effects of low-level environmental agents.

Multifunctional composites: optimizing microstructures for simultaneous transport of heat and electricity.

The properties of bird feathers as converse piezoelectric transducers and as receptors of microwave radiation. I. Bird feathers as converse piezoelectric transducers.

Brain banks and non nervous tissues.

Characterization of three iron ferredoxins by microwave power saturation.

[Possible mechanisms of aftereffects of GSM electromagnetic radiation on air-dry seeds].

Microwave grafted, composite and coprocessed materials: drug delivery applications.

Production of a Novel Mineral-based Sun Lotion for Protecting the Skin from Biohazards of Electromagnetic Radiation in the UV Region.

Microwave drying remediation of petroleum-contaminated drill cuttings.

--Leaf Cluster 23 (88)

Theme - Specific absorption rate in human body models

Titles

Body effects on SAR distributions for microwave exposures in a realistic model of the human head.

Analysis of SAR distribution in human head of antenna used in wireless power transform based on magnetic resonance.

FDTD chiral brain tissue model for specific absorption rate determination under radiation from mobile phones at 900 and 1800 MHz.

FDTD calculations of specific energy absorption rate in a seated voxel model of the human body from 10 MHz to 3 GHz.

Development of a rat head exposure system for simulating human exposure to RF fields from handheld wireless telephones.

Radio frequency electromagnetic exposure: tutorial review on experimental dosimetry.

SAR calculations in an anatomically realistic model of the head for mobile communication transceivers at 900 MHz and 1.8 GHz.

Specific absorption rate (SAR) in models of the human head exposed to hand-held UHF portable radios.

Initial analysis of SAR from a cell phone inside a vehicle by numerical computation.

Dosimetry associated with exposure to non-ionizing radiation: very low frequency to microwaves.

SAR versus S(inc): What is the appropriate RF exposure metric in the range 1-10 GHz? Part I: Using planar body models.

Whole-body and local dosimetry in rats exposed to 2.45-GHz microwave radiation.

Specific absorption rate in rats exposed to 2,450-MHz microwaves under seven exposure conditions.

Electromagnetic fields: human safety issues.

Microwave radiation absorption in the rat: frequency-dependent SAR distribution in body and tail.

Observing-responses of rats exposed to 1.28- and 5.62-GHz microwaves.

Multibody effects on microwave power absorption by multilayered cylindrical models of man.

Numerical compliance testing of human exposure to electromagnetic radiation from smart-watches.

A simulation for effects of RF electromagnetic radiation from a mobile handset on eyes model using the finite-difference time-domain method.

Outdoor measurement of SAR in a full-sized human model exposed to 29.9 MHz in the near field.

Effects of frequency, irradiation geometry and polarisation on computation of SAR in human brain.

SAR in a child voxel phantom from exposure to wireless computer networks (Wi-Fi).

Preliminary studies: far-field microwave dosimetric measurements of a full-scale model of man.

Numerical simulation of pressure waves in the cochlea induced by a microwave pulse.

The effects of RF absorbers on exposure levels at 100 MHz.

Comparison of numerical and experimental methods for determination of SAR and radiation patterns of handheld wireless telephones.

Dominant factors influencing whole-body average SAR due to far-field exposure in whole-body resonance frequency and GHz regions.

Numerical evaluation of human exposure to WiMax patch antenna in tablet or laptop.

Far-field microwave dosimetry in a rhesus monkey model.

A method for safety testing of radiofrequency/microwave-emitting devices using MRI.

Local exposure system for rats head using a figure-8 loop antenna in 1500-MHz band.

Analytic SAR computation in a multilayer elliptic cylinder for bioelectromagnetic applications.

Computation of high-resolution SAR distributions in a head due to a radiating dipole antenna representing a hand-held mobile phone.

Thermal mapping on male genital and skin tissues of laptop thermal sources and electromagnetic interaction.

Acute dosimetry and estimation of threshold-inducing behavioral signs of thermal stress in rabbits at 2.45-GHz microwave exposure.

Comparison of Thermal Response for RF Exposure in Human and Rat Models.

Systems for exposing mice to 2,450-MHz electromagnetic fields.

A suggested limit for population exposure to radiofrequency radiation.

SAR distribution in a bio-medium in close proximity with dual segment cylindrical dielectric resonator antenna.

A comparative study of the PIFA and printed monopole antenna EM absorption.

Compact shielded exposure system for the simultaneous long-term UHF irradiation of forty small mammals. II. Dosimetry.

Thermal effects of radiation from cellular telephones.

SAR in rats exposed in 2,450-MHz circularly polarized waveguides.

A formula for human average whole-body SAR<sub>wb</sub> under diffuse fields exposure in the GHz region.

Scaling the physiological effects of exposure to radiofrequency electromagnetic radiation: consequences of body size.

Radiofrequency dosimetry in subjects implanted with metallic straight wires: a numerical study.

Further studies of human whole-body radiofrequency absorption rates.

Estimation of whole-body SAR from electromagnetic fields using personal exposure meters.

Numerical modelling of thermal effects in rats due to high-field magnetic resonance imaging (0.5-1 GHz).

Dosimetry for a study of effects of 2.45-GHz microwaves on mouse testis.

SAR exposure from UHF RFID reader in adult, child, pregnant woman, and fetus anatomical models.

Head and neck resonance in a rhesus monkey--a comparison with results from a human model.

On the averaging area for incident power density for human exposure limits at frequencies over 6 GHz.

Dosimetric study on eye's exposure to wide band radio frequency electromagnetic fields: variability by the ocular axial length.

Absorption of microwave energy by muscle models and by birds of differing mass and geometry.

Influence of electromagnetic polarization on the whole-body averaged SAR in children for plane-wave exposures.

Thermal effects of MR imaging: worst-case studies on sheep.

Comparison of dose dependences for bioeffects of continuous-wave and high-peak power microwave emissions using gel-suspended cell cultures.

An attempt at quantitative specification of SAR distribution homogeneity.

A new method of SAR determination in animals exposed to microwave/radiofrequency radiation (MW/RFR).

Metabolic and vasomotor responses of rhesus monkeys exposed to 225-MHz radiofrequency energy.

Exposure assessment of one-year-old child to 3G tablet in uplink mode and to 3G femtocell in downlink mode using polynomial chaos decomposition.

Harmful effects of 41 and 202 MHz radiations on some body parts and tissues.

Whole-body new-born and young rats' exposure assessment in a reverberating chamber operating at 2.4 GHz.

A 3-D hp finite/infinite element method to calculate power deposition in the human head.

Ocular effects of radiofrequency energy.

The development of biomedical approaches and concepts in radiofrequency radiation protection.

Absorbed energy distribution from radiofrequency electromagnetic radiation in a mammalian cell model: effect of membrane-bound water.

Statistical analysis of whole-body absorption depending on anatomical human characteristics at a frequency of 2.1 GHz.

Computational human model VHP-FEMALE derived from datasets of the national library of medicine.

Modeling the detectability of vesicoureteral reflux using microwave radiometry.

Radio-wave exposure of the human head: analytical study based on a versatile eccentric spheres model including a brain core and a pair of eyeballs.

Millimeter-wave absorption by cutaneous blood vessels: a computational study.

Simple method to measure power density entering a plane biological sample at millimeter wavelengths.

Exposure of Insects to Radio-Frequency Electromagnetic Fields from 2 to 120 GHz.

[Use of dose parameters of UHF irradiation in the interpretation of lethal effects in laboratory animals].

Noninvasive measurement of current in the human body for electromagnetic dosimetry.

Exposure to non-ionizing radiation provokes changes in rat thyroid morphology and expression of HSP-90.

Induced EM fields inside human bodies irradiated by EM waves of up to 500 MHz.

A dual vial waveguide exposure facility for examining microwave effects in vitro.

[Estimation of the restricted area related to the limitation of exposure of the general public to electromagnetic fields in the vicinity of microwave relay antenna systems].

FDTD simulation of electromagnetic wave scattering from retina cells.

Effect of metal-framed spectacles on microwave radiation hazards to the eye of humans.

Effect of insertion depth on helical antenna performance in a muscle-equivalent phantom.

A survey of the urban radiofrequency (RF) environment.

[The evaluation of the consequences of electromagnetic irradiation of hands in operators of high-frequency welding devices].

Dosimetry considerations in far field microwave exposure of mammalian cells.

[Changes of neurocytes in CNS under general exposure to UHF field with local protection applied].

--Leaf Cluster 21 (63)

Theme - Adverse effects of millimeter-wave exposures on biological systems



## Titles

[Effects of millimeter wave irradiation with different frequency and power density on their offsprings in mice].

[Relationship between millimeter wave irradiation in pregnant mice and c-Fos protein expression in hippocampus and learning and memory functions in their offsprings].

Gene expression changes in the skin of rats induced by prolonged 35 GHz millimeter-wave exposure.

[Effect of low intensity of electromagnetic radiation in the centimeter and millimeter range on proliferative and cytotoxic activity of murine spleen lymphocytes].

[Effects of millimeter wave on gene expression in human keratinocytes].

Current state and implications of research on biological effects of millimeter waves: a review of the literature.

Acute ocular injuries caused by 60-Ghz millimeter-wave exposure.

A non-thermal effect of millimeter wave radiation on the puffing of giant chromosomes.

Effects of millimeter waves on ionic currents of *Lymnaea* neurons.

Evaluation of the potential in vitro antiproliferative effects of millimeter waves at some therapeutic frequencies on RPMI 7932 human skin malignant melanoma cells.

[Acoustic detection of absorption of millimeter-band electromagnetic waves in biological objects].

Reception of low-intensity millimeter-wave electromagnetic radiation by the electroreceptors in skates.

Effect of cyclophosphamide and 61.22 GHz millimeter waves on T-cell, B-cell, and macrophage functions.

Frequency and irradiation time-dependant antiproliferative effect of low-power millimeter waves on RPMI 7932 human melanoma cell line.

Hypothalamic effects of millimeter wave irradiation depend on location of exposed acupuncture zones in unanesthetized rabbits.

Some basic properties of biological tissues for potential biomedical applications of millimeter waves.

[The electrical activity of the hypothalamus in exposure to millimeter-wave radiation at biologically active points].

Electromagnetic millimeter wave induced hypoalgesia: frequency dependence and involvement of endogenous opioids.

Comparison of blood pressure and thermal responses in rats exposed to millimeter wave energy or environmental heat.

Modulation of neuronal activity and plasma membrane properties with low-power millimeter waves in organotypic cortical slices.

Thermal modeling of millimeter wave damage to the primate cornea at 35 GHz and 94 GHz.

Thermal response of tissues to millimeter waves: implications for setting exposure guidelines.

[Activity of natural killer cells of the spleen of mice exposed to low-intensity of extremely high frequency electromagnetic radiation].

Study of narrow band millimeter-wave potential interactions with endoplasmic reticulum stress sensor genes.

Effect of millimeter waves on natural killer cell activation.

Transmission electron microscopy study of the effects produced by wide-band low-power millimeter waves on MCF-7 human breast cancer cells in culture.

Morphological changes in skin nerves caused by electromagnetic radiation of the millimeter range.

The use of millimeter wavelength electromagnetic waves in cardiology.

Millimeter wave exposure reverses TPA suppression of gap junction intercellular communication in HaCaT human keratinocytes.

Millimeter wave induced reversible externalization of phosphatidylserine molecules in cells exposed in vitro.

[The simulation of the cooperative effect of development in a culture of early mouse embryos after irradiation with electromagnetic waves in the millimeter range].

Effects of Millimeter-Wave Electromagnetic Radiation on the Experimental Model of Migraine.

Effect of 99 GHz continuous millimeter wave electro-magnetic radiation on E. coli viability and metabolic activity.

Effect of low-intensity millimeter wave electromagnetic radiation on regeneration of the sciatic nerve in rats.

Millimeter waves thermally alter the firing rate of the Lymnaea pacemaker neuron.

Numerical model of heat transfer in the rabbit eye exposed to 60-GHz millimeter wave radiation.

[Power density analysis on millimeter waves irradiated into cell monolayers in culture dishes].

Effect of millimeter waves on cyclophosphamide induced suppression of the immune system.

Immunomodulating action of low intensity millimeter waves on primed neutrophils.

Suppression of pain sensation caused by millimeter waves: a double-blinded, cross-over, prospective human volunteer study.

[The effect of continuous millimeter low-intensity radiation on the Na<sup>+</sup> ion transport in the frog skin].

[Effects of millimeter wave on gap junctional intercellular communication in human keratinocytes].

[The effect of electromagnetic radiation in the millimeter-wave range on the immune status of peptic ulcer patients].

Effect of millimeter waves on cyclophosphamide induced suppression of T cell functions.

Millimeter-wave effects on electric activity of crayfish stretch receptors.

Reflection and penetration depth of millimeter waves in murine skin.

Search for frequency-specific effects of millimeter-wave radiation on isolated nerve function.

Millimeter wave-induced modulation of calcium dynamics in an engineered skin co-culture model: role of secreted ATP on calcium spiking.

Millimeter wave absorption in the nonhuman primate eye at 35 GHz and 94 GHz.

[Effect of extremely high-frequency electromagnetic radiation on the function of skin sensory endings].

Induced movements of giant vesicles by millimeter wave radiation.

Sustained 35-GHz radiofrequency irradiation induces circulatory failure.

[The effects of electromagnetic radiation of extremely high frequency and low intensity on the growth rate of bacteria *Escherichia coli* and the role of medium pH].

[Effect of coherent extremely high-frequency and low-intensity electromagnetic radiation on the activity of membrane systems in *Escherichia coli*].

Effect of millimeter waves on cyclophosphamide induced NF-kappaB.

[Resonance effect of coherent millimeter-band electromagnetic waves on living organisms].

Large Metasurface Aperture for Millimeter Wave Computational Imaging at the Human-Scale.

[The effect of millimeter-range electromagnetic radiation on the evoked potentials from the vestibular cortical area of the cerebral hemispheres (an experimental study)].

Long-lasting (fatiguing) activity of isolated muscle fibres influenced by microwave electromagnetic field.

The mechanisms of athermal microwave biological effects.

[Experimental study on possibility of corneal injury by electromagnetic wave].

Multi-center feasibility study of microwave radiometry thermometry for non-invasive differential diagnosis of arterial disease in diabetic patients with suspected critical limb ischemia.

Tagging frogs with passive integrated transponders causes disruption of the cutaneous bacterial community and proliferation of opportunistic fungi.

--Leaf Cluster 44 (95)

Theme – Adverse effects of microwave resonances in biological systems

Titles

Thermal Response of Human Skin to Microwave Energy: A Critical Review.

Tissue models for RF exposure evaluation at frequencies above 6 GHz.

Thermal models for microwave hazards and their role in standards development.

A thermal model for human thresholds of microwave-evoked warmth sensations.

Modeling thermal responses in human subjects following extended exposure to radiofrequency energy.

Physiological interaction processes and radio-frequency energy absorption.

Human exposure at two radio frequencies (450 and 2450 MHz): similarities and differences in physiological response.

Vibrational resonances in biological systems at microwave frequencies.

Thermoregulatory physiologic responses in the human body exposed to microwave radiation.

[Dosimetric aspects in studying the biological action of nonionizing electromagnetic radiation].

High-resolution simulations of the thermophysiological effects of human exposure to 100 MHz RF energy.

Thermal Modeling for the Next Generation of Radiofrequency Exposure Limits: Commentary.

Microwave-induced pressure waves in a model of muscle tissue.

Radiofrequency energy on cortical bone and soft tissue: a pilot study.

[Role of polarization and resonance in assessing the biological effects of electromagnetic radiation].

Microwave challenges to the thermoregulatory system.

Physiologic regulation in electromagnetic fields.

Thermal Response of In Vivo Human Skin to Fractional Radiofrequency Microneedle Device.

Impact of monopolar radiofrequency energy on subchondral bone viability.

A comparative study of human sensory thresholds: 2450-MHz microwaves vs far-infrared radiation.

Energy deposition processes in biological tissue: nonthermal biohazards seem unlikely in the ultra-high frequency range.

Generalized model of the microwave auditory effect.

Thermophysiological responses of human volunteers during controlled whole-body radio frequency exposure at 450 MHz.

Mechanical and biochemical effect of monopolar radiofrequency energy on human articular cartilage: an in vitro study.

The influence of radiofrequency/microwave energy absorption on physiological regulation.

Considerations for human exposure standards for fast-rise-time high-peak-power electromagnetic pulses.

[Mechanisms of biophysical effects of microwaves].

Effects of electromagnetic radiation on the Q of quartz resonators.

Energy issues in microwave food processing: A review of developments and the enabling potentials of solid-state power delivery.

Biophysical limits on athermal effects of RF and microwave radiation.

Auditory response to pulsed radiofrequency energy.

Thresholds for lenticular damage in the rabbit eye due to single exposure to CW microwave radiation: an analysis of the experimental information at a frequency of 2.45 GHz.

A Closer Look at the Thresholds of Thermal Damage: Workshop Report by an ICNIRP Task Group.

Theory of the anomalous resonant absorption of DNA at microwave frequencies.

Intrinsic and roughness-induced absorption of electromagnetic radiation incident on optical surfaces.

Ultrawide-band electromagnetic pulses induced hypotension in rats.

Ultrawide-band electromagnetic pulses induced hypotension in rats.

2D plasmon excitation and nonthermal effects of microwaves on biological membranes.

Thresholds of microwave-evoked warmth sensations in human skin.

The effect of radiofrequency energy on the ultrastructure of joint capsular collagen.

[Resonance interactions of surface charged lipid vesicles with the microwave electromagnetic field].

Synchronization in a mechanical resonator array coupled quadratically to a common electromagnetic field mode.

Ovicidal levels of 2.45 GHz electromagnetic energy for the southern corn rootworm.

On the possibility of nonthermal biological effects of pulsed electromagnetic radiation.

Fine structural alterations in radiofrequency energy-induced lesions in dog hearts: possible basis for reduced arrhythmic complications.

Microwave and RF hazard standard considerations.

A model of the electric field of the brain at EEG and microwave frequencies.

[The peculiarities of the microwave in the frequency range of 51-52 GHz spectrum effects on *E. coli* cells].

[Electromagnetic radiation in the radiofrequency range: radiation safety].

Ultrashort microwave signals: a didactic discussion.

A cooperative model for  $\text{Ca}^{++}$  efflux windowing from cell membranes exposed to electromagnetic radiation.

Electromagnetic-field exposure and cancer.

Monte Carlo simulations of electromagnetic wave scattering from a random rough surface with three-dimensional penetrable buried object: mine detection application using the steepest-descent fast multipole method.

Microwave absorption by magnetite: a possible mechanism for coupling nonthermal levels of radiation to biological systems.

Nonlinear changes in brain electrical activity due to cell phone radiation.

Thermoregulatory responses of febrile monkeys during microwave exposure.

[Experiment with the local effect of superhigh-frequency electromagnetic energy on biologically active points].

Monte Carlo simulations for scattering of electromagnetic waves from perfectly conductive random rough surfaces.

[Electromagnetic radiofrequency radiation (microwaves): principles and criteria of standardization, threshold dose levels].

Development of a hybrid microwave-optical tissue oxygenation probe to measure thermal response in the deep tissue.

[Dependence of anti-inflammatory effects of high peak-power pulsed electromagnetic radiation of extremely high frequency on exposure parameters].

Electrical discontinuity of tissue substitute models at 27.12 MHz.

Analysis of strain-induced EPR-line shapes and anisotropic spin-lattice relaxation in a [2Fe-2S] ferredoxin.

The human skin as a sub-THz receiver - Does 5G pose a danger to it or not?

Effects of microwave radiation on living tissues.

Monitoring variations of biological impedances using microwave Doppler radar.

Scaling Relationship of In Vivo Muscle Contraction Strength of Rabbits Exposed to High-Frequency Nanosecond Pulse Bursts.

Biophysical injury mechanisms in electrical shock trauma.

Dynamic nuclear polarisation of biological matter.

Microwave imaging using the finite-element method and a sensitivity analysis approach.

[An evaluation of absorbed doses of high energy electromagnetic radiation in radiotherapy of laryngeal cancer].

[The effects of pulsed low-level EM fields on memory processes].

Ultrawideband radiation and pentylenetetrazol-induced convulsions in rats.

Multi-Center Pilot Study to Evaluate the Safety Profile of High Energy Fractionated Radiofrequency With Insulated Microneedles to Multiple Levels of the Dermis.

Propagation of an electromagnetic wave in an absorbing anisotropic medium and infrared transmission of liquid crystals: comparison with experiments.

Microwave medical imaging based on sparsity and an iterative method with adaptive thresholding.

Microwave-field-driven acoustic modes in DNA.

Long-term study of 435 MHz radio-frequency radiation on blood-borne end points in cannulated rats. Part I: Engineering considerations.

Comment I on "Generation of focused, nonspherically decaying pulses of electromagnetic radiation"

Moisture Monitoring in Fluid-Bed Granulation by Multi-Resonance Microwave Sensor: Applicability on Crystal-Water Containing Donepezil Granules.

[Immunotropic effects of electromagnetic fields in the range of radio- and microwave frequencies].

Multiple scattering of electromagnetic waves by an array of parallel gyrotropic rods.

Human leukocyte functions and the U.S. safety standard for exposure to radio-frequency radiation.

[Biological and ecological aspects of the effects combined electromagnetic rays on farm animals].

A model of cell electromagnetic susceptibility associated with the membrane electric field.

An algorithm to derive the fraction of photosynthetically active radiation absorbed by photosynthetic elements of the canopy (FAPAR(ps)) from eddy covariance flux tower data.

Transfer of light-induced electron-spin polarization from the intermediary acceptor to the prereduced primary acceptor in the reaction center of photosynthetic bacteria.

A signal-to-noise standard for pulsed EPR.

[Effect of decimeter polarized electromagnetic radiation on germinating capacity of seeds].

Multifrequency electron paramagnetic resonance study on deproteinized human bone.

Measurement of heart rate variability and stress evaluation by using microwave reflectometric vital signal sensing.

Frequency selective solutions for an efficient non-ionising radiation protection in the radiofrequency and microwave ranges.

How might spatial nonuniformity of dose in a homogeneous biological system affect its total response?

EM-field effect upon properties of NADPH-cytochrome P-450 reductase with model substrates.

Comment II on "Generation of focused, nonspherically decaying pulses of electromagnetic radiation"

--Leaf Cluster 47 (107)

Theme - Adverse biological effects of decimeter waves

Titles

[Energy and plastic metabolism of the heart muscle in rabbits undergoing thyroid irradiation with decimeter waves].

[The action of decimeter waves and merkazolil on myocardial metabolism in the rabbit and its hormonal regulation].

[The immunological and hormonal effects of combined exposure to a bitemporal ultrahigh-frequency electrical field and to decimeter waves at different sites].

[Effect of electromagnetic radiation of the decimetric wave range on myocardium cell membranes].



[Role of ultrasonic dopplerography in monitoring the effectiveness of treatment of patients who have sustained a stroke with decimeter-range electromagnetic waves].

[Dynamic ultrastructural shifts in the cardiomyocytes during the irradiation of the cardiac area with decimeter electromagnetic waves].

[Myocardial energy metabolism in decimeter-wave exposures].

Modulation of a compressional electromagnetic wave in a magnetized electron-positron quantum plasma.

Interference of electromagnetic waves in dynamic metabolism.

Electromagnetic wave scattering from a rough interface above a chiral medium: generalized field transforms.

[Ultrastructure of the cerebral cortex in the rat after the effect of electromagnetic impulse].

Information transfer by electromagnetic waves in cortex layers.

Levy noise improves the electrical activity in a neuron under electromagnetic radiation.

Response of Electrical Activity in an Improved Neuron Model under Electromagnetic Radiation and Noise.

Possible microwave mechanisms of the mammalian nervous system.

[The effect of decimeter waves on the metabolism of the myocardium and its hormonal regulation in rabbits with experimental ischemia].

[Ultrastructure of cells of the lateral field of the hypothalamus of the cat after exposure to electromagnetic radiation].

[Morphological changes in the thyroid and adrenals under the bitemporal action of a UHF electrical field and decimeter waves (experimental research)].

Some neurotropic effects of low-intensity electromagnetic waves in rats with different typological characteristics of higher nervous activity.

[Systematic analysis of the state of man exposed to radio wave irradiation for a long time].

Poly(dimethylsilylene)diacetylene-Guided ZIF-Based Heterostructures for Full Ku-Band Electromagnetic Wave Absorption.

[The brain function of animals exposed to the action of centimeter electromagnetic waves].

Modulation of coherence of vectorial electromagnetic waves in the Young interferometer.

[Effect of electromagnetic waves with 59-63 GHz frequency on myocardial infarct patients in the subacute stage].

Reflection and transmission of electromagnetic waves at a temporal boundary.

Effect of low-intensity millimeter-range electromagnetic irradiation on the recovery of function in lesioned sciatic nerves in rats.

[Changes in physico-chemical parameters of homeopathic remedies ferrum metallicum CH6 and ferrum metallicum CH30 after exposure to high frequency electromagnetic radiation of low intensity].

Multi-functional coding metasurface for dual-band independent electromagnetic wave control.

[Changes in intracellular regeneration and the indices of endocrine function and cardiac microcirculation in exposure to decimeter waves].

Multiple scattering of electromagnetic waves by an aggregate of uniaxial anisotropic spheres.

Low power radio-frequency and microwave effects on human electroencephalogram and behavior.

Electrophysiological effects of non-invasive Radio Electric Asymmetric Conveyor (REAC) on thalamocortical neural activities and perturbed experimental conditions.

[Electromagnetic radiation of non-thermal intensity and short exposition as a sub-threshold irritant for the central nervous system].

[The effects of influence of electromagnetic irradiation of millimeter wavelength on background impulse activity of supraoptic nucleus' neurons of rats' hypothalamus].

Current problems of nonionizing radiation.

MOF-Derived Porous Co/C Nanocomposites with Excellent Electromagnetic Wave Absorption Properties.

Hierarchical neuronal modeling of cognitive functions: from synaptic transmission to the Tower of London.

Electromagnetic wave absorbing properties of amorphous carbon nanotubes.

[Electromagnetic radiation damage to the retina (author's transl)].

Prediction and measurement of the electromagnetic environment of high-power medium-wave and short-wave broadcast antennas in far field.

Hierarchical neuronal modeling of cognitive functions: from synaptic transmission to the Tower of London.

Out of time: a possible link between mirror neurons, autism and electromagnetic radiation.

About the biological effects of high and extremely high frequency electromagnetic fields.

Exact description of free electromagnetic wave fields in terms of rays.

[Health disorders caused by radiation].

Nanometer-scale surface modification of epoxy with carbon black and electromagnetic waves.

The histologic effects of pulsed and continuous radiofrequency lesions at 42 degrees C to rat dorsal root ganglion and sciatic nerve.

[Effect of low intensity and ultra high frequency electromagnetic irradiation on memory functions].

[The enhanced lethality of cells in suspension during simultaneous exposure to pulsed electrical and shock-wave acoustic fields].

Food collection and response to pheromones in an ant species exposed to electromagnetic radiation.

Morphology-Control Synthesis of a Core-Shell Structured NiCu Alloy with Tunable Electromagnetic-Wave Absorption Capabilities.

[Degranulation of skin mast cells caused by high frequency electromagnetic irradiation of low intensity].

[The general patterns in the development of the ultrastructural reactions under the action of electromagnetic radiations].

Controlling Energy Radiations of Electromagnetic Waves via Frequency Coding Metamaterials.

Intensity statistics and the finesse of electromagnetic radiation in random structures.

Effects of the action of microwave-frequency electromagnetic radiation on the spike activity of neurons in the supraoptic nucleus of the hypothalamus in rats.

[Immunosuppressive effect of the decimeter-band electromagnetic field].

A Route to Chaotic Behavior of Single Neuron Exposed to External Electromagnetic Radiation.

[Radiosensitivity of morphoenzymological structural elements of the jejunum mucous membrane in chronodynamics of the impact of electromagnetic fields impulses].

Radiofrequency neurolysis in a clinical model. Neuropathological correlation.

[Experimental research on the electromagnetic radiation immunity of a kind of portable monitor].

Possible physical substrates for the interaction of electromagnetic fields with biologic membranes.

Modifications in ventricular fibrillation and capture capacity induced by a linear radiofrequency lesion.

Evaluation of the maximum permissible level of low-intensity electromagnetic radiation at mobile connection frequency (1 GHz) by changes in motor activity of *Spirostomum Ambiguum*.

Post-mortem histologic evaluation of microwave lesions after epicardial pulmonary vein isolation for atrial fibrillation.

Modulation of surface electromagnetic waves.

[Adaptive changes in the body upon exposure to electromagnetic radiation].

[Effect of impulse extrabroad-band electromagnetic radiation on electroencephalogram and sleep in laboratory animals].

[Influence of ultra-high electromagnetic irradiation on the electrophoretic mobility of erythrocytes].

Nanocomposite synthesis by absorption of nanoparticles into macroporous hydrogels. Building a chemomechanical actuator driven by electromagnetic radiation.

Spontaneous bodily rotations and direction of locomotion at different times after radio frequency lesions at sites in and near the substantia nigra.

Effect of lesion morphology on microwave signature in 2-D ultra-wideband breast imaging.

[The evaluation of the body response of experimental animals to exposure to the magnetic component of electromagnetic radiation for setting a hygiene standard].

Quantitative analysis of lesion parameters in radiofrequency trigeminal rhizotomy.

Features of electromagnetic radiation time-and-frequency fluctuation intensity distributions from human brain structures.

[The effects of space flight factors on the central nervous system. Structural-functional aspects of radio-modifying action].

[Dissipative functions of processes of electromagnetic radiation interaction with biological objects].

[Specific and non-specific electromagnetic irradiation effects on biological objects].

[Changes in gastric electric activity and serum catecholamine level under the influence of electromagnetic microwaves (experimental studies)].

[Features of control of electromagnetic radiation emitted by personal computers].

[Phenomenology and genesis of changes in the total bioelectrical activity of the brain in response to electromagnetic radiation].

Nano sulfur particles decorated bi-lamella composites for superior electromagnetic wave absorption.

Meridian is a three-dimensional network from bio-electromagnetic radiation interference: an interference hypothesis of meridian.

Modulational instability of electromagnetic waves in birefringent fibers with periodic and random dispersion.

[Effect of extremely low frequency electromagnetic radiation and ultra-violet radiation on aggregation of thymocytes and erythrocytes].

Numerical study of electromagnetic waves interacting with negative index materials.

[The structural dynamics of the afferent flow in the action on the receptor field of a low-intensity stimulant].

General description of electromagnetic radiation processes based on instantaneous charge acceleration in "endpoints".

[Behavior of the human skin under the influence of electromagnetic radiation in the visible and near infrared region (author's transl)].

Physical modalities other than stretch in spastic hypertonia.

[Ultrastructure of skeletal muscle tissue of microwave damaged chick embryos].

Response to pulsed and continuous radiofrequency lesioning of the dorsal root ganglion and segmental nerves in patients with chronic lumbar radicular pain.

The biological effectiveness of solar electromagnetic radiation in space.

[Myocardial damage after high tension electricity injury in rabbits].

Bacterial transformation using micro-shock waves.

[Effect of electromagnetic irradiation of the millimetric range on hemodynamics in patients with arterial hypertension].

The biological effects of solar activity.

Mode of action of Phoneutria nigriventer spider venom at the isolated phrenic nerve-diaphragm of the rat.

GSM 900 MHz radiation inhibits ants' association between food sites and encountered cues.

Extending human perception of electromagnetic radiation to the UV region through biologically inspired photochromic fuzzy logic (BIPFUL) systems.

[Ecological and hygienic studies of electromagnetic irradiation of navigation safety system in Eastern area of the Finnish Gulf].

Failure of chronic exposure to nonthermal FM radio waves to mutate *Drosophila*.

[Normal doses of visible light can cause mutations in skin].

Effect of cyclooxygenase blockade on blood flow through well-developed coronary collateral vessels.

Long-wavelength red light emission from TV and photosensitive seizures.

The aversive effect of electromagnetic radiation on foraging bats: a possible means of discouraging bats from approaching wind turbines.

Bilateral symmetry of local inflammatory activation in human carotid atherosclerotic plaques.

Fourth Level Cluster 82 (529)

Theme - Adverse effects of mobile phone radiation, especially oxidative stress

--Leaf Cluster 22 (127)

Theme - Effects of radiofrequency radiation, especially from mobile phones, on rats

Titles

Effects of electromagnetic field produced by mobile phones on the oxidant and antioxidant status of rats.

Nanometer-scale elongation rate fluctuations in the *Myriophyllum aquaticum* (Parrot feather) stem were altered by radio-frequency electromagnetic radiation.

Nanometer-scale elongation rate fluctuations in the *Myriophyllum aquaticum* (Parrot feather) stem were altered by radio-frequency electromagnetic radiation.

The effect of electromagnetic radiation in the mobile phone range on the behaviour of the rat.

Radio frequency electromagnetic radiation (RF-EMR) from GSM (0.9/1.8GHz) mobile phones induces oxidative stress and reduces sperm motility in rats.

The effects of radiofrequency electromagnetic radiation on sperm function.

Effects of folic acid on rat kidney exposed to 900 MHz electromagnetic radiation.

[Experimental justification of possible mechanisms of action of low intensity electromagnetic radiation (EMR) on animals' behavior].

Modulation of mammalian immunity by electromagnetic radiation.

Recent reports of Wi-Fi and mobile phone-induced radiation on oxidative stress and reproductive signaling pathways in females and males.

The radioprotective effects of *Moringa oleifera* against mobile phone electromagnetic radiation-induced infertility in rats.

Protective Effects of Zinc on 2.45 GHz Electromagnetic Radiation-Induced Oxidative Stress and Apoptosis in HEK293 Cells.

Long-term exposure to 4G smartphone radiofrequency electromagnetic radiation diminished male reproductive potential by directly disrupting Spock3-MMP2-BTB axis in the testes of adult rats.

The effect of pulsed electromagnetic radiation from mobile phone on the levels of monoamine neurotransmitters in four different areas of rat brain.

Long-term exposure of 2450MHz electromagnetic radiation induces stress and anxiety like behavior in rats.

The impact of electromagnetic radiation (2.45 GHz, Wi-Fi) on the female reproductive system: The role of vitamin C.

Electromagnetic radiation influence on nonlinear charge and energy transport in biosystems.

900 MHz radiofrequency-induced histopathologic changes and oxidative stress in rat endometrium: protection by vitamins E and C.

Probing the Origins of 1,800 MHz Radio Frequency Electromagnetic Radiation Induced Damage in Mouse Immortalized Germ Cells and Spermatozoa in vitro.

Effects of the exposure to mobile phones on male reproduction: a review of the literature.

Neurobiological effects of microwave exposure: a review focused on morphological findings in experimental animals.

Impact of 2.45 GHz microwave radiation on the testicular inflammatory pathway biomarkers in young rats: The role of gallic acid.

Liver antioxidant stores protect the brain from electromagnetic radiation (900 and 1800 MHz)-induced oxidative stress in rats during pregnancy and the development of offspring.

Effects of electromagnetic radiation from a cellular telephone on epidermal Merkel cells.

Effects of electromagnetic radiation from a cellular telephone on the oxidant and antioxidant levels in rabbits.

Electromagnetic radiation 2450 MHz exposure causes cognition deficit with mitochondrial dysfunction and activation of intrinsic pathway of apoptosis in rats.

Protective effects of beta-glucan against oxidative injury induced by 2.45-GHz electromagnetic radiation in the skin tissue of rats.

[Possible modification of radiation injury using radio frequency electromagnetic radiation].

[Role of phospholipase A2 and epoxygenase in inhibition of respiration burst in neutrophils by low intensity radiation of extremely high frequency].

Effects of acute and chronic exposure to both 900 MHz and 2100 MHz electromagnetic radiation on glutamate receptor signaling pathway.

Behavior and memory evaluation of Wistar rats exposed to 1.8 GHz radiofrequency electromagnetic radiation.

[Biological effects of electromagnetic radiation of extremely high frequencies combined with physiologically active compounds].

Non-ionizing electromagnetic radiation and cancer--is there a relationship?

Benefits and hazards of electromagnetic waves, telecommunication, physical and biomedical: a review.

[Suppression of nonspecific resistance of the body under the effect of extremely high frequency electromagnetic radiation of low intensity].

The impact of exposure of diabetic rats to 900 MHz electromagnetic radiation emitted from mobile phone antenna on hepatic oxidative stress.

Analysis of emotionality and locomotion in radio-frequency electromagnetic radiation exposed rats.

[Effects of extremely high-frequency electromagnetic radiation on the immune system and systemic regulation of homeostasis].

Challenging cell phone impact on reproduction: a review.

Radiofrequency electromagnetic radiation-induced behavioral changes and their possible basis.

Selenium reduces mobile phone (900 MHz)-induced oxidative stress, mitochondrial function, and apoptosis in breast cancer cells.

[Electromagnetic radiations from computer video terminals and their effect on health].

Mobile phone radiation induces reactive oxygen species production and DNA damage in human spermatozoa in vitro.

[FEATURES OF MODIFYING EFFECT OF LOW-INTENSITY ELECTROMAGNETIC RADIATION OF NATURAL AND TECHNOGENIC ORIGIN ON VIABILITY AND FUNCTIONAL STATUS OF NEUTROPHILIC GRANULOCYTES].

Effects of electromagnetic radiation from a cellular phone on human sperm motility: an in vitro study.

[Intracellular regeneration of adrenocorticocytes in response to the prophylactic application of low-intensity electromagnetic radiation under the conditions of radiation (an experimental study)].

Electromagnetic radiation--parameters for risk assessment.

Effect of 1.8 GHz radiofrequency electromagnetic radiation on novel object associative recognition memory in mice.

[Epidemiologic studies of the effect of microwaves (neurophysiologic, hematologic and ophthalmologic aspects)].



[The activity of prooxidant-antioxidant system in loach embryos under the action of microwave radiation].

The effects of electromagnetic radiation (2450 MHz wireless devices) on the heart and blood tissue: role of melatonin.

Immune responses of a wall lizard to whole-body exposure to radiofrequency electromagnetic radiation.

Features of anti-inflammatory effects of modulated extremely high-frequency electromagnetic radiation.

Effect of exposure and withdrawal of 900-MHz-electromagnetic waves on brain, kidney and liver oxidative stress and some biochemical parameters in male rats.

Overproduction of free radical species in embryonal cells exposed to low intensity radiofrequency radiation.

Possible cause for altered spatial cognition of prepubescent rats exposed to chronic radiofrequency electromagnetic radiation.

Polarization: A Key Difference between Man-made and Natural Electromagnetic Fields, in regard to Biological Activity.

Exposure to acute electromagnetic radiation of mobile phone exposure range alters transiently skin homeostasis of a model of pigmented reconstructed epidermis.

Structural and ultrastructural study of rat liver influenced by electromagnetic radiation.

[Effects of low-intensity electromagnetic radiation of extremely high frequency on the animal body within the framework of total low-dose x-ray irradiation].

[Metabolic and ultrastructural adaptation mechanisms during the primary prophylactic action of low-intensity electromagnetic radiation under normal and radiation conditions].

Exposure of tumor-bearing mice to extremely high-frequency electromagnetic radiation modifies the composition of fatty acids in thymocytes and tumor tissue.

The antioxidant effect of Green Tea Mega EGCG against electromagnetic radiation-induced oxidative stress in the hippocampus and striatum of rats.

The chronic effect of pulsed 1800 MHz electromagnetic radiation on amino acid neurotransmitters in three different areas of juvenile and young adult rat brain.

[Decrease in the intensity of the cellular immune response and nonspecific inflammation upon exposure to extremely high frequency electromagnetic radiation].

Electromagnetic radiation at 900 MHz induces sperm apoptosis through bcl-2, bax and caspase-3 signaling pathways in rats.

Model analysis of nonlinear modification of neutrophil calcium homeostasis under the influence of modulated electromagnetic radiation of extremely high frequencies.

Hippocampal lipidome and transcriptome profile alterations triggered by acute exposure of mice to GSM 1800 MHz mobile phone radiation: An exploratory study.

[The specific features of the development of metabolic and regenerative processes under the action of low-intensity electromagnetic radiation in radiation exposure conditions (an experimental study)].

Impact of electromagnetic radiation emitted by monitors on changes in the cellular membrane structure and protective antioxidant effect of vitamin A - In vitro study.

Mobile Phone Radiation: Physiological & Pathophysiological Considerations.

Fatty Acid Content and Tumor Growth Changes in Mice After Exposure to Extremely High-Frequency Electromagnetic Radiation and Consumption of N-3 Fatty Acids.

Disordered redox metabolism of brain cells in rats exposed to low doses of ionizing radiation or UHF electromagnetic radiation.

[Modulated extremely high frequency electromagnetic radiation of low intensity activates or inhibits respiratory burst in neutrophils depending on modulation frequency].

The role of fatty acids in anti-inflammatory effects of low-intensity extremely high-frequency electromagnetic radiation.

[Effect of low intensity pulse-modulated electromagnetic radiation on activity of alkaline phosphatase in blood serum].

The effect of electromagnetic radiation on the rat brain: an experimental study.

[Protective action of electromagnetic radiation (40.68 MHz) on *Saccharomyces cerevisiae* UCM Y-517].

Radiofrequency electromagnetic radiation exposure effects on amygdala morphology, place preference behavior and brain caspase-3 activity in rats.

[Influence of electromagnetic fields on the emotional behaviour of rats].

Testicular apoptosis and histopathological changes induced by a 2.45 GHz electromagnetic field.

[The application of low-intensity electromagnetic radiation under immobilization stress conditions (an experimental study)].

Extremely high-frequency electromagnetic radiation enhances neutrophil response to particulate agonists.

Inhibition by Egb761 of the effect of cellphone radiation on the male reproductive system.

Variations in amino acid neurotransmitters in some brain areas of adult and young male albino rats due to exposure to mobile phone radiation.

[Effect of radio-frequency electromagnetic radiation on physiological features of *Saccharomyces cerevisiae* strain UCM Y-517].

Variations of melatonin and stress hormones under extended shifts and radiofrequency electromagnetic radiation.

[Effect of radiofrequency range electromagnetic radiation on chemoreceptor structure].

Effects of intensive cell phone (Philips Genic 900) use on the rat kidney tissue.

Effects of prenatal and postnatal exposure of Wi-Fi on development of teeth and changes in teeth element concentration in rats. [corrected].

Changes in mitochondrial functioning with electromagnetic radiation of ultra high frequency as revealed by electron paramagnetic resonance methods.

Effect of electromagnetic waves on human reproduction.

Effects of short-duration electromagnetic radiation on early postnatal neurogenesis in rats: Fos and NADPH-d histochemical studies.

[The effect of electromagnetic radiation on the monoamine oxidase A activity in the rat brain].

[Changes in the immune status under the influence of high-frequency electromagnetic radiation].

The effect of low frequency electromagnetic radiation on the morphology of dental and periodontal tissues (experimental investigation).

Structural and ultrastructural study of rat testes influenced by electromagnetic radiation.

[The combined action of drinking mineral water and low-intensity electromagnetic radiation under the immobilization stress conditions (an experimental study)].

Effects of low-intensity ultrahigh frequency electromagnetic radiation on inflammatory processes.

[Effect of Low-Intensity 900 MHz Frequency Electromagnetic Radiation on Rat Brain Enzyme Activities Linked to Energy Metabolism].

Adverse cutaneous effects of ionizing and non-ionizing electromagnetic radiation.

[The influence of electromagnetic radiation of industrial frequency on *Daphnia magna* (Straus)].

Effects of electromagnetic radiation from 3G mobile phone on heart rate, blood pressure and ECG parameters in rats.

[Mechanism of radiobiological effects of low intensity nonionizing electromagnetic radiation].

Transdermal patches loaded with L-cysteine HCL as a strategy for protection from mobile phone emitting electromagnetic radiation hazards.

Effect of delta-rhythm-modulated extremely high frequency electromagnetic radiation on rats.

[Effect of hypokinetic stress and low intensity electromagnetic field of extremely high frequency on changes of cytokine concentration in rat blood].

Non-ionizing electromagnetic radiations, emitted by a cellular phone, modify cutaneous blood flow.

Low frequency electromagnetic waves increase human sperm motility - A pilot study revealing the potent effect of 43 kHz radiation.

Biological effects of electromagnetic fields and radiation.

[Status quo of the researches on the biological effect of electromagnetic radiation on the testis and epididymal sperm].

[Effect of low intensity electromagnetic waves from cell phones on human health].

[Impact of cell phone radiation on male reproduction].

Mobile phones electromagnetic radiation and NAD(+)-dependent isocitrate dehydrogenase as a mitochondrial marker in asthenozoospermia.

Electromagnetic radiation emitted from video computer terminals.

[Effect of low intensity and very high frequency electromagnetic radiation on occupationally exposed personnel].

[Effects of electromagnetic radiation in metropolis environment on teenagers' electrocardiogram and blood cells].

Influence of electromagnetic radiation produced by mobile phone on some biophysical blood properties in rats.

[Influence of light and electromagnetic radiation of Sun on circadian rhythms of the total antioxidant capacity of human saliva in the North].

[Radar radiation damages sperm quality].

[Influence of electromagnetic radiation on toxicity of Vipera lebetina obtusa venom].

[On prevention of a combined impact of electromagnetic radiation and climatic/weather factors on worker's organism].

Propagation of electromagnetic radiation in mitochondria?

The effect of low level radiofrequency electromagnetic radiation on the excretion rates of stress hormones in operators during 24-hour shifts.

[Physical factors and stress].

[Effect of weak electromagnetic radiation on learning in the grain beetle *Tenebrio monitor*].

[Disturbances of glucose tolerance in workers exposed to electromagnetic radiation].

--Leaf Cluster 26 (129)

Theme - Oxidative stress effects from mobile phone radiofrequency radiation

Titles

Ginkgo biloba prevents mobile phone-induced oxidative stress in rat brain.

Mobile phone radiation-induced free radical damage in the liver is inhibited by the antioxidants N-acetyl cysteine and epigallocatechin-gallate.

The link between radiofrequencies emitted from wireless technologies and oxidative stress.

The protective effects of N-acetyl-L-cysteine and epigallocatechin-3-gallate on electric field-induced hepatic oxidative stress.

Modulation of wireless (2.45 GHz)-induced oxidative toxicity in laryngotracheal mucosa of rat by melatonin.

Effect of 900 MHz radiofrequency radiation on oxidative stress in rat brain and serum.

The protective effect of caffeic acid phenethyl ester (CAPE) on oxidative stress in rat liver exposed to the 900 MHz electromagnetic field.

Exposure to radiofrequency radiation induces oxidative stress in duckweed *Lemna minor* L.

The prophylactic effect of vitamin C on oxidative stress indexes in rat eyes following exposure to radiofrequency wave generated by a BTS antenna model.

Vitamin C protects rat cerebellum and encephalon from oxidative stress following exposure to radiofrequency wave generated by a BTS antenna model.

Effects of Electromagnetic Radiation Use on Oxidant/Antioxidant Status and DNA Turn-over Enzyme Activities in Erythrocytes and Heart, Kidney, Liver, and Ovary Tissues From Rats: Possible Protective Role of Vitamin C.

Long-term exposure to electromagnetic radiation from mobile phones and Wi-Fi devices decreases plasma prolactin, progesterone, and estrogen levels but increases uterine oxidative stress in pregnant rats and their offspring.

Oxidative stress and prevention of the adaptive response to chronic iron overload in the brain of young adult rats exposed to a 150 kilohertz electromagnetic field.

Effect of 900-, 1800-, and 2100-MHz radiofrequency radiation on DNA and oxidative stress in brain.

Melatonin reduces oxidative stress induced by chronic exposure of microwave radiation from mobile phones in rat brain.

Selenium supplementation ameliorates electromagnetic field-induced oxidative stress in the HEK293 cells.

Therapeutic approaches of melatonin in microwave radiations-induced oxidative stress-mediated toxicity on male fertility pattern of Wistar rats.

Effects of mobile phones on oxidant/antioxidant balance in cornea and lens of rats.

Effects of acute exposure to the radiofrequency fields of cellular phones on plasma lipid peroxide and antioxidase activities in human erythrocytes.

Exposure to static magnetic field of pregnant rats induces hepatic GSH elevation but not oxidative DNA damage in liver and kidney.

Effects of 837 and 1950 MHz radiofrequency radiation exposure alone or combined on oxidative stress in MCF10A cells.

Oxidative stress effects on the central nervous system of rats after acute exposure to ultra high frequency electromagnetic fields.

A cross-sectional study on oxidative stress in workers exposed to extremely low frequency electromagnetic fields.

Effects of melatonin on Wi-Fi-induced oxidative stress in lens of rats.

The effect of melatonin on the liver of rats exposed to microwave radiation.

Oxidative stress-mediated alterations on sperm parameters in male Wistar rats exposed to 3G mobile phone radiation.

Wi-Fi (2.45 GHz)- and mobile phone (900 and 1800 MHz)-induced risks on oxidative stress and elements in kidney and testis of rats during pregnancy and the development of offspring.

Effects of Low-Frequency Electromagnetic Field on Oxidative Stress in Selected Structures of the Central Nervous System.

Effect of low level microwave radiation exposure on cognitive function and oxidative stress in rats.

900 MHz pulse-modulated radiofrequency radiation induces oxidative stress on heart, lung, testis and liver tissues.

Exposure to mobile phone (900-1800 MHz) during pregnancy: tissue oxidative stress after childbirth.

The Effects of Melatonin on Oxidative Stress Parameters and DNA Fragmentation in Testicular Tissue of Rats Exposed to Microwave Radiation.

Exposure to cell phone induce oxidative stress in mice preantral follicles during in vitro cultivation: An experimental study.

[Effect of American Ginseng Capsule on the liver oxidative injury and the Nrf2 protein expression in rats exposed by electromagnetic radiation of frequency of cell phone].

Effects of acute electromagnetic field exposure and movement restraint on antioxidant system in liver, heart, kidney and plasma of Wistar rats: a preliminary report.

Effect of mobile phone exposure on apoptotic glial cells and status of oxidative stress in rat brain.

Effects of third generation mobile phone-emitted electromagnetic radiation on oxidative stress parameters in eye tissue and blood of rats.

Pathological Findings Observed in the Kidneys of Postnatal Male Rats Exposed to the 2100 MHz Electromagnetic Field.

Effects of exposure to 50 Hz electric field at different strengths on oxidative stress and antioxidant enzyme activities in the brain tissue of guinea pigs.

Melatonin modulates 900 Mhz microwave-induced lipid peroxidation changes in rat brain.

Biochemical modifications and neuronal damage in brain of young and adult rats after long-term exposure to mobile phone radiations.

The preventive effect of lotus seedpod procyanidins on cognitive impairment and oxidative damage induced by extremely low frequency electromagnetic field exposure.

900-MHz microwave radiation promotes oxidation in rat brain.

Influence of extremely-low-frequency magnetic field on antioxidative melatonin properties in AT478 murine squamous cell carcinoma culture.

2.45 GHz microwave irradiation-induced oxidative stress affects implantation or pregnancy in mice, *Mus musculus*.

In vitro free radical scavenging activities and effect of synthetic oligosaccharides on antioxidant enzymes and lipid peroxidation in aged mice.

The physiopathological effects of quercetin on oxidative stress in radiation of 4.5 g mobile phone exposed liver tissue of rat.

Assessment of oxidant/antioxidant status in saliva of cell phone users.

Effects of 900-MHz electromagnetic field emitted from cellular phone on brain oxidative stress and some vitamin levels of guinea pigs.

Chronic exposure to 50Hz magnetic fields causes a significant weakening of antioxidant defence systems in aged rat brain.

Effects of static magnetic field and cadmium on oxidative stress and DNA damage in rat cortex brain and hippocampus.

Melatonin protects rat thymus against oxidative stress caused by exposure to microwaves and modulates proliferation/apoptosis of thymocytes.

Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation.

The effects of N-acetylcysteine and epigallocatechin-3-gallate on liver tissue protein oxidation and antioxidant enzyme levels after the exposure to radiofrequency radiation.

Oxidative stress-mediated skin damage in an experimental mobile phone model can be prevented by melatonin.

Long term exposure to cell phone frequencies (900 and 1800 MHz) induces apoptosis, mitochondrial oxidative stress and TRPV1 channel activation in the hippocampus and dorsal root ganglion of rats.

Impacts of exposure to 900 MHz mobile phone radiation on liver function in rats.

Static magnetic field affects oxidative stress in mouse cochlea.

Effects of cell phone radiation on lipid peroxidation, glutathione and nitric oxide levels in mouse brain during epileptic seizure.

The effect of electromagnetic radiation emitted by display screens on cell oxygen metabolism - in vitro studies.

Effects of electromagnetic radiation produced by 3G mobile phones on rat brains: magnetic resonance spectroscopy, biochemical, and histopathological evaluation.

Role of Mitochondria in the Oxidative Stress Induced by Electromagnetic Fields: Focus on Reproductive Systems.

Effect of selenium pre-treatment on plasma antioxidant vitamins A (retinol) and E (alpha-tocopherol) in static magnetic field-exposed rats.

Effect of cell phone use on salivary total protein, enzymes and oxidative stress markers in young adults: a pilot study.

Radiofrequency radiation emitted from Wi-Fi (2.4 GHz) causes impaired insulin secretion and increased oxidative stress in rat pancreatic islets.

[Corrective effects of electromagnetic radiation in a millimeter wavelength range on the parameters of oxidative stress after standard anti-helicobacterial therapy in patients with ulcer disease].

Oxidative effects of extremely low frequency magnetic field and radio frequency radiation on testes tissues of diabetic and healthy rats.



Investigation of the effects of distance from sources on apoptosis, oxidative stress and cytosolic calcium accumulation via TRPV1 channels induced by mobile phones and Wi-Fi in breast cancer cells.

Radiofrequency electromagnetic radiation from cell phone causes defective testicular function in male Wistar rats.

Effect of 950 MHz UHF electromagnetic radiation on biomarkers of oxidative damage, metabolism of UFA and antioxidants in the livers of young rats of different ages.

The influence of microwave radiation from cellular phone on fetal rat brain.

Effects of chronic exposure to 950 MHz ultra-high-frequency electromagnetic radiation on reactive oxygen species metabolism in the right and left cerebral cortex of young rats of different ages.

Effects of radiofrequency electromagnetic wave exposure from cellular phones on the reproductive pattern in male Wistar rats.

Radiations and male fertility.

Electromagnetic radiation (Wi-Fi) and epilepsy induce calcium entry and apoptosis through activation of TRPV1 channel in hippocampus and dorsal root ganglion of rats.

Immunohistopathologic demonstration of deleterious effects on growing rat testes of radiofrequency waves emitted from conventional Wi-Fi devices.

[Effect of electromagnetic field produced by mobile phones on the activity of superoxide dismutase (SOD-1) and the level of malonyldialdehyde (MDA)--in vitro study].

[Effects of extremely low frequency electromagnetic field and its combination with lead on the antioxidant system in mouse].

Mobile phone (1800MHz) radiation impairs female reproduction in mice, *Mus musculus*, through stress induced inhibition of ovarian and uterine activity.

[Interference of vitamin E on the brain tissue damage by electromagnetic radiation of cell phone in pregnant and fetal rats].

Evaluation of genotoxic effects in male Wistar rats following microwave exposure.

1800 MHz mobile phone irradiation induced oxidative and nitrosative stress leads to p53 dependent Bax mediated testicular apoptosis in mice, *Mus musculus*.

The 2100MHz radiofrequency radiation of a 3G-mobile phone and the DNA oxidative damage in brain.

[On the mechanism of cytogenetic effect of electromagnetic radiation: a role of oxidation homeostasis].

Neuroprotective effects of dietary supplement Kang-fu-ling against high-power microwave through antioxidant action.

Effect of extremely low frequency magnetic field on antioxidant activity in plasma and red blood cells in spot welders.

Antioxidants alleviate electric field-induced effects on lung tissue based on assays of heme oxygenase-1, protein carbonyl content, malondialdehyde, nitric oxide, and hydroxyproline.

Cell phone electromagnetic field radiations affect rhizogenesis through impairment of biochemical processes.

GSM base station electromagnetic radiation and oxidative stress in rats.

The Effects of Cell Phone Waves (900 MHz-GSM Band) on Sperm Parameters and Total Antioxidant Capacity in Rats.

Extremely low frequency electromagnetic field reduces oxidative stress during the rehabilitation of post-acute stroke patients.

Evaluation of selected biochemical parameters in the saliva of young males using mobile phones.

Protein oxidation under extremely low frequency electric field in guinea pigs. Effect of N-acetyl-L-cysteine treatment.

Selenium supplementation ameliorates static magnetic field-induced disorders in antioxidant status in rat tissues.

In vitro effects of 50 Hz magnetic fields on oxidatively damaged rabbit red blood cells.

[Protective effect of Liuweidihuang Pills against cellphone electromagnetic radiation-induced histomorphological abnormality, oxidative injury, and cell apoptosis in rat testes].

The impact of electromagnetic radiation of different parameters on platelet oxygen metabolism - in vitro studies.

Melatonin attenuates radiofrequency radiation (900 MHz)-induced oxidative stress, DNA damage and cell cycle arrest in germ cells of male Swiss albino mice.

The effect of 50 hz magnetic field of different shape on oxygen metabolism in blood platelets: in vitro studies.

[Protective effect of melatonin and vitamin E against prooxidative action of iron ions and static magnetic field].

The role of zinc supplementation in the inhibition of tissue damage caused by exposure to electromagnetic field in rat lung and liver tissues.

The influence of 1800 MHz GSM-like signals on hepatic oxidative DNA and lipid damage in nonpregnant, pregnant, and newly born rabbits.

Effect of rosmarinic acid on sertoli cells apoptosis and serum antioxidant levels in rats after exposure to electromagnetic fields.

Effects of electromagnetic radiation exposure on bone mineral density, thyroid, and oxidative stress index in electrical workers.

[Electromagnetic radiation of the terahertz range at the nitric oxide frequency in correction and prophylaxis of functional activity disorders in thrombocytes of white rats under long-term stress].

Wi-Fi is an important threat to human health.

The influence of 1800 MHz GSM-like signals on blood chemistry and oxidative stress in non-pregnant and pregnant rabbits.

[Effect of electromagnetic field produced by mobile phones on the activity of superoxide dismutase (SOD-1)--in vitro researches].

[Effects of nano-selenium on cognition performance of mice exposed in 1800 MHz radiofrequency fields].

Mobile phone usage and male infertility in Wistar rats.

Evidence of oxidative stress in American kestrels exposed to electromagnetic fields.

[Use of terahertz electromagnetic radiation at nitric oxide frequencies for the correction of thyroid functional state during stress].

Correction of microcirculatory disturbances with terahertz electromagnetic radiation at nitric oxide frequencies in albino rats under conditions of acute stress.

The effect of Wi-Fi electromagnetic waves on neuronal response properties in rat barrel cortex.

Electromagnetic wave emitting products and "Kikoh" potentiate human leukocyte functions.

[Influence of 900 MHz frequency electromagnetic radiation on some blood indices].

Effects of electromagnetic waves emitted from 3G+wi-fi modems on human semen analysis.

Reactive oxygen species elevation and recovery in Drosophila bodies and ovaries following short-term and long-term exposure to DECT base EMF.

[PARAMETERS OF SPERMATOGENESIS IN MEN EXPOSED TO DIFFICULT ENVIRONMENTS].

Metal, EMF, and brain energy metabolism.

[Changes in the functional state of rat liver and kidney mitochondria under the effect of electromagnetic fields].

[Effect of low-intensity 900 MHz frequency electromagnetic radiation on rat liver and blood serum enzyme activities].

Ultra-wideband pulses increase nitric oxide production by RAW 264.7 macrophages incubated in nitrate.

[Some regularities of morphological changes in liver tissue exposed to electricity].

Microwave effects on immobilized peroxidase chemiluminescence.

Sympathetic Resonance Technology: scientific foundation and summary of biologic and clinical studies.

Examination of electric field effects on tissues by using back propagation neural network.

A novel method to estimate changes in stress-induced salivary alpha-amylase using heart rate variability and respiratory rate, as measured in a non-contact manner using a single radar attached to the back of a chair.

Effects of new Phoneutria spider toxins on glutamate release and  $[Ca^{2+}]_i$  in rat cortical synaptosomes.

--Leaf Cluster 37 (140)

Theme - Effect of radiofrequency exposure, especially prenatal exposure, on rats

Titles

Maternal exposure to a continuous 900-MHz electromagnetic field provokes neuronal loss and pathological changes in cerebellum of 32-day-old female rat offspring.

The effects of prenatal exposure to a 900-MHz electromagnetic field on the 21-day-old male rat heart.

The effects of exposure to electromagnetic field on rat myocardium.

900 MHz electromagnetic field exposure affects qualitative and quantitative features of hippocampal pyramidal cells in the adult female rat.

The effect of prenatal exposure to 1800 MHz electromagnetic field on calcineurin and bone development in rats.

Exposure to a 900 MHz electromagnetic field for 1 hour a day over 30 days does change the histopathology and biochemistry of the rat testis.

Effects of a unique electromagnetic field system on the fertility of rats.

Protective effects of luteolin on rat testis following exposure to 900 MHz electromagnetic field.

Evaluation of testicular degeneration induced by low-frequency electromagnetic fields.

Maternal mobile phone exposure alters intrinsic electrophysiological properties of CA1 pyramidal neurons in rat offspring.

Electromagnetic fields promote severe and unique vascular calcification in an animal model of ectopic calcification.

Effects of exposure to electromagnetic field (1.8/0.9 GHz) on testicular function and structure in growing rats.

The effects of prenatal long-duration exposure to 900-MHz electromagnetic field on the 21-day-old newborn male rat liver.

Common behaviors alterations after extremely low-frequency electromagnetic field exposure in rat animal model.

Pathological effects of prenatal exposure to a 900 MHz electromagnetic field on the 21-day-old male rat kidney.

Deleterious impacts of a 900-MHz electromagnetic field on hippocampal pyramidal neurons of 8-week-old Sprague Dawley male rats.

Pernicious effects of long-term, continuous 900-MHz electromagnetic field throughout adolescence on hippocampus morphology, biochemistry and pyramidal neuron numbers in 60-day-old Sprague Dawley male rats.

The effect of exposure of rats during prenatal period to radiation spreading from mobile phones on renal development.

Effects of extremely low frequency electromagnetic fields (100μT) on behaviors in rats.

Biological and morphological effects on the reproductive organ of rats after exposure to electromagnetic field.

An evaluation of the effects of long-term cell phone use on the testes via light and electron microscope analysis.

Effects of 900-MHz electromagnetic fields exposure throughout middle/late adolescence on the kidney morphology and biochemistry of the female rat.

Effects of electromagnetic field (1.8/0.9 GHz) exposure on growth plate in growing rats.

Effects of low-intensity electromagnetic fields on behavioral activity of rats.

Anxiety-like behavioural effects of extremely low-frequency electromagnetic field in rats.

Biochemical and pathological changes in the male rat kidney and bladder following exposure to continuous 900-MHz electromagnetic field on postnatal days 22-59.

The effects of an electromagnetic field on the boundary tissue of the seminiferous tubules of the rat: A light and transmission electron microscope study.

The effect of prenatal exposure to 900-MHz electromagnetic field on the 21-old-day rat testicle.

Testicular development evaluation in rats exposed to 60 Hz and 1 mT electromagnetic field.

Effect of electromagnetic irradiation produced by 3G mobile phone on male rat reproductive system in a simulated scenario.

Lasting hepatotoxic effects of prenatal mobile phone exposure.

Nonthermal effects of lifelong high-frequency electromagnetic field exposure on social memory performance in rats.

Effects of prenatal 900 MHz electromagnetic field exposures on the histology of rat kidney.

Neuroprotective effects of melatonin and omega-3 on hippocampal cells prenatally exposed to 900 MHz electromagnetic fields.

Microwave exposure affecting reproductive system in male rats.

Morphological and antioxidant impairments in the spinal cord of male offspring rats following exposure to a continuous 900MHz electromagnetic field during early and mid-adolescence.

Whole-body microwave exposure emitted by cellular phones and testicular function of rats.

Purkinje cell number decreases in the adult female rat cerebellum following exposure to 900 MHz electromagnetic field.

Effect of electromagnetic waves from mobile phone on immune status of male rats: possible protective role of vitamin D.

Changes in antioxidant capacity of blood due to mutual action of electromagnetic field (1800 MHz) and opioid drug (tramadol) in animal model of persistent inflammatory state.

Evaluation of hormonal change, biochemical parameters, and histopathological status of uterus in rats exposed to 50-Hz electromagnetic field.

Stress-related endocrinological and psychopathological effects of short- and long-term 50Hz electromagnetic field exposure in rats.

Impact of microwave at X-band in the aetiology of male infertility.

The effect on rat thymocytes of the simultaneous in vivo exposure to 50-Hz electric and magnetic field and to continuous light.

Effects on rat testis of 1.95-GHz W-CDMA for IMT-2000 cellular phones.

Disruption of the ovarian follicle reservoir of prepubertal rats following prenatal exposure to a continuous 900-MHz electromagnetic field.

Influence of electromagnetic field (1800 MHz) on lipid peroxidation in brain, blood, liver and kidney in rats.

[Effect of Guilingji Capsule on the fertility, liver functions, and serum LDH of male SD rats exposed by 900 mhz cell phone].

Zinc supplementation ameliorates electromagnetic field-induced lipid peroxidation in the rat brain.

A histopathological and biochemical evaluation of oxidative injury in the sciatic nerves of male rats exposed to a continuous 900-megahertz electromagnetic field throughout all periods of adolescence.

Effects of short-term exposure to powerline-frequency electromagnetic field on the electrical activity of the heart.

Altered operant behavior of adult rats after perinatal exposure to a 60-Hz electromagnetic field.

[Autoimmune processes after long-term low-level exposure to electromagnetic fields (the results of an experiment). Part 5. Impact of the blood serum from rats exposed to low-level electromagnetic fields on pregnancy, foetus and offspring development of intact female rats].

The effects of long-term exposure to a 2450 MHz electromagnetic field on growth and pubertal development in female Wistar rats.

Effects of mobile phone radiation on serum testosterone in Wistar albino rats.

Effects of exposure to 2100MHz GSM-like radiofrequency electromagnetic field on auditory system of rats.

Maternal mobile phone exposure adversely affects the electrophysiological properties of Purkinje neurons in rat offspring.

[Female genital toxicities of high-frequency electromagnetic field on rats].

Effects of exposure to electromagnetic field from mobile phone on serum hepcidin and iron status in male albino rats.

[State of the reproductive system in male rats of 1st generation obtained from irradiated parents and exposed to electromagnetic radiation (897 MHz) during embryogenesis and postnatal development].

The effects of microwave emitted by cellular phones on ovarian follicles in rats.

Effects of prenatal exposure to a 900 MHz electromagnetic field on the dentate gyrus of rats: a stereological and histopathological study.

Effect of Modified Wuzi Yanzong Pill ( ) on Tip60-Mediated Apoptosis in Testis of Male Rats after Microwave Radiation.

Influence of electromagnetic fields on reproductive system of male rats.

Effect of 910-MHz electromagnetic field on rat bone marrow.

Effects of electromagnetic radiation exposure on stress-related behaviors and stress hormones in male wistar rats.

Chronic prenatal exposure to the 900 megahertz electromagnetic field induces pyramidal cell loss in the hippocampus of newborn rats.

Effect of short duration electromagnetic field exposures on rat mass.

Hypospermatogenesis and spermatozoa maturation arrest in rats induced by mobile phone radiation.

[The delayed effects of modulated and non-modulated electromagnetic field on epileptiform activity in rats].

Effect of extremely low frequency electromagnetic field on brain histopathology of Caspian Sea Cyprinus carpio.

Effects of chronic exposure to electromagnetic waves on the auditory system.

Influence of a 60 Hz, 3 microT, electromagnetic field on the somatic maturation of wistar rat offspring fed a regional basic diet during pregnancy.

The effect of extremely low-frequency electromagnetic fields on skin and thyroid amine- and peptide-containing cells in rats: an immunohistochemical and morphometrical study.

Effects of the electromagnetic field, 60 Hz, 3 microT, on the hormonal and metabolic regulation of undernourished pregnant rats.

[Early and Delayed Effects of Radio Frequency Electromagnetic Fields on the Reproductive Function and Functional Status of the Offspring of Experimental Animals].

The effects of electromagnetic waves emitted by the cell phones on the testicular tissue.

2.1 GHz electromagnetic field does not change contractility and intracellular  $\text{Ca}^{2+}$  transients but decreases beta-adrenergic responsiveness through nitric oxide signaling in rat ventricular myocytes.

The influence of electromagnetic radiation generated by a mobile phone on the skeletal system of rats.

Inhibitory effects of low doses of melatonin on induction of preneoplastic liver lesions in a medium-term liver bioassay in F344 rats: relation to the influence of electromagnetic near field exposure.

Effects of cellular phone emissions on sperm motility in rats.

[The physiological mechanisms of the regulation of zoosocial behavior in rats exposed to low-frequency electromagnetic fields].

The therapeutic effect of a pulsed electromagnetic field on the reproductive patterns of male Wistar rats exposed to a 2.45-GHz microwave field.

Postnatal development and behavior effects of in-utero exposure of rats to radiofrequency waves emitted from conventional WiFi devices.



Effects of prenatal exposure to WIFI signal (2.45GHz) on postnatal development and behavior in rat: Influence of maternal restraint.

Effect of Electromagnetic Waves from Mobile Phones on Spermatogenesis in the Era of 4G-LTE.

Exposure to radio-frequency electromagnetic waves alters acetylcholinesterase gene expression, exploratory and motor coordination-linked behaviour in male rats.

Post-continuous whole body exposure of rabbits to 650 MHz electromagnetic fields: effects on liver, spleen, and brain.

Effect of low-intensity extremely high frequency radiation on reproductive function in wistar rats.

[The neurotropic effects of low-intensity electromagnetic waves in rats with different typological characteristics of higher nervous activity].

[The progeny of male rats subjected to chronic exposure to a permanent magnetic field].

The influence of electric field exposure on bone growth and fracture repair in rats.

Effects of pulsed and sinusoidal electromagnetic fields on MMP-2, MMP-9, collagen type IV and E-cadherin expression levels in the rat kidney: an immunohistochemical study.

[Study on effects of bioelectric parameters of rats in electromagnetic radiation of HV transmission line].

Effect of chronic exposure to cellular telephone electromagnetic fields on hearing in rats.

[Bioeffects of chronic exposure to radiofrequency electromagnetic fields of low intensity (standardization strategy)].

[cts of prenatal exposure of 850-1900MHz mobile phone on the expression of PCNA and DCX in dentate gyrus of offspring rats].

Short-Term Exposure to Electromagnetic Fields Generated by Mobile Phone Jammers Decreases the Fasting Blood Sugar in Adult Male Rats.

Learning ability of young rats is unaffected by repeated exposure to a static electromagnetic field in early life.

Effects of exposure to electromagnetic field radiation (EMFR) generated by activated mobile phones on fasting blood glucose.

Histological characteristics of cutaneous and thyroid mast cell populations in male rats exposed to power-frequency electromagnetic fields.

Neural and behavioral teratological evaluation of rats exposed to ultra-wideband electromagnetic fields.

Effect of 50-Hz electromagnetic field on the retention of toxic radionuclides in rat tissues.

Influence of electromagnetic fields on bone mass and growth in developing rats: a morphometric, densitometric, and histomorphometric study.

[Cellphone electromagnetic radiation damages the testicular ultrastructure of male rats].

Effect of the pulsed electromagnetic field on the release of inflammatory mediators from adipose-derived stem cells (ADSCs) in rats.

Prevention of mobile phone induced skin tissue changes by melatonin in rat: an experimental study.

[The effects of extremely low frequency electromagnetic field exposure on the pH of the adult male semen and the motricity parameters of spermatozoa in vitro].

Congenital anomalies in the offspring of rats after exposure of the testis to an electrostatic field.

Effect of a 1800 MHz electromagnetic field emitted during embryogenesis on chick development and hatchability.

[Systemic effects of the interaction of an organism and microwaves].

Prenatal exposure to non-ionizing radiation: effects of WiFi signals on pregnancy outcome, peripheral B-cell compartment and antibody production.

[Morphological structure of rat epiphysis exposed to electromagnetic radiation from communication devices].

The effects of microwave frequency electromagnetic fields on the development of *Drosophila melanogaster*.

Effects of low level electromagnetic field exposure at 2.45 GHz on rat cornea.

[Reaction of Reproductive System and Epididymal Spermatozoa .of Rats to Electromagnetic Radiation from Mobile Phone (1745 MHz) of Various Duration].

Excretion and tissue distribution of selenium following treatment of male F344 rats with benzylselenocyanate or sodium selenite.

[Immunomorphologic changes in the testes upon exposure to a microwave electromagnetic field].

Effects of 900 MHz electromagnetic field emitted by cellular phones on electrocardiograms of guinea pigs.

Effect of whole-body exposure to high-frequency electromagnetic field on the brain electrogeny in neurodefective and healthy mice.

Effect of Electromagnetic Wave on Bone Healing in Fixed and Unfixed Conditions.

Some immunological responses of common carp (*Cyprinus carpio*) fingerling to acute extremely low-frequency electromagnetic fields (50 Hz).

Effects of 60 Hz electromagnetic fields on early growth in three plant species and a replication of previous results.

Influence of 400, 900, and 1900 MHz electromagnetic fields on *Lemna minor* growth and peroxidase activity.

[Effect of fluctuating electromagnetic fields on the processes of growth and blastomogenesis].

Effects of broad band electromagnetic fields on HSP70 expression and ischemia-reperfusion in rat hearts.

[The effect of electromagnetic radiation in the millimeter range on the development of disorders in the liver induced by ether anesthesia (experimental research)].

Cell Phone Radiation Effect on Bone-to-Implant Osseointegration: A Preliminary Histologic Evaluation in Rabbits.

The Effects of Electromagnetic Fields Generated from 1800 MHz Cell Phones on Erythrocyte Rheological Parameters and Zinc Level in Rats.

[The biological activity of a decameter-range electromagnetic field with a frequency of 24 MHz].

[Effect of discontinuous short-wave electromagnetic field irradiation on the state of the endocrine glands].

Effects of microwaves (950 MHz mobile phone) on morphometric and apoptotic changes of rabbit epididymis.

Effect of high frequency electromagnetic wave stimulation on muscle injury in a rat model.

[Response to electricity in the muscles of rat's jaw].

Hematological and toxicogenomic effects of ferromagnetic screening of natural electromagnetic fields.

The effects of 910-MHz electromagnetic field on rat cranial arachnoid and dura mater collagen. The axial periodicity of collagen fibrils.

Effect of electromagnetic radiation modulated by biostructures on the course of alloxan-induced diabetes mellitus in rats.

[The interaction of changes in the genitalia in the pathogenesis of sterility in men].

[Evaluation of magnesium, zinc, copper and calcium levels in workers exposed to organic solvents, hydrogen cyanide and harmful physical factors].

Induction of macrophage migration inhibitory factor precedes the onset of acute tonsillitis.

--Leaf Cluster 38 (133)

Theme - Effect of radiofrequency radiation on rat brain

Titles

Effects of early-onset radiofrequency electromagnetic field exposure (GSM 900 MHz) on behavior and memory in rats.

Mobile phone radiation and the developing brain: behavioral and morphological effects in juvenile rats.

GFAP expression in the rat brain following sub-chronic exposure to a 900 MHz electromagnetic field signal.

Blood-brain barrier permeability and nerve cell damage in rat brain 14 and 28 days after exposure to microwaves from GSM mobile phones.

Effect of a chronic GSM 900 MHz exposure on glia in the rat brain.

Effect of mobile telephony on blood-brain barrier permeability in the fetal mouse brain.

Biochemical and histological studies on adverse effects of mobile phone radiation on rat's brain.

Blood-brain barrier and electromagnetic fields: effects of scopolamine methylbromide on working memory after whole-body exposure to 2.45 GHz microwaves in rats.

Effects of GSM modulated radio-frequency electromagnetic radiation on permeability of blood-brain barrier in male & female rats.

Effect of 900 MHz radio frequency radiation on beta amyloid protein, protein carbonyl, and malondialdehyde in the brain.

Histopathological examinations of rat brains after long-term exposure to GSM-900 mobile phone radiation.

Effects of GSM and UMTS mobile telephony signals on neuron degeneration and blood-brain barrier permeation in the rat brain.

Cognitive impairment in rats after long-term exposure to GSM-900 mobile phone radiation.

Genotoxic potential of 1.6 GHz wireless communication signal: in vivo two-year bioassay.

One-year, simultaneous combined exposure of CDMA and WCDMA radiofrequency electromagnetic fields to rats.

A confirmation study of Russian and Ukrainian data on effects of 2450 MHz microwave exposure on immunological processes and teratology in rats.

Long term and excessive use of 900 MHz radiofrequency radiation alter microRNA expression in brain.

Radio frequency radiation effects on protein kinase C activity in rats' brain.

Confirmation studies of Soviet research on immunological effects of microwaves: Russian immunology results.

Long-term effects of 900 MHz radiofrequency radiation emitted from mobile phone on testicular tissue and epididymal semen quality.

Nerve cell damage in mammalian brain after exposure to microwaves from GSM mobile phones.

Biological and morphological effects on the brain after exposure of rats to a 1439 MHz TDMA field.

Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8GHz GSM base station environmental emission.

8-Oxo-7, 8-dihydro-2'-deoxyguanosine as a biomarker of DNA damage by mobile phone radiation.

Glial markers and emotional memory in rats following acute cerebral radiofrequency exposures.

Histological and cytological examination of rat reproductive tissue after short-time intermittent radiofrequency exposure.

Acute exposure to GSM 900-MHz electromagnetic fields induces glial reactivity and biochemical modifications in the rat brain.

[Autoimmune processes after long-term low-level exposure to electromagnetic fields (the results of an experiment). Part 3. The effect of the long-term non-thermal RF EMF exposure on complement-fixation antibodies against homogenous tissue].

Effects of 2.4 GHz radiofrequency radiation emitted from Wi-Fi equipment on microRNA expression in brain tissue.

Blood-brain barrier disruption by continuous-wave radio frequency radiation.

Effect of long-term (2 years) exposure of mouse brains to global system for mobile communication (GSM) radiofrequency fields on astrocytic immunoreactivity.

Effect of long-term mobile communication microwave exposure on vascular permeability in mouse brain.

The effects of pulsed 860 MHz radiofrequency radiation on the promotion of neurogenic tumors in rats.

Micronucleus frequency in erythrocytes of mice after long-term exposure to radiofrequency radiation.

Fifty-gigahertz microwave exposure effect of radiations on rat brain.

The effect of chronic exposure to 835.62 MHz FDMA or 847.74 MHz CDMA radiofrequency radiation on the incidence of spontaneous tumors in rats.

Effect of an acute 900MHz GSM exposure on glia in the rat brain: a time-dependent study.

Does prolonged radiofrequency radiation emitted from Wi-Fi devices induce DNA damage in various tissues of rats?

The effect of radiofrequency radiation generated by a Global System for Mobile Communications source on cochlear development in a rat model.

Mutagenic response of 2.45 GHz radiation exposure on rat brain.

Effect of GSM-900 and -1800 signals on the skin of hairless rats. I: 2-hour acute exposures.

Long-term study of 435 MHz radio-frequency radiation on blood-borne end points in cannulated rats. Part II: methods, results, and summary.

Exposure to GSM 900 MHz electromagnetic fields affects cerebral cytochrome c oxidase activity.

GSM and DCS wireless communication signals: combined chronic toxicity/carcinogenicity study in the Wistar rat.

Evidence for mobile phone radiation exposure effects on reproductive pattern of male rats: role of ROS.

Microglial activation as a measure of stress in mouse brains exposed acutely (60 minutes) and long-term (2 years) to mobile telephone radiofrequency fields.

DNA damage in rat brain cells after in vivo exposure to 2450 MHz electromagnetic radiation and various methods of euthanasia.

Commentary on the utility of the National Toxicology Program study on cell phone radiofrequency radiation data for assessing human health risks despite unfounded criticisms aimed at minimizing the findings of adverse health effects.

Effect of in utero wi-fi exposure on the pre- and postnatal development of rats.

Cerebral radiofrequency exposures during adolescence: Impact on astrocytes and brain functions in healthy and pathologic rat models.

The effect of 2100 MHz radiofrequency radiation of a 3G mobile phone on the parotid gland of rats.

Expression of the water channel protein, aquaporin-4, in mouse brains exposed to mobile telephone radiofrequency fields.

Effects of mobile phone radiation (900 MHz radiofrequency) on structure and functions of rat brain.

Effects of 900 MHz radiofrequency on corticosterone, emotional memory and neuroinflammation in middle-aged rats.

Circadian rhythmicity of antioxidant markers in rats exposed to 1.8 GHz radiofrequency fields.

[Effects of electromagnetic pulse on blood-brain barrier permeability and tight junction proteins in rats].

Effects of head-only exposure of rats to GSM-900 on blood-brain barrier permeability and neuronal degeneration.

Effects of 900 MHz radiofrequency radiation on skin hydroxyproline contents.

Effects of gestational exposure to 1.95-GHz W-CDMA signals for IMT-2000 cellular phones: Lack of embryotoxicity and teratogenicity in rats.

In utero and early-life exposure of rats to a Wi-Fi signal: screening of immune markers in sera and gestational outcome.

The effect of radiofrequency radiation on DNA and lipid damage in female and male infant rabbits.

Effect of global system for mobile communication (gsm)-like radiofrequency fields on vascular permeability in mouse brain.

Does head-only exposure to GSM-900 electromagnetic fields affect the performance of rats in spatial learning tasks?

The effects of mobile phones on apoptosis in cerebral tissue: an experimental study on rats.

Survival and cancer in laboratory mammals exposed to radiofrequency energy.

The effects of simultaneous combined exposure to CDMA and WCDMA electromagnetic fields on rat testicular function.

Teratogenic effects of 27.12 MHz radiofrequency radiation in rats.

The effects of 860 MHz radiofrequency radiation on the induction or promotion of brain tumors and other neoplasms in rats.

Effect of long-term exposure of 2.4 GHz radiofrequency radiation emitted from Wi-Fi equipment on testes functions.

Effects of continuous low-level exposure to radiofrequency radiation on intrauterine development in rats.

Electromagnetic fields and the blood-brain barrier.

Effects of 20-MHz radiofrequency radiation on rat hematology, splenic function, and serum chemistry.

Effects of GSM-like radiofrequency irradiation during the oogenesis and spermiogenesis of *Xenopus laevis*.

Effects of mobile phone electromagnetic fields at nonthermal SAR values on melatonin and body weight of Djungarian hamsters (*Phodopus sungorus*).

Expression of the immediate early gene, c-fos, in fetal brain after whole of gestation exposure of pregnant mice to global system for mobile communication microwaves.

Electromagnetic field effect or simply stress? Effects of UMTS exposure on hippocampal longterm plasticity in the context of procedure related hormone release.

Effect of GSM-900 and -1800 signals on the skin of hairless rats. II: 12-week chronic exposures.

Exposure to cell phone radiofrequency changes corticotrophin hormone levels and histology of the brain and adrenal glands in male Wistar rat.

Neurodegenerative changes and apoptosis induced by intrauterine and extrauterine exposure of radiofrequency radiation.

Rat fertility and embryo fetal development: influence of exposure to the Wi-Fi signal.

Effects of prenatal and postnatal exposure to GSM-like radiofrequency on blood chemistry and oxidative stress in infant rabbits, an experimental study.

Heat shock protein induction in fetal mouse brain as a measure of stress after whole of gestation exposure to mobile telephony radiofrequency fields.

Micronucleus induction after whole-body microwave irradiation of rats.

Effects of GSM-Frequency Electromagnetic Radiation on Some Physiological and Biochemical Parameters in Rats.

Effects of simultaneous combined exposure to CDMA and WCDMA electromagnetic fields on serum hormone levels in rats.

The differential effects of 200, 591, and 2,450 MHz radiation on rat brain energy metabolism.

RAPD Profiling, DNA Fragmentation, and Histomorphometric Examination in Brains of Wistar Rats Exposed to Indoor 2.5 Ghz Wi-Fi Devices Radiation.

[Autoimmune processes after long-term low-level exposure to electromagnetic fields (the results of an experiment). Part 4. Manifestation of oxidative intracellular stress-reaction after long-term non-thermal EMF exposure of rats].

Exposure to an 890-MHz mobile phone-like signal and serum levels of S100B and transthyretin in volunteers.

Effects of electromagnetic radiation on spatial memory and synapses in rat hippocampal CA1.

Developmental toxicity interactions of salicylic acid and radiofrequency radiation or 2-methoxyethanol in rats.



The effect of radiofrequency radiation on DNA and lipid damage in non-pregnant and pregnant rabbits and their newborns.

Effect of Short-term 900 MHz low level electromagnetic radiation exposure on blood serotonin and glutamate levels.

Effect of electromagnetic pulse exposure on brain micro vascular permeability in rats.

Alteration of adaptive behaviors of progeny after maternal mobile phone exposure.

Survivability and long-term stress reactivity levels following repeated exposure to nuclear magnetic resonance imaging procedures in rats.

[Autoimmune processes after long-term low-level exposure to electromagnetic fields (the results of an experiment). Part 2. General scheme and conditions of the experiment. Development of RF exposure conditions complying with experimental tasks. Animal's status during the long-term exposure].

Multigenerational effects of whole body exposure to 2.14 GHz W-CDMA cellular phone signals on brain function in rats.

Detrimental effect of electromagnetic pulse exposure on permeability of in vitro blood-brain-barrier model.

Effects of exposure to electromagnetic field from 915 MHz radiofrequency identification system on circulating blood cells in the healthy adult rat.

[Effects of 2000  $\mu\text{W}/\text{cm}^2$ ; electromagnetic radiation on expression of immunoreactive protein and mRNA of NMDA receptor 2A subunit in rats hippocampus].

Effects of 1800-MHz radiofrequency fields on circadian rhythm of plasma melatonin and testosterone in male rats.

Effects of exposure of the ear to GSM microwaves: in vivo and in vitro experimental studies.

Age-Related Modulations of AQP4 and Caveolin-1 in the Hippocampus Predispose the Toxic Effect of Phoneutria nigriventer Spider Venom.

GSM radiation triggers seizures and increases cerebral c-Fos positivity in rats pretreated with subconvulsive doses of picrotoxin.

[Studies on the injury effects of hippocampus induced by high power microwave radiation in rat].

GSM-like radiofrequency exposure induces apoptosis via caspase-dependent pathway in infant rabbits.

Exposure to GSM 900-MHz mobile radiation impaired inhibitory avoidance memory consolidation in rat: Involvements of opioidergic and nitrgergic systems.

Electromagnetic pulse exposure induces overexpression of beta amyloid protein in rats.

Effects of intrauterine and extrauterine exposure to GSM-like radiofrequency on distortion product otoacoustic emissions in infant male rabbits.

Effects of whole-body exposure to 915 MHz RFID on secretory functions of the thyroid system in rats.

[The assessment of modulated radiofrequency electromagnetic radiation on cognitive function in rats of different ages].

Life-Time Dosimetric Assessment for Mice and Rats Exposed in Reverberation Chambers of the 2-Year NTP Cancer Bioassay Study on Cell Phone Radiation.

Exposure setup to study potential adverse effects at GSM 1800 and UMTS frequencies on the auditory systems of rats.

The effects of 2100-MHz radiofrequency radiation on nasal mucosa and mucociliary clearance in rats.

[A comparative histochemical study of cytochrome oxidase activity in the somatosensory and auditory brain centers in the normal rat and after exposure to superhigh-frequency electromagnetic fields].

Estimates of absorption of radiofrequency radiation by the embryo and fetus during pregnancy.

MRI gradient fields increase brain mannitol space.

The identification of an intensity 'window' on the bioeffects of mobile telephony radiation.

Effects of 7 Hz-modulated 450 MHz electromagnetic radiation on human performance in visual memory tasks.

Dataset on significant role of Candesartan on cognitive functions in rats having memory impairment induced by electromagnetic waves.

Effects of electromagnetic radiation on morphology and TGF-beta3 expression in mouse testicular tissue.

Effects of radiofrequency exposure on the GABAergic system in the rat cerebellum: clues from semi-quantitative immunohistochemistry.

Metabolomic study of urinary polyamines in rat exposed to 915 MHz radiofrequency identification signal.

An international project to confirm Soviet-era results on immunological and teratological effects of RF field exposure in Wistar rats and comments on Grigoriev et al. [2010].

Radiotelemetry and wildlife: Highlighting a gap in the knowledge on radiofrequency radiation effects.

Non-thermal continuous and modulated electromagnetic radiation fields effects on sleep EEG of rats.

The Radiofrequency Radiation Dosimetry Handbook: reminiscences.

Effects of acute exposure to ultrahigh radiofrequency radiation on three antenna engineers.

Bioeffects of mobile telephony radiation in relation to its intensity or distance from the antenna.

Mediastinal fibrosis and radiofrequency radiation exposure: is there an association?

Effects of GSM-like radiofrequency on distortion product otoacoustic emissions in pregnant adult rabbits.

[The biological action of physical factors in the critical periods of embryogenesis].

Fourth Level Cluster 84 (692)

Theme - Genotoxic effects of radiofrequency radiation

--Leaf Cluster 20 (126)

Theme - DNA damage after microwave radiation

Titles

Evaluation of basal DNA damage and oxidative stress in Wistar rat leukocytes after exposure to microwave radiation.

The effect of electromagnetic field exposure on the formation of DNA single strand breaks in human cells.

Measurement of DNA damage after exposure to 2450 MHz electromagnetic radiation.

Human fibroblasts and 900 MHz radiofrequency radiation: evaluation of DNA damage after exposure and co-exposure to 3-chloro-4-(dichloromethyl)-5-hydroxy-2(5h)-furanone (MX).

Electromagnetic noise inhibits radiofrequency radiation-induced DNA damage and reactive oxygen species increase in human lens epithelial cells.

Influence of 1.8-GHz (GSM) radiofrequency radiation (RFR) on DNA damage and repair induced by X-rays in human leukocytes in vitro.

DNA Damage of Lymphocytes in Volunteers after 4 hours Use of Mobile Phone.

Studying the synergistic damage effects induced by 1.8 GHz radiofrequency field radiation (RFR) with four chemical mutagens on human lymphocyte DNA using comet assay in vitro.

Effect of superposed electromagnetic noise on DNA damage of lens epithelial cells induced by microwave radiation.

[DNA damage and repair induced by acute exposure of microwave from mobile phone on cultured human lens epithelial cells].

Intermittent extremely low frequency electromagnetic fields cause DNA damage in a dose-dependent way.

50-Hertz electromagnetic fields induce gammaH2AX foci formation in mouse preimplantation embryos in vitro.

Measurement of DNA damage after acute exposure to pulsed-wave 2450 MHz microwaves in rat brain cells by two alkaline comet assay methods.

Single- and double-strand DNA breaks in rat brain cells after acute exposure to radiofrequency electromagnetic radiation.

Exposure to 1800 MHz radiofrequency electromagnetic radiation induces oxidative DNA base damage in a mouse spermatocyte-derived cell line.

Measurements of alkali-labile DNA damage and protein-DNA crosslinks after 2450 MHz microwave and low-dose gamma irradiation in vitro.

Electromagnetic fields and the induction of DNA strand breaks.

Age-related effects on induction of DNA strand breaks by intermittent exposure to electromagnetic fields.

[Influence of 1.8 GHz microwave on DNA damage induced by ultraviolet C ray].

Non-thermal DNA breakage by mobile-phone radiation (1800 MHz) in human fibroblasts and in transformed GFSH-R17 rat granulosa cells in vitro.

DNA and chromosomal damage in response to intermittent extremely low-frequency magnetic fields.

The toxic effects of mobile phone radiofrequency (940 MHz) on the structure of calf thymus DNA.

Melatonin and a spin-trap compound block radiofrequency electromagnetic radiation-induced DNA strand breaks in rat brain cells.

Effects of in vitro exposure to power frequency magnetic fields on UV-induced DNA damage of rat lymphocytes.

Evaluating the combinative effects on human lymphocyte DNA damage induced by ultraviolet ray C plus 1.8 GHz microwaves using comet assay in vitro.

[Influence of 1.8 GHz microwave on DNA damage induced by 4 chemical mutagens].

Induction of DNA strand breaks by intermittent exposure to extremely-low-frequency electromagnetic fields in human diploid fibroblasts.

60 Hz magnetic field exposure induces DNA crosslinks in rat brain cells.

Combined effects of 872 MHz radiofrequency radiation and ferrous chloride on reactive oxygen species production and DNA damage in human SH-SY5Y neuroblastoma cells.

8-oxoG DNA glycosylase-1 inhibition sensitizes Neuro-2a cells to oxidative DNA base damage induced by 900 MHz radiofrequency electromagnetic radiation.

Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure.

Radioprotective effects of honeybee venom (*Apis mellifera*) against 915-MHz microwave radiation-induced DNA damage in wistar rat lymphocytes: in vitro study.

Assessment of DNA sensitivity in peripheral blood leukocytes after occupational exposure to microwave radiation: the alkaline comet assay and chromatid breakage assay.

Assessment of genetic damage in peripheral blood of human volunteers exposed (whole-body) to a 200  $\mu$ T, 60 Hz magnetic field.

Acute exposure to a 60 Hz magnetic field increases DNA strand breaks in rat brain cells.

Influence of a static magnetic field (250 mT) on the antioxidant response and DNA integrity in THP1 cells.

Investigation of co-genotoxic effects of radiofrequency electromagnetic fields in vivo.

Evaluation of genotoxic effects in human leukocytes after in vitro exposure to 1950 MHz UMTS radiofrequency field.

Adaptive response in mouse bone-marrow stromal cells exposed to 900-MHz radiofrequency fields: Gamma-radiation-induced DNA strand breaks and repair.

Short-term exposure to 50 Hz ELF-EMF alters the cisplatin-induced oxidative response in AT478 murine squamous cell carcinoma cells.

Measurement of DNA damage and apoptosis in Molt-4 cells after in vitro exposure to radiofrequency radiation.

Electromagnetic fields and health: DNA-based dosimetry.

Combinative exposure effect of radio frequency signals from CDMA mobile phones and aphidicolin on DNA integrity.

Magnetic-field-induced DNA strand breaks in brain cells of the rat.

Genotoxicity of radiofrequency signals. I. Investigation of DNA damage and micronuclei induction in cultured human blood cells.

DNA repair after gamma irradiation in lymphocytes exposed to low-frequency pulsed electromagnetic fields.

Epinephrine, DNA integrity and oxidative stress in workers exposed to extremely low-frequency electromagnetic fields (ELF-EMFs) at 132 kV substations.

Measurement of DNA damage after exposure to electromagnetic radiation in the cellular phone communication frequency band (835.62 and 847.74 MHz).

Effect of Radiofrequency Radiation on Human Hematopoietic Stem Cells.

Mobile phone signal exposure triggers a hormesis-like effect in *Atm*(+/+) and *Atm*(-/-) mouse embryonic fibroblasts.

Evaluation of genotoxic effects in human fibroblasts after intermittent exposure to 50 Hz electromagnetic fields: a confirmatory study.

Single strand DNA breaks in rat brain cells exposed to microwave radiation.

DNA damage, cell kinetics and ODC activities studied in CBA mice exposed to electromagnetic fields generated by transmission lines.

Acute low-intensity microwave exposure increases DNA single-strand breaks in rat brain cells.

The effect of electromagnetic field exposure on the formation of DNA lesions.

Single-strand DNA breaks in human hair root cells exposed to mobile phone radiation.

Sensitivity of spiral ganglion neurons to damage caused by mobile phone electromagnetic radiation will increase in lipopolysaccharide-induced inflammation in vitro model.

Oxidative DNA damage in rats exposed to extremely low frequency electro magnetic fields.

Ataxia telangiectasia mutated deficiency does not result in genetic susceptibility to 50 Hz magnetic fields exposure in mouse embryonic fibroblasts.

[Effects of 2,450 MHz microwave on DNA damage induced by three chemical mutagens in vitro].

In vitro assessment of clastogenicity of mobile-phone radiation (835 MHz) using the alkaline comet assay and chromosomal aberration test.

Effects of pulsed electric fields on DNA of human lymphocytes.

[Blocking 1800 MHz mobile phone radiation-induced reactive oxygen species production and DNA damage in lens epithelial cells by noise magnetic fields].

Adaptive response in mice exposed to 900 MHz radiofrequency fields: primary DNA damage.

Exposure of mammalian cells to 60-Hz magnetic or electric fields: analysis for DNA single-strand breaks.

Impact of radio frequency electromagnetic radiation on DNA integrity in the male germline.

Effect of GSTM1 and GSTT1 Polymorphisms on Genetic Damage in Humans Populations Exposed to Radiation From Mobile Towers.

DNA damage induced in brain cells of CBA mice exposed to magnetic fields.

[Effects of GSM 1800 MHz radiofrequency electromagnetic fields on DNA damage in Chinese hamster lung cells].

Loss of transforming activity of plasmid DNA (pBR322) in *E. coli* caused by singlet molecular oxygen.

Decreased DNA repair rates and protection from heat induced apoptosis mediated by electromagnetic field exposure.

Cytotoxic and genotoxic effect in RTG-2 cell line exposed to selected biocides used in the disinfection of cooling towers.

Mobile phone specific electromagnetic fields induce transient DNA damage and nucleotide excision repair in serum-deprived human glioblastoma cells.

Adaptive response in mice exposed to 900 MHz radiofrequency fields: bleomycin-induced DNA and oxidative damage/repair.

14.6 mT ELF magnetic field exposure yields no DNA breaks in model system *Salmonella*, but provides evidence of heat stress protection.

Effect of Radiofrequency Radiation Emitted from 2G and 3G Cell Phone on Developing Liver of Chick Embryo - A Comparative Study.

Cell type-specific genotoxic effects of intermittent extremely low-frequency electromagnetic fields.

Biological effects of non-ionizing electromagnetic fields: Two sides of a coin.

Radiofrequency exposure and mammalian cell toxicity, genotoxicity, and transformation.

Studying the protein expression in human B lymphoblastoid cells exposed to 1.8-GHz (GSM) radiofrequency radiation (RFR) with protein microarray.

Mobile phone radiation induces mode-dependent DNA damage in a mouse spermatocyte-derived cell line: a protective role of melatonin.

An evaluation of genotoxicity in human neuronal-type cells subjected to oxidative stress under an extremely low frequency pulsed magnetic field.

Exposure of rat brain to 915 MHz GSM microwaves induces changes in gene expression but not double stranded DNA breaks or effects on chromatin conformation.

Radiofrequency (microwave) radiation exposure of mammalian cells during UV-induced DNA repair synthesis.

[Effect of low-intensity microwave of on mitomycin C-induced genotoxicity in vitro].

Effects of 1800 MHz RF-EMF exposure on DNA damage and cellular functions in primary cultured neurogenic cells.

Importance of DNA fragmentation in apoptosis with regard to TUNEL specificity.

Oxidative changes and apoptosis induced by 1800-MHz electromagnetic radiation in NIH/3T3 cells.

The genomic effects of cell phone exposure on the reproductive system.

Exposure to 1800 MHz radiofrequency radiation induces oxidative damage to mitochondrial DNA in primary cultured neurons.

Mitochondrial DNA damage and oxidative damage in HL-60 cells exposed to 900MHz radiofrequency fields.

Microwave miniprep of total genomic DNA from fungi, plants, protists and animals for PCR.

Exposure to 915 MHz radiation induces micronuclei in *Vicia faba* root tips.

[Pulse-modulated Electromagnetic Radiation of Extremely High Frequencies Protects Cellular DNA against Damaging Effect of Physico-Chemical Factors in vitro].

GSM 900 MHz cellular phone radiation can either stimulate or depress early embryogenesis in Japanese quails depending on the duration of exposure.

Microwaves from UMTS/GSM mobile phones induce long-lasting inhibition of 53BP1/gamma-H2AX DNA repair foci in human lymphocytes.

915 MHz microwaves and 50 Hz magnetic field affect chromatin conformation and 53BP1 foci in human lymphocytes from hypersensitive and healthy persons.

Synergism between electricity and ionizing radiation.

[Mechanisms of electromagnetic radiation damaging male reproduction].

Comments on "Radiofrequency electromagnetic fields (UMTS, 1,950 MHz) induce genotoxic effects in vitro in human fibroblasts but not in lymphocytes" by Schwarz et al. (Int Arch Occup Environ Health 2008; doi: 10.1007/s00420-008-0305-5).

Genotoxic effects of exposure to radiofrequency electromagnetic fields (RF-EMF) in HL-60 cells are not reproducible.

[Changes in the chromatin structure of lymphoid cells under the influence of low-intensity extremely high-frequency electromagnetic radiation against the background of inflammatory process].

Effect of 7 mT static magnetic field and iron ions on rat lymphocytes: apoptosis, necrosis and free radical processes.



[Cytophotometry of myelokaryocyte DNA following a single exposure to low-intensity UHF irradiation].

Genotoxicity of radiofrequency radiation. DNA/Genetox Expert Panel.

Effect of Mobile Phone Radiation on Cardiovascular Development of Chick Embryo.

Effects of gamma rays, ultraviolet radiation, sunlight, microwaves and electromagnetic fields on gene expression mediated by human immunodeficiency virus promoter.

Radiofrequency radiation (900 MHz)-induced DNA damage and cell cycle arrest in testicular germ cells in swiss albino mice.

Effect of exposure to 900 MHz radiofrequency radiation on intrachromosomal recombination in pKZ1 mice.

Evaluation of DNA damage in spinal cord and mutagenic effect of a Phalpa1beta recombinant toxin with analgesic properties from the Phoneutria nigriventer spider.

Microwaves from GSM mobile telephones affect 53BP1 and gamma-H2AX foci in human lymphocytes from hypersensitive and healthy persons.

Effects of co-exposure to extremely low frequency (ELF) magnetic fields and benzene or benzene metabolites determined in vitro by the alkaline comet assay.

Study of low-intensity 2450-MHz microwave exposure enhancing the genotoxic effects of mitomycin C using micronucleus test and comet assay in vitro.

Effects of radiofrequency electromagnetic waves (RF-EMW) from cellular phones on human ejaculated semen: an in vitro pilot study.

Oxidative and mutagenic effects of low intensity GSM 1800 MHz microwave radiation.

Effects of Long-Term Exposure to 60 GHz Millimeter-Wavelength Radiation on the Genotoxicity and Heat Shock Protein (Hsp) Expression of Cells Derived from Human Eye.

Investigation of potential genotoxic effects of low frequency electromagnetic fields on Escherichia coli.

[Impact of mobile phone radiation on the quality and DNA methylation of human sperm in vitro].

[Effects of low-intensity extremely high frequency electromagnetic radiation on chromatin structure of lymphoid cells in vivo and in vitro].

Characterisation of transcriptionally active and inactive chromatin domains in neurons.

Effect of microwave exposure on the ovarian development of Drosophila melanogaster.

Exposure to non-ionizing electromagnetic radiation of public risk prevention instruments threatens the quality of spermatozooids.

The biological effects of radiofrequency radiation: a critical review and recommendations.

Increase in the mitotic recombination frequency in *Drosophila melanogaster* by magnetic field exposure and its suppression by vitamin E supplement.

[Mechanisms of the combined effect of SHF electromagnetic radiation and hydrogen peroxide on the viability of microorganisms].

RNA-dependent DNA polymerase (reverse transcriptase) from avian myeloblastosis virus: a zinc metalloenzyme.

--Leaf Cluster 28 (100)

Theme - Chromosome damage in lymphocytes exposed to radiofrequency radiation

Titles

Chromosome damage and micronucleus formation in human blood lymphocytes exposed in vitro to radiofrequency radiation at a cellular telephone frequency (847.74 MHz, CDMA).

Cytogenetic studies in human blood lymphocytes exposed in vitro to 2.45 GHz or 8.2 GHz radiofrequency radiation.

Cytogenetic studies in human blood lymphocytes exposed in vitro to radiofrequency radiation at a cellular telephone frequency (835.62 MHz, FDMA).

Effects of modulated microwave radiation at cellular telephone frequency (1.95 GHz) on X-ray-induced chromosome aberrations in human lymphocytes in vitro.

Influence of radiofrequency radiation on chromosome aberrations in CHO cells and its interaction with DNA-damaging agents.

Increased levels of numerical chromosome aberrations after in vitro exposure of human peripheral blood lymphocytes to radiofrequency electromagnetic fields for 72 hours.

Comparison of chromosome aberrations in peripheral blood lymphocytes from people occupationally exposed to ionizing and radiofrequency radiation.

935 MHz cellular phone radiation. An in vitro study of genotoxicity in human lymphocytes.

Evaluation of genotoxic effects in human peripheral blood leukocytes following an acute in vitro exposure to 900 MHz radiofrequency fields.

Genetic damage in mammalian somatic cells exposed to radiofrequency radiation: a meta-analysis of data from 63 publications (1990-2005).

Mutagenic and morphologic impacts of 1.8GHz radiofrequency radiation on human peripheral blood lymphocytes (hPBLs) and possible protective role of pre-treatment with Ginkgo biloba (EGb 761).

Effects of 1-week and 6-week exposure to GSM/DCS radiofrequency radiation on micronucleus formation in B6C3F1 mice.

Influence of GSM signals on human peripheral lymphocytes: study of genotoxicity.

The repair of gamma-ray-induced chromosomal damage in human lymphocytes after exposure to extremely low frequency electromagnetic fields.

Exposure of human peripheral blood lymphocytes to electromagnetic fields associated with cellular phones leads to chromosomal instability.

Genetic damage in human cells exposed to non-ionizing radiofrequency fields: a meta-analysis of the data from 88 publications (1990-2011).

Incidence of micronuclei in human peripheral blood lymphocytes exposed to modulated and unmodulated 2450 MHz radiofrequency fields.

Effects of in vivo exposure to GSM-modulated 900 MHz radiation on mouse peripheral lymphocytes.

Clastogenic effects in human lymphocytes of power frequency electric fields: in vivo and in vitro studies.

Frequency of micronuclei in the blood and bone marrow cells of mice exposed to ultra-wideband electromagnetic radiation.

Micronucleus assay and lymphocyte mitotic activity in risk assessment of occupational exposure to microwave radiation.

Effect of nuclear magnetic resonance on chromosomes of mouse bone marrow cells.

In vitro lymphocyte proliferation induced by radio-frequency electromagnetic radiation under isothermal conditions.

Induction of adaptive response in human blood lymphocytes exposed to 900 MHz radiofrequency fields: influence of cell cycle.

Lymphocytes and low-frequency electromagnetic fields.

Chromosomal effects in lymphocytes of 400 kV-substation workers.

Effects of high-frequency electromagnetic fields on human lymphocytes in vitro.

Assessment of genotoxicity and genomic instability in rat primary astrocytes exposed to 872 MHz radiofrequency radiation and chemicals.

Increased chromatid-type chromosomal aberrations in mouse m5S cells exposed to power-line frequency magnetic fields.

Cytogenetic studies in human cells exposed in vitro to GSM-900 MHz radiofrequency radiation using R-banded karyotyping.

Genotoxic effects of 3 T magnetic resonance imaging in cultured human lymphocytes.

Age-dependent effects of in vitro radiofrequency exposure (mobile phone) on CD95+ T helper human lymphocytes.

Micronuclei in peripheral blood and bone marrow cells of mice exposed to 42 GHz electromagnetic millimeter waves.

Cytogenetic effects of 900 MHz (GSM) microwaves on human lymphocytes.

Radiofrequency electromagnetic fields (UMTS, 1,950 MHz) induce genotoxic effects in vitro in human fibroblasts but not in lymphocytes.

Elevated sister chromatid exchange frequencies in dividing human peripheral blood lymphocytes exposed to 50 Hz magnetic fields.

Chromosomal damage in human diploid fibroblasts by intermittent exposure to extremely low-frequency electromagnetic fields.

Micronuclei in the blood and bone marrow cells of mice exposed to specific complex time-varying pulsed magnetic fields.

Enhanced cytotoxic and genotoxic effects of gadolinium following ELF-EMF irradiation in human lymphocytes.

[Effects of electromagnetic radiation on health and immune function of operators].

[Chromosome abnormalities caused by computer video display monitors' radiation].

Effect of low-level pulsed electromagnetic fields on human chromosomes in vitro: analysis of chromosomal aberrations.

Effect of high-frequency electromagnetic fields with a wide range of SARs on chromosomal aberrations in murine m5S cells.

Cytogenetic effects of 935.2-MHz (GSM) microwaves alone and in combination with mitomycin C.

Effect of 900 MHz Electromagnetic Radiation on the Induction of ROS in Human Peripheral Blood Mononuclear Cells.

Analysis of chromosomal aberrations, sister chromatid exchanges and micronuclei among power linesmen with long-term exposure to 50-Hz electromagnetic fields.

A chromosomal study of workers with long-term exposure to radio-frequency radiation.

Induction of adaptive response in mice exposed to 900MHz radiofrequency fields: application of micronucleus assay.

Genetic damage in subjects exposed to radiofrequency radiation.

Investigation of the genotoxic effect of microwave irradiation in rat bone marrow cells: in vivo exposure.

[Effect of electromagnetic radiation on T-lymphocyte subpopulations and immunoglobulin level in human blood serum after occupational exposure].

Effects of low frequency electromagnetic fields on expression of lymphocyte subsets and production of cytokines of men and women employed in a museum.

Terahertz radiation increases genomic instability in human lymphocytes.

Cytogenetic damage in human lymphocytes following GSMK phase modulated microwave exposure.

Aneuploidy studies in human cells exposed in vitro to GSM-900 MHz radiofrequency radiation using FISH.

X-rays, microwaves and vinyl chloride monomer: their clastogenic and aneugenic activity, using the micronucleus assay on human lymphocytes.

[The effect of ultrahigh-frequency radiation on adaptation thresholds and the damages to blood system cells].

Erythropoietic changes in rats after 2.45 GJz nonthermal irradiation.

Cytogenetic observations in human peripheral blood leukocytes following in vitro exposure to THz radiation: a pilot study.

Effect of long-term 50 Hz magnetic field exposure on the micronucleated polychromatic erythrocytes of mice.

Interactive developmental toxicity of radiofrequency radiation and 2-methoxyethanol in rats.

Proflavin and microwave radiation: absence of a mutagenic interaction.

Effects of GSM-modulated 900 MHz radiofrequency electromagnetic fields on the hematopoietic potential of mouse bone marrow cells.

Follow up study on the immune response to low frequency electromagnetic fields in men and women working in a museum.

Adverse and beneficial effects in Chinese hamster lung fibroblast cells following radiofrequency exposure.

Cytogenetic effects of extremely low frequency magnetic field on Wistar rat bone marrow.

[Chromosome studies of personnel exposed to electromagnetic radiation at radar centers].

Evaluation of the cytogenotoxic damage in immature and mature rats exposed to 900 MHz radiofrequency electromagnetic fields.

Clastogenicity and aneuploidy in newborn and adult mice exposed to 50 Hz magnetic fields.

Effects of electromagnetic fields on the immune systems of occupationally exposed humans and mice.

954 MHz microwaves enhance the mutagenic properties of mitomycin C.

[Comparative effectiveness of different tests to determine the mutagenicity of certain factors in mammals. II. Frequency of anomalous sperm head in mice exposed to different factors].

Cytotoxic and genotoxic effects of high-frequency electromagnetic fields (GSM 1800 MHz) on immature and mature rats.

Interactions of radiofrequency radiation on 2-methoxyethanol teratogenicity in rats.

[The cytogenetic action of electromagnetic fields in the short-wave range].

In vitro fertilization of mouse ova by spermatozoa exposed isothermally to radio-frequency radiation.

Effect of Exposure to 900 MHz GSM Mobile Phone Radiofrequency Radiation on Estrogen Receptor Methylation Status in Colon Cells of Male Sprague Dawley Rats.

Adaptive response in mouse bone marrow stromal cells exposed to 900MHz radiofrequency fields: Impact of poly (ADP-ribose) polymerase (PARP).

Effects of electromagnetic fields produced by radiotelevision broadcasting stations on the immune system of women.

Assessment of radio-frequency electromagnetic radiation by the micronucleus test in bovine peripheral erythrocytes.

[Levels of immunoglobulin and subpopulations of T lymphocytes and NK cells in men occupationally exposed to microwave radiation in frequencies of 6-12 GHz].

Association of low job control with a decrease in memory (CD4+ CD45RO+) T lymphocytes in Japanese middle-aged male workers in an electric power plant.

Effects of extremely low-frequency electromagnetic fields on delayed chromosomal instability induced by bleomycin in normal human fibroblast cells.

[Proliferation of bone marrow cells upon exposure to constant magnetic fields of ultra-high strength].

The immune response of women with prolonged exposure to electromagnetic fields produced by radiotelevision broadcasting stations.

Acute exposure to 930 MHz CW electromagnetic radiation in vitro affects reactive oxygen species level in rat lymphocytes treated by iron ions.

The process of myelopoiesis in guinea pigs under conditions of a static magnetic field.

[Effect of electromagnetic radiation of millimetric wave band on genome of somatic cells].

Suppression of T-lymphocyte cytotoxicity following exposure to 60-Hz sinusoidal electric fields.

Reactive oxygen species formation and apoptosis in human peripheral blood mononuclear cell induced by 900 MHz mobile phone radiation.

Occupational exposure to high frequency electromagnetic fields and its effect on human immune parameters.

Does radio frequency radiation induce micronuclei frequency in exfoliated bladder cells of diabetic rats?

Radiofrequency radiation and the immune system. Part 3. In vitro effects on human immunoglobulin and on murine T- and B-lymphocytes.

Leukocyte trafficking in response to magnetic resonance imaging.

Combined effects of traffic and electromagnetic fields on the immune system of fertile atopic women.

Developmental toxicity interactions of methanol and radiofrequency radiation or 2-methoxyethanol in rats.

Neoplastic transformation in C3H 10T(1/2) cells after exposure to 835.62 MHz FDMA and 847.74 MHz CDMA radiations.

Adaptive response in animals exposed to non-ionizing radiofrequency fields: some underlying mechanisms.

Probing lymphoma infiltration in spleen of AKR/J mice chronically exposed to electromagnetic fields for risk assessment--toward noninvasive modeling.

Combined exposure of ELF magnetic fields and x-rays increased mutant yields compared with x-rays alone in pTN89 plasmids.

--Leaf Cluster 45 (179)

Theme - Adverse effects of low-frequency EMF on cells

Titles

Extremely low frequency variable electromagnetic fields affect cancer and noncancerous cells in vitro differently: Preliminary study.

Effect of electromagnetic field exposure on chemically induced differentiation of friend erythroleukemia cells.

Extremely low-frequency electromagnetic fields cause G1 phase arrest through the activation of the ATM-Chk2-p21 pathway.

Extremely low frequency electromagnetic field exposure promotes differentiation of pituitary corticotrope-derived AtT20 D16V cells.

Effect of extremely low-frequency electromagnetic fields on antioxidant activity in the human keratinocyte cell line NCTC 2544.

Electromagnetic fields with frequencies of 5, 60 and 120 Hz affect the cell cycle and viability of human fibroblast BJ in vitro.

Bidirectional frequency-dependent effect of extremely low-frequency electromagnetic field on E. coli K-12.

Melatonin protects rat cerebellar granule cells against electromagnetic field-induced increases in Na(+) currents through intracellular Ca(2+) release.

Neuroprotective effects of lotus seedpod procyanidins on extremely low frequency electromagnetic field-induced neurotoxicity in primary cultured hippocampal neurons.

Pulsed Electromagnetic Field Stimulation Promotes Anti-cell Proliferative Activity in Doxorubicin-treated Mouse Osteosarcoma Cells.

Effects of low frequency electromagnetic field on proliferation of human epidermal stem cells: An in vitro study.

Extremely low-frequency electromagnetic field exposure enhances inflammatory response and inhibits effect of antioxidant in RAW 264.7 cells.

[Effects of extremely low frequency pulsed electromagnetic field on different-derived osteoblast-like cells].

Impact of extremely low frequency electromagnetic fields on CD4 expression in peripheral blood mononuclear cells.

[Effect of long-term power frequency electromagnetic field exposure on proliferation and apoptosis of SRA01/04 cells].

[Effect of pulsed electromagnetic field with different frequencies on the proliferation, apoptosis and migration of human ovarian cancer cells].

Extremely low frequency electromagnetic fields affect proliferation and mitochondrial activity of human cancer cell lines.

Effects of extremely low-frequency pulsed electromagnetic fields on morphological and biochemical properties of human breast carcinoma cells (T47D).

Correlation between pulsed electromagnetic fields exposure time and cell proliferation increase in human osteosarcoma cell lines and human normal osteoblast cells in vitro.

Influence of extremely low frequency electromagnetic fields on the swimming behavior of ciliates.

Suppression of a differentiation response in MC-3T3-E1 osteoblast-like cells by sustained, low-level, 30 Hz magnetic-field exposure.



Exposure of rats to extremely low-frequency electromagnetic fields (ELF-EMF) alters cytokines production.

Exposure to extremely low frequency electromagnetic fields alters the calcium dynamics of cultured entorhinal cortex neurons.

Effects of electromagnetic fields on molecules and cells.

Effect of intermittent and continuous exposure to electromagnetic fields on cultured hippocampal cells.

The impact of electromagnetic field at a frequency of 50 Hz and a magnetic induction of 2.5 mT on viability of pineal cells in vitro.

Induction of apoptotic cell death in human leukemic cell line, HL-60, by extremely low frequency electric magnetic fields: analysis of the possible mechanisms in vitro.

Acute effects of low-frequency electromagnetic fields on leukocyte-endothelial interactions in vivo.

Effects of 50 Hz pulsed electromagnetic fields on the growth and cell cycle arrest of mesenchymal stem cells: an in vitro study.

Haemopoietic cell proliferation in murine bone marrow cells exposed to extreme low frequency (ELF) electromagnetic fields.

Extremely low frequency electromagnetic field exposure affects fertilization outcome in swine animal model.

Effects of extremely low frequency electromagnetic fields on human fetal scleral fibroblasts.

Action of a 50 Hz magnetic field on proliferation of cells in culture.

In vitro evaluation of teratogenic effects by time-varying MR gradient fields on fetal human fibroblasts.

Chronic electromagnetic field exposure decreases HSP70 levels and lowers cytoprotection.

Effect of exposure to an extremely low frequency-electromagnetic field on the cellular collagen with respect to signaling pathways in osteoblast-like cells.

Effect of puerarin on matrix metalloproteinase-2 in human fetal scleral fibroblasts treated with low frequency electromagnetic fields.

Effects of extremely low frequency electromagnetic fields on intracellular calcium transients in cardiomyocytes.

[Biological effects of non-ionizing electromagnetic radiation].

Effects of 60 Hz extremely low frequency magnetic fields (EMF) on radiation- and chemical-induced mutagenesis in mammalian cells.

Exposure to ELF-pulse modulated X band microwaves increases in vitro human astrocytoma cell proliferation.

Bioelectromagnetic field effects on cancer cells and mice tumors.

A 700 MHz 1H-NMR study reveals apoptosis-like behavior in human K562 erythroleukemic cells exposed to a 50 Hz sinusoidal magnetic field.

Low intensity and frequency pulsed electromagnetic fields selectively impair breast cancer cell viability.

Cellular effects of electromagnetic fields.

50 Hz extremely low frequency electromagnetic fields enhance protein carbonyl groups content in cancer cells: effects on proteasomal systems.

Pulsed electromagnetic fields accelerate apoptotic rate in osteoclasts.

A short-term extremely low frequency electromagnetic field exposure increases circulating leukocyte numbers and affects HPA-axis signaling in mice.

Delineation of electric and magnetic field effects of extremely low frequency electromagnetic radiation on transcription.

Pulsed or continuous electromagnetic field induce p53/p21-mediated apoptotic signaling pathway in mouse spermatogenic cells in vitro and thus may affect male fertility.

Power-frequency electromagnetic fields and the capacitative calcium entry system in SV40-transformed Swiss 3T3 cells.

Transferrin receptors and natural killer cell lysis. A study using Colo 205 cells exposed to 60 Hz electromagnetic fields.

Electromagnetic fields and cells.

Calcium protects differentiating neuroblastoma cells during 50 Hz electromagnetic radiation.

A review of in vitro studies: low-frequency electromagnetic fields.

Electric and/or magnetic field effects on DNA structure and function in cultured human cells.

Effects of long-term 50Hz power-line frequency electromagnetic field on cell behavior in Balb/c 3T3 cells.

Low-intensity electromagnetic fields induce human cryptochrome to modulate intracellular reactive oxygen species.

Effect of extremely low frequency (ELF) magnetic field exposure on morphological and biophysical properties of human lymphoid cell line (Raji).

Effect of 0.2 T static magnetic field on human neurons: remodeling and inhibition of signal transduction without genome instability.

Exposure to 1.8 GHz electromagnetic fields affects morphology, DNA-related Raman spectra and mitochondrial functions in human lympho-monocytes.

Effects of 60-Hz fields, estradiol and xenoestrogens on human breast cancer cells.

Influence of a 50 hz extra low frequency electromagnetic field on spermatozoa motility and fertilization rates in rabbits.

Semi-quantitative proteomics of mammalian cells upon short-term exposure to non-ionizing electromagnetic fields.

[Experimental data on extremely low frequency (ELF) electromagnetic fields].

[Effect of static magnetic field on development toxicity of rat embryonic midbrain neurons cells].

[Flow cytometric analysis of the effects of 50 Hz magnetic fields on mouse spermatogenesis].

Dose dependence of acetylcholinesterase activity in neuroblastoma cells exposed to modulated radio-frequency electromagnetic radiation.

Increased apoptosis, changes in intracellular  $\text{Ca}^{2+}$ , and functional alterations in lymphocytes and macrophages after in vitro exposure to static magnetic field.

Biomarkers of induced electromagnetic field and cancer.

IGF-II receptor number is increased in TE-85 osteosarcoma cells by combined magnetic fields.

Nonlinear cell response to strong electric fields.

Mechanisms underlying spontaneous calcium spiking in aequorin-loaded ROS 17/2.8 cells.

The effects of low-energy 60-Hz environmental electromagnetic fields upon the growth-related enzyme ornithine decarboxylase.

Effects of extremely low frequency electromagnetic fields on turkeys.

The Bioeffects Resulting from Prokaryotic Cells and Yeast Being Exposed to an 18 GHz Electromagnetic Field.

The effect of electromagnetic field on reactive oxygen species production in human neutrophils in vitro.

[Effect of low-frequency electromagnetic fields on the individual functional systems of the body].

[Modeling of the effect of modulated electromagnetic radiation on animal cells].

2.45-Gz wireless devices induce oxidative stress and proliferation through cytosolic  $\text{Ca}^{2+}$  influx in human leukemia cancer cells.

[Influence of electromagnetic radiation of different ranges on the transmembrane transport of Na<sup>+</sup>, K<sup>+</sup>, and Ca<sup>2+</sup> ions in normal and tumor cells].

Reactive oxygen species levels and DNA fragmentation on astrocytes in primary culture after acute exposure to low intensity microwave electromagnetic field.

Analysis of the effect of a 60 Hz AC field on histamine release by rat peritoneal mast cells.

Intramembrane protein distribution in cell cultures is affected by 50 Hz pulsed magnetic fields.

Calcium homeostasis of isolated heart muscle cells exposed to pulsed high-frequency electromagnetic fields.

Do electromagnetic fields interact directly with DNA?

Extremely low frequency 7 Hz 100 microT electromagnetic radiation promotes differentiation in the human epithelial cell line HaCaT.

Effects of 60 Hz electromagnetic field exposure on testicular germ cell apoptosis in mice.

Antiproliferative effect of millimeter radiation on human erythromyeloid leukemia cell line K562 in culture: ultrastructural- and metabolic-induced changes.

A 3 milliTesla 60 Hz magnetic field is neither mutagenic nor co-mutagenic in the presence of menadione and MNU in a transgenic rat cell line.

Exposure to low frequency pulsed electromagnetic fields increases interleukin-1 and interleukin-6 production by human peripheral blood mononuclear cells.

Enhanced proliferation caused by a low frequency weak magnetic field in chick embryo fibroblasts is suppressed by radical scavengers.

The interaction between electromagnetic fields at megahertz, gigahertz and terahertz frequencies with cells, tissues and organisms: risks and potential.

In vitro evaluation of magnetic resonance imaging at 3.0 tesla on clonogenic ability, proliferation, and cell cycle in human embryonic lung fibroblasts.

Increased ornithine decarboxylase activity in cultured cells exposed to low energy modulated microwave fields and phorbol ester tumor promoters.

Subchronic effects on leukocyte-endothelial interactions in mice by whole body exposure to extremely low frequency electromagnetic fields.

Acute and chronic effects of exposure to a 1-mT magnetic field on the cytoskeleton, stress proteins, and proliferation of astroglial cells in culture.

Effects of weak environmental magnetic fields on the spontaneous bioelectrical activity of snail neurons.

Long-term effects of repetitive exposure to a static magnetic field (1.5 T) on proliferation of human fetal lung fibroblasts.

Modification of electrokinetic properties of nuclei in human buccal epithelial cells by electric fields.

Bioeffects induced by exposure to microwaves are mitigated by superposition of ELF noise.

Electromagnetic fields (UHF) increase voltage sensitivity of membrane ion channels; possible indication of cell phone effect on living cells.

Synaptosomal acetylcholinesterase activity variation pattern in the presence of electromagnetic fields.

Chicken embryo fibroblasts exposed to weak, time-varying magnetic fields share cell proliferation, adenosine deaminase activity, and membrane characteristics of transformed cells.

Low-frequency electromagnetic fields alter the replication cycle of MS2 bacteriophage.

Effects of exposure to electromagnetic radiation at 835 MHz on growth, morphology and secretory characteristics of a mast cell analogue, RBL-2H3.

Cell membrane lipid molecular dynamics in a solenoid versus a magnetically shielded room.

Studies on the possible biological effects of 50 Hz electric and/or magnetic fields: evaluation of some glycolytic enzymes, glycolytic flux, energy and oxido-reductive potentials in human erythrocytes exposed in vitro to power frequency fields.

Modelling the internal field distribution in human erythrocytes exposed to MW radiation.

Nonlinear dynamical law governs magnetic field induced changes in lymphoid phenotype.

Extremely low frequency electromagnetic fields and heat shock can increase microvesicle motility in astrocytes.

[Extremely low frequency electromagnetic radiation enhanced energy metabolism and induced oxidative stress in *Caenorhabditis elegans*].

Exposure to low-frequency pulsed electromagnetic fields increases mitogen-induced lymphocyte proliferation in Down's syndrome.

Injury by electrical forces: pathophysiology, manifestations, and therapy.

Joint actions of environmental nonionizing electromagnetic fields and chemical pollution in cancer promotion.

Cellular communication in clone 9 cells exposed to magnetic fields.

Spindle disturbances in human-hamster hybrid (A(L)) cells induced by the electrical component of the mobile communication frequency range signal.

Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts at non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action.

Neoplastic transformation of C3H/10T1/2 cells following exposure to 120-Hz modulated 2.45-GHz microwaves and phorbol ester tumor promoter.

Effects of 50 Hz electromagnetic fields on rat cortical synaptosomes.

Effect of pulsed electromagnetic field exposure on adenosine receptors in rat brain.

[Effect of sinusoidal electricity magnetic fields on the proliferation and differentiation of osteoblasts in vitro].

A study of the electric field distribution in erythrocyte and rod shape cells from direct RF exposure.

Carcinogenesis and initiation of cell cycling by charge-induced membrane clusters may be due to mitogen receptors and  $\text{Na}^+/\text{H}^+$  antiports.

The effect of a high frequency electromagnetic field in the microwave range on red blood cells.

[A static magnetic field loading system for in vitro cultured cells].

Mobile phones modulate response patterns of human brain activity.

Cytokine profile of human peripheral blood mononuclear cells exposed to 50 Hz EMF.

Low-Frequency Electromagnetic Field Exposure Enhances Extracellular Trap Formation by Human Neutrophils through the NADPH Pathway.

Alterations in protein kinase activity following exposure of cultured human lymphocytes to modulated microwave fields.

Offset of the vacuolar potential of Characean cells in response to electromagnetic radiation over the range 250 Hz-250 kHz.

Effect of 935-MHz phone-simulating electromagnetic radiation on endometrial glandular cells during mouse embryo implantation.

Human standing balance is affected by exposure to pulsed ELF magnetic fields: light intensity-dependent effects.

Effects of ELF (1-120 Hz) and modulated (50 Hz) RF fields on the efflux of calcium ions from brain tissue in vitro.

Influence of extremely low frequency magnetic fields on  $\text{Ca}^{2+}$  signaling and NMDA receptor functions in rat hippocampus.

A 50 Hz sinusoidal magnetic field does not damage MG-63 three-dimensional tumor spheroids but induces changes in their invasive properties.

A mechanism for action of oscillating electric fields on cells.

Electromagnetic fields (1.8 GHz) increase the permeability to sucrose of the blood-brain barrier in vitro.

ELF magnetic fields increase amino acid uptake into *Vicia faba* L. roots and alter ion movement across the plasma membrane.

Nonlinear determinism in the immune system. In vivo influence of electromagnetic fields on different functions of murine lymphocyte subpopulations.

Modulation of cell death in the rat thymus. Light and electron microscopic investigations.

Spindle disturbances in human-hamster hybrid (AL) cells induced by mobile communication frequency range signals.

Occupational exposure to static, ELF, VF and VLF magnetic fields and immune parameters.

Role of radical pairs and feedback in weak radio frequency field effects on biological systems.

Vacuolar hyperpolarizing offsets in characean cells exposed to mono- and bichromatic CW and to squarewave-modulated electromagnetic radiation in the band 200-1,000 MHz.

Evaluations of Acute and Sub-Acute Biological Effects of Narrowband and Moderate-Band High Power Electromagnetic Waves on Cellular Spheroids.

A 0.5 G, 60 Hz magnetic field suppresses melatonin production in pinealocytes.

Response of the seminiferous epithelium of the mouse exposed to low dose high energy (HZE) and electromagnetic radiation.

Initial studies on the effects of combined 60 Hz electric and magnetic field exposure on the immune system of nonhuman primates.

Induction of stress proteins by electromagnetic fields in cultured HL-60 cells.

Electromagnetic fields may act via calcineurin inhibition to suppress immunity, thereby increasing risk for opportunistic infection: Conceivable mechanisms of action.

The vacuolar potential of Characean cells subjected to electromagnetic radiation in the range 200-8,200 MHz.

Radiation and brain calcium: a review and critique.

Effects of a moderate-intensity static magnetic field on VEGF-A stimulated endothelial capillary tubule formation in vitro.

Low-amplitude, high-frequency electromagnetic field exposure causes delayed and reduced growth in *Rosa hybrida*.

[The laboratory detection of intra-cellular factors of anti-viral defense under community-acquired pneumonia in evaluation of effects of low-intensity microwave radiation].

Induced mitogenic activity in AML-12 mouse hepatocytes exposed to low-dose ultra-wideband electromagnetic radiation.

Are there modulated electromagnetic field effects on human conscious perception during attentional blink test?

Effects of electromagnetic radiation in the range 20-300 MHz on the vacuolar potential of characean cells.

Frohlich electromagnetic radiation from human leukocytes: implications for leukocyte adherence inhibition test.

Evaluation of health risks caused by radio frequency accelerated carcinogenesis: the importance of processes driven by the calcium ion signal.

Diacetyl and 2,3-pentanedione exposure of human cultured airway epithelial cells: Ion transport effects and metabolism of butter flavoring agents.

[Mechanism of the biological impact of weak electromagnetic fields and in vitro effects of degassing of blood].

Effects of 45-Hz magnetic fields on the functional state of the human brain.

Some characteristics of the glutathione cycle revealed by ionising and non-ionising electromagnetic radiation.

Magnetic Field Reference Levels for Arbitrary Periodic Waveforms for Prevention of Peripheral Nerve Stimulation.

Magnetism and cardiac arrhythmias.

Aluminum, calcium ion and radiofrequency synergism in acceleration of lymphomagenesis.

Low-frequency electromagnetic fields induce a stress effect upon higher plants, as evident by the universal stress signal, alanine.

Electromagnetic Fields and Stem Cell Fate: When Physics Meets Biology.

Inhibition of neuronal high-voltage activated calcium channels by the omega-phoneutria nigriventer Tx3-3 peptide toxin.

Effect of pulsed high frequency electromagnetic radiation on embryonic mouse palate in vitro.

[The physical mechanism of the effect of low-intensity electromagnetic radiation on biological cells].

[Changes in the acaricidal properties of organophosphorus compounds under the influence of magnetic resonance treatment].



Functional changes in human peripheral neutrophils in workers with different exposure to noxious agents.

Relationship between the Contents of Cyclins, Cyclin-Dependent Kinases, and Their Inhibitors in Whole Blood Mononuclear Leukocytes during the Postclinical Stage of Community-Acquired Pneumonia under the Influence of 1-GHz Microwaves.

Circadian locomotor activity of *Musca* flies: recording method and effects of 10 Hz square-wave electric fields.

The spark of life: electricity and regeneration.

Sensitive model with which to detect athermal effects of non-ionizing electromagnetic radiation.

--Leaf Cluster 24 (111)

Theme - Gene expression alterations following radiofrequency exposure

Titles

2.45 GHz radiofrequency fields alter gene expression in cultured human cells.

Whole-genome expression analysis in primary human keratinocyte cell cultures exposed to 60 GHz radiation.

Analysis of gene expression in a human-derived glial cell line exposed to 2.45 GHz continuous radiofrequency electromagnetic fields.

Analysis of gene expression in mouse brain regions after exposure to 1.9 GHz radiofrequency fields.

Analysis of proto-oncogene and heat-shock protein gene expression in human derived cell-lines exposed in vitro to an intermittent 1.9 GHz pulse-modulated radiofrequency field.

Characterization of biological effect of 1763 MHz radiofrequency exposure on auditory hair cells.

Using model organism *Saccharomyces cerevisiae* to evaluate the effects of ELF-MF and RF-EMF exposure on global gene expression.

Expression of cancer-related genes in human cells exposed to 60 Hz magnetic fields.

Effects on protein kinase C and gene expression in a human mast cell line, HMC-1, following microwave exposure.

Gene expression analysis of a human lymphoblastoma cell line exposed in vitro to an intermittent 1.9 GHz pulse-modulated radiofrequency field.

Mobile phone radiation causes changes in gene and protein expression in human endothelial cell lines and the response seems to be genome- and proteome-dependent.

Gene expression changes in human cells after exposure to mobile phone microwaves.

Gene expression profiles in white blood cells of volunteers exposed to a 50 Hz electromagnetic field.

Gene Expression Analysis in Human Peripheral Blood Cells after 900 MHz RF-EMF Short-Term Exposure.

In vitro study of the effects of ELF electric fields on gene expression in human epidermal cells.

Analysis of gene expression in two human-derived cell lines exposed in vitro to a 1.9 GHz pulse-modulated radiofrequency field.

[Global gene response to GSM 1800 MHz radiofrequency electromagnetic field in MCF-7 cells].

Biological effects of EMF exposure on Ets genes.

Evaluation of HSP70 expression and DNA damage in cells of a human trophoblast cell line exposed to 1.8 GHz amplitude-modulated radiofrequency fields.

Effects of the exposure to intermittent 1.8 GHz radio frequency electromagnetic fields on HSP70 expression and MAPK signaling pathways in PC12 cells.

2-GHz band CW and W-CDMA modulated radiofrequency fields have no significant effect on cell proliferation and gene expression profile in human cells.

Mobile phone radiation might alter protein expression in human skin.

Radiofrequency radiation (900 MHz) induces Egr-1 gene expression and affects cell-cycle control in human neuroblastoma cells.

Evaluation of bax, bcl-2, p21 and p53 genes expression variations on cerebellum of BALB/c mice before and after birth under mobile phone radiation exposure.

HSP70 expression in human trophoblast cells exposed to different 1.8 Ghz mobile phone signals.

Effects of exposure to a 1950 MHz radio frequency field on expression of Hsp70 and Hsp27 in human glioma cells.

Analysis of Gene Expression in Mice Testes Exposed to 1.765 GHz Microwave in Utero.

Modulation of heat shock protein response in SH-SY5Y by mobile phone microwaves.

Gene expression in human breast epithelial cells exposed to 60 Hz magnetic fields.

Gene and protein expression following exposure to radiofrequency fields from mobile phones.

Influence of high-frequency electromagnetic fields on different modes of cell death and gene expression.

Biological stress responses to radio frequency electromagnetic radiation: are mobile phones really so (heat) shocking?

A Genome-Wide mRNA Expression Profile in *Caenorhabditis elegans* under Prolonged Exposure to 1750MHz Radiofrequency Fields.

Impact of 60-GHz millimeter waves on stress and pain-related protein expression in differentiating neuron-like cells.

[Effects of GSM 1800 MHz radiofrequency electromagnetic fields on protein expression profile of human breast cancer cell MCF-7].

Gene expression and reproductive abilities of male *Drosophila melanogaster* subjected to ELF-EMF exposure.

Biological monitoring of non-thermal effects of mobile phone radiation: recent approaches and challenges.

Mobile-phone radiation-induced perturbation of gene-expression profiling, redox equilibrium and sporadic-apoptosis control in the ovary of *Drosophila melanogaster*.

The genotoxic effect of radiofrequency waves on mouse brain.

Connection between Cell Phone use, p53 Gene Expression in Different Zones of Glioblastoma Multiforme and Survival Prognoses.

Exposure to cell phone radiation up-regulates apoptosis genes in primary cultures of neurons and astrocytes.

In vivo modulation of ETS genes induced by electromagnetic fields.

Human health consequences of environmentally-modulated gene expression: potential roles of ELF-EMF induced epigenetic versus mutagenic mechanisms of disease.

Exposure to 2.45 GHz electromagnetic fields induces hsp70 at a high SAR of more than 20 W/kg but not at 5W/kg in human glioma MO54 cells.

Hsp70 is an independent stress marker among frequent users of mobile phones.

Study of p53 expression and post-transcriptional modifications after GSM-900 radiofrequency exposure of human amniotic cells.

Non-thermal activation of the hsp27/p38MAPK stress pathway by mobile phone radiation in human endothelial cells: molecular mechanism for cancer- and blood-brain barrier-related effects.

Exposure to global system for mobile communication (GSM) cellular phone radiofrequency alters gene expression, proliferation, and morphology of human skin fibroblasts.

Expression analysis of human HL60 cells exposed to 60 Hz square- or sine-wave magnetic fields.

p53, Rb and bcl-2 expression during the cell cycle: a study in phytohaemagglutinin stimulated lymphocytes and microwave irradiated lymphoid tissue sections.

Human skin cell stress response to GSM-900 mobile phone signals. In vitro study on isolated primary cells and reconstructed epidermis.

In vitro study of the stress response of human skin cells to GSM-1800 mobile phone signals compared to UVB radiation and heat shock.

Proteomic analysis on the alteration of protein expression in the early-stage placental villous tissue of electromagnetic fields associated with cell phone exposure.

Activity and expression of acetylcholinesterase in PC12 cells exposed to intermittent 1.8 GHz 217-GSM mobile phone signal.

Effect of 900 MHz electromagnetic fields on nonthermal induction of heat-shock proteins in human leukocytes.

In vitro effect of cell phone radiation on motility, DNA fragmentation and clusterin gene expression in human sperm.

Electromagnetic fields at a mobile phone frequency (900 MHz) trigger the onset of general stress response along with DNA modifications in *Eisenia fetida* earthworms.

Effects of a 2450 MHz high-frequency electromagnetic field with a wide range of SARs on the induction of heat-shock proteins in A172 cells.

Effect of GSM-900 and -1800 signals on the skin of hairless rats. III: Expression of heat shock proteins.

Analysis of the cellular stress response in MCF10A cells exposed to combined radio frequency radiation.

The Effect of Radiation Emitted by Cell Phone on The Gelatinolytic Activity of Matrix Metalloproteinase-2 and -9 of Mouse Pre-Antral Follicles during In Vitro Culture.

Effect of 3G cell phone exposure with computer controlled 2-D stepper motor on non-thermal activation of the hsp27/p38MAPK stress pathway in rat brain.

[Responses of thymocytes and splenocytes to low-intensity extremely high-frequency electromagnetic radiation in normal mice and in mice with systemic inflammation].

Analysis of proteome response to the mobile phone radiation in two types of human primary endothelial cells.

Mobile phone electromagnetic radiation activates MAPK signaling and regulates viability in *Drosophila*.

Novel electric power-driven hydrodynamic injection system for gene delivery: safety and efficacy of human factor IX delivery in rats.

Proto-oncogene mRNA levels and activities of multiple transcription factors in C3H 10T 1/2 murine embryonic fibroblasts exposed to 835.62 and 847.74 MHz cellular phone communication frequency radiation.

Effect of cell phone-like electromagnetic radiation on primary human thyroid cells.

Expression of the immediate early gene, c-fos, in mouse brain after acute global system for mobile communication microwave exposure.

[Effects of high power microwave on the expressions of Bcl-2 and C-myc proteins in the rat testis].

[The Impact of Electroacupuncture Intervention on Expression of 5-HTR 1 B/2 C Genes in Mice under Radiation Stimulation from Mobile Phone].

Cell phone use and parotid salivary gland alterations: no molecular evidence.

Electromagnetic fields may act directly on DNA.

Stimulation of ubiquitin-proteasome pathway through the expression of amidohydrolase for N-terminal asparagine (Ntan1) in cultured rat hippocampal neurons exposed to static magnetism.

Proteomic analysis of human lens epithelial cells exposed to microwaves.

[Effects of electromagnetic pulses on apoptosis and TGF-beta3 expression of mouse testis tissue].

[Changes in Ca(2+) concentration and caspase-3 expression and their relationship in Raji cells exposed to electromagnetic radiation].

Effects of pulsed electromagnetic fields on cartilage apoptosis signalling pathways in ovariectomised rats.

Upregulation of specific mRNA levels in rat brain after cell phone exposure.

Meta-proteomic analysis of protein expression distinctive to electricity-generating biofilm communities in air-cathode microbial fuel cells.

Response of *Caenorhabditis elegans* to wireless devices radiation exposure.

[The role of heat shock proteins HSP90 in the response of immune cells to centimeter microwaves].

Mechanism of short-term ERK activation by electromagnetic fields at mobile phone frequencies.

[Effects of electromagnetic radiation on RAF/MEK/ERK signaling pathway in rats hippocampus].

Electromagnetic-pulse-induced activation of p38 MAPK pathway and disruption of blood-retinal barrier.

Electromagnetic fields at mobile phone frequency induce apoptosis and inactivation of the multi-chaperone complex in human epidermoid cancer cells.

Electromagnetic wave irradiation promotes osteoblastic cell proliferation and up-regulates growth factors via activation of the ERK1/2 and p38 MAPK pathways.

Millimeter-wave exposure promotes the differentiation of bone marrow stromal cells into cells with a neural phenotype.

Electromagnetic pulse activated brain microglia via the p38 MAPK pathway.

Cytotoxicity of temozolomide on human glioblastoma cells is enhanced by the concomitant exposure to an extremely low-frequency electromagnetic field (100Hz, 100G).

Exposure to 50 Hz electromagnetic radiation promote early maturation and differentiation in newborn rat cerebellar granule neurons.

Analysis of the novel excretory cell expressed ECP-1 protein and its proposed ECP-1/IFC-2 fusion protein EXC-2 in the nematode *Caenorhabditis elegans*.

Microwave induced alteration in the neuron specific enolase gene expression.

Cytosolic calreticulin inhibits microwave radiation-induced microvascular endothelial cell injury through the integrin-focal adhesion kinase pathway.

Experimental study of millimeter wave-induced differentiation of bone marrow mesenchymal stem cells into chondrocytes.

Effect of 72 Hz pulsed magnetic field exposure on ras p21 expression in CCRF-CEM cells.

Bcl-2 and p53 immunoprofile in Kaposi's sarcoma.

The amelioration of phagocytic ability in microglial cells by curcumin through the inhibition of EMF-induced pro-inflammatory responses.

Cell phone use is associated with an inflammatory cytokine profile of parotid gland saliva.

Calreticulin protects rat microvascular endothelial cells against microwave radiation-induced injury by attenuating endoplasmic reticulum stress.

Qualitative effect on mRNAs of injury-associated proteins by cell phone like radiation in rat facial nerves.

p53 immunoreactivity in cutaneous PUVA tumors is similar to that in other non-melanoma skin neoplasms.

Effects of 2.45 GHz electromagnetic fields with a wide range of SARs on bacterial and HPRT gene mutations.

Microglia M1/M2 polarization contributes to electromagnetic pulse-induced brain injury.

900-MHz microwave radiation enhances gamma-ray adverse effects on SHG44 cells.

[The role of RKIP mediated ERK pathway in hippocampus neurons injured by electromagnetic radiation].

Isoflurane preconditioning ameliorates electromagnetic pulse-induced neural damage by shifting microglia polarization toward anti-inflammatory phenotype via upregulation of SOCS1.

Effects of prolonged exposure to moderate static magnetic field and its synergistic effects with alkaline pH on *Enterococcus faecalis*.

Abnormal physical architecture of the lipophilic domains of human sperm membrane in oligospermia: a logical cause for low fertility profiles.

[Ecological and biological characteristics of *Drosophila melanogaster* features depending on the dose of electromagnetic radiation of various types].

Construction and clinical significance of a predictive system for prognosis of hepatocellular carcinoma.

--Leaf Cluster 11 (51)

Theme - Adverse impacts of radiofrequency fields on sleep

Titles

Stimulation of the brain with radiofrequency electromagnetic field pulses affects sleep-dependent performance improvement.

Exposure to radiofrequency electromagnetic fields and sleep quality: a prospective cohort study.

Effects of mobile phone exposure (GSM 900 and WCDMA/UMTS) on polysomnography based sleep quality: An intra- and inter-individual perspective.

Environmental Radiofrequency Electromagnetic Fields Exposure at Home, Mobile and Cordless Phone Use, and Sleep Problems in 7-Year-Old Children.

Radio frequency electromagnetic field exposure in humans: Estimation of SAR distribution in the brain, effects on sleep and heart rate.

Wireless communication fields and non-specific symptoms of ill health: a literature review.

Cohort study on the effects of everyday life radio frequency electromagnetic field exposure on non-specific symptoms and tinnitus.

Memory performance, wireless communication and exposure to radiofrequency electromagnetic fields: A prospective cohort study in adolescents.

Exposure to pulse-modulated radio frequency electromagnetic fields affects regional cerebral blood flow.

Symptoms and the use of wireless communication devices: A prospective cohort study in Swiss adolescents.

Sleep after mobile phone exposure in subjects with mobile phone-related symptoms.

Cognitive performance measures in bioelectromagnetic research--critical evaluation and recommendations.

Sleep duration, quality, and timing and their associations with age in a community without electricity in Haiti.

Radiofrequency electromagnetic field exposure and non-specific symptoms of ill health: a systematic review.

Children's health and RF EMF exposure. Views from a risk assessment and risk communication perspective.

Human sleep under the influence of pulsed radiofrequency electromagnetic fields: a polysomnographic study using standardized conditions.

Conduct of a personal radiofrequency electromagnetic field measurement study: proposed study protocol.

Effects of electromagnetic fields emitted from W-CDMA-like mobile phones on sleep in humans.

International policy and advisory response regarding children's exposure to radio frequency electromagnetic fields (RF-EMF).

Effects of short- and long-term pulsed radiofrequency electromagnetic fields on night sleep and cognitive functions in healthy subjects.

Electromagnetic fields, such as those from mobile phones, alter regional cerebral blood flow and sleep and waking EEG.

Effects of electromagnetic fields emitted by mobile phones (GSM 900 and WCDMA/UMTS) on the macrostructure of sleep.

Individual variation in temporal relationships between exposure to radiofrequency electromagnetic fields and non-specific physical symptoms: A new approach in studying 'electrosensitivity'.

Mobile phone use, behavioural problems and concentration capacity in adolescents: A prospective study.

Towards 5G communication systems: Are there health implications?

Acute effects of electromagnetic fields emitted by GSM mobile phones on subjective well-being and physiological reactions: a meta-analysis.

A Prospective Cohort Study of Adolescents' Memory Performance and Individual Brain Dose of Microwave Radiation from Wireless Communication.

[Investigation of sleep disorders in the vicinity of high frequency transmitters].



Effect of a single 30 min UMTS mobile phone-like exposure on the thermal pain threshold of young healthy volunteers.

Quality Matters: Systematic Analysis of Endpoints Related to "Cellular Life" in Vitro Data of Radiofrequency Electromagnetic Field Exposure.

The effect of electromagnetic fields emitted by mobile phones on human sleep.

Mobile phone 'talk-mode' signal delays EEG-determined sleep onset.

The response of human bacteria to static magnetic field and radiofrequency electromagnetic field.

Exposure to radio-frequency electromagnetic fields and behavioural problems in Bavarian children and adolescents.

Human sleep EEG under the influence of pulsed radio frequency electromagnetic fields. Results from polysomnographies using submaximal high power flux densities.

[Effects of radio- and microwaves emitted by wireless communication devices on the functions of the nervous system selected elements].

Effects of radiation emitted by WCDMA mobile phones on electromagnetic hypersensitive subjects.

Electromagnetic radiation and behavioural response of ticks: an experimental test.

Effects of Sleep Quality on the Association between Problematic Mobile Phone Use and Mental Health Symptoms in Chinese College Students.

Investigating short-term exposure to electromagnetic fields on reproductive capacity of invertebrates in the field situation.

Could myelin damage from radiofrequency electromagnetic field exposure help explain the functional impairment electrohypersensitivity? A review of the evidence.

Association between exposure to radiofrequency electromagnetic fields assessed by dosimetry and acute symptoms in children and adolescents: a population based cross-sectional study.

Cochlear implants in the etiopathogenesis of glioblastoma--an interesting observation or independent finding?

Terrestrial Trunked Radio (TETRA) exposure and its impact on slow cortical potentials.

Influence of electromagnetic fields emitted by GSM-900 cellular telephones on the circadian patterns of gonadal, adrenal and pituitary hormones in men.

[Prevalence of insomnia in adults aged 18 to 60 years and exposure to electromagnetic fields in households of Barranquilla, Colombia].

"Triple M" Effect: A Proposed Mechanism to Explain Increased Dental Amalgam Microleakage after Exposure to Radiofrequency Electromagnetic Radiation.

The Effect of a Single 30-Min Long Term Evolution Mobile Phone-Like Exposure on Thermal Pain Threshold of Young Healthy Volunteers.

Pain, pain intensity and pain disability in high school students are differently associated with physical activity, screening hours and sleep.

Long-Term Evolution Electromagnetic Fields Exposure Modulates the Resting State EEG on Alpha and Beta Bands.

Microwaves emitted by cellular telephones affect human slow brain potentials.

--Leaf Cluster 41 (125)

Theme - Adverse effects of radiofrequency fields on cells

Titles

The effects of radiofrequency fields on cell proliferation are non-thermal.

Effects of RF-EMF Exposure from GSM Mobile Phones on Proliferation Rate of Human Adipose-derived Stem Cells: An In-vitro Study.

Effects of radiofrequency exposure emitted from a GSM mobile phone on proliferation, differentiation, and apoptosis of neural stem cells.

Are the young more sensitive than adults to the effects of radiofrequency fields? An examination of relevant data from cellular and animal studies.

Comparative study of cell cycle kinetics and induction of apoptosis or necrosis after exposure of human Mono Mac 6 cells to radiofrequency radiation.

Apoptosis induced by ultraviolet radiation is enhanced by amplitude modulated radiofrequency radiation in mutant yeast cells.

Review of possible modulation-dependent biological effects of radiofrequency fields.

An in vitro study of the effects of exposure to a GSM signal in two human cell lines: monocytic U937 and neuroblastoma SK-N-SH.

Ornithine decarboxylase activity is affected in primary astrocytes but not in secondary cell lines exposed to 872 MHz RF radiation.

Disturbance of cell proliferation in response to mobile phone frequency radiation.

Effects of chronic exposure to radiofrequency electromagnetic fields on energy balance in developing rats.

Exposure to 835 MHz radiofrequency electromagnetic field induces autophagy in hippocampus but not in brain stem of mice.

Continuous exposure to 900MHz GSM-modulated EMF alters morphological maturation of neural cells.

Enhancement of X-ray Induced Apoptosis by Mobile Phone-Like Radio-Frequency Electromagnetic Fields in Mouse Spermatocyte-Derived Cells.

Cell oxidation-reduction imbalance after modulated radiofrequency radiation.

Pulse modulated 900 MHz radiation induces hypothyroidism and apoptosis in thyroid cells: a light, electron microscopy and immunohistochemical study.

1950MHz Radio Frequency Electromagnetic Radiation Inhibits Testosterone Secretion of Mouse Leydig Cells.

Non-thermal biomarkers of exposure to radiofrequency/microwave radiation.

In vitro non-thermal oxidative stress response after 1800 MHz radiofrequency radiation.

Effect of radiofrequency electromagnetic field exposure on in vitro models of neurodegenerative disease.

Influence of a 902.4 MHz GSM signal on the human visual system: investigation of the discrimination threshold.

Biological indicators in response to radiofrequency/microwave exposure.

The protective effect of autophagy on mouse spermatocyte derived cells exposure to 1800MHz radiofrequency electromagnetic radiation.

Proliferation and apoptosis in a neuroblastoma cell line exposed to 900 MHz modulated radiofrequency field.

p25/CDK5 is partially involved in neuronal injury induced by radiofrequency electromagnetic field exposure.

Microwave exposure of neuronal cells in vitro: Study of apoptosis.

Apoptosis is induced by radiofrequency fields through the caspase-independent mitochondrial pathway in cortical neurons.

[Impact of radiofrequency/microwave radiation on cell and cytoskeleton structure].

Reaction of the immune system to low-level RF/MW exposures.

Exposure to Global System for Mobile Communication 900 MHz Cellular Phone Radiofrequency Alters Growth, Proliferation and Morphology of Michigan Cancer Foundation-7 Cells and Mesenchymal Stem Cells.

Exposure to 900 MHz radiofrequency radiation induces caspase 3 activation in proliferating human lymphocytes.

Proteomic analysis of continuous 900-MHz radiofrequency electromagnetic field exposure in testicular tissue: a rat model of human cell phone exposure.

Anthropogenic Radio-Frequency Electromagnetic Fields Elicit Neuropathic Pain in an Amputation Model.

Effect of high SARs produced by cell phone like radiofrequency fields on mollusk single neuron.

Investigation of the effects of 2.1 GHz microwave radiation on mitochondrial membrane potential (DeltaPsim), apoptotic activity and cell viability in human breast fibroblast cells.

Comparison of 864 MHz and 935 MHz microwave radiation effects on cell culture.

Free radical release and HSP70 expression in two human immune-relevant cell lines after exposure to 1800 MHz radiofrequency radiation.

Effects of GSM-modulated radiofrequency electromagnetic fields on B-cell peripheral differentiation and antibody production.

Effect of radiofrequency radiation in cultured mammalian cells: A review.

Effect of 835 MHz radiofrequency radiation exposure on calcium binding proteins in the hippocampus of the mouse brain.

Viability and phagocytosis of neutrophils exposed in vitro to 100-MHz radiofrequency radiation.

Effects of 3G cell phone exposure on the structure and function of the human cytochrome P450 reductase.

Possible effects of radiofrequency electromagnetic fields on in vivo C6 brain tumors in Wistar rats.

In-vitro exposure of neuronal networks to the GSM-1800 signal.

Mitochondrial hyperpolarization and cytochrome-c release in microwave-exposed MCF-7 cells.

Does MW Radiation Affect Gene Expression, Apoptotic Level, and Cell Cycle Progression of Human SH-SY5Y Neuroblastoma Cells?

Effect of exposure to the edge signal on oxidative stress in brain cell models.

Impact of 864 MHz or 935 MHz radiofrequency microwave radiation on the basic growth parameters of V79 cell line.

Effect of a 2.45-GHz radiofrequency electromagnetic field on neutrophil chemotaxis and phagocytosis in differentiated human HL-60 cells.

Effects of low intensity radiofrequency electromagnetic fields on electrical activity in rat hippocampal slices.

Effects of mobile phone type signals on calcium levels within human leukaemic T-cells (Jurkat cells).

Does exposure to a radiofrequency electromagnetic field modify thermal preference in juvenile rats?

Measurement of the 100MHz EMF radiation in vivo effects on zebrafish *D. rerio* embryonic development: A multidisciplinary study.

Microwave effects on the nervous system.

[Effects of radiofrequency electromagnetic fields on mammalian spermatogenesis].

Effects of simultaneous combined exposure to CDMA and WCDMA electromagnetic field on immune functions in rats.

Microwaves from Mobile Phones Inhibit 53BP1 Focus Formation in Human Stem Cells More Strongly Than in Differentiated Cells: Possible Mechanistic Link to Cancer Risk.

Effects of 900-MHz radio frequencies on the chemotaxis of human neutrophils in vitro.

Problems in assessment of risks from exposures to microwaves of mobile communication.

Bioassay for assessing cell stress in the vicinity of radio-frequency irradiating antennas.

Heart rate variability affected by radiofrequency electromagnetic field in adolescent students.

Mobile phone radiation alters proliferation of hepatocarcinoma cells.

A new in vitro exposure device for the mobile frequency of 900 MHz.

A radio-frequency system for in vivo pilot experiments aimed at the studies on biological effects of electromagnetic fields.

Modeling cell dynamics under mobile phone radiation.

Evaluation of the potential of mobile phone specific electromagnetic fields (UMTS) to produce micronuclei in human glioblastoma cell lines.

Exposure to radiation from single or combined radio frequencies provokes macrophage dysfunction in the RAW 264.7 cell line.

Responses of neurons to an amplitude modulated microwave stimulus.

Pathophysiology of cell phone radiation: oxidative stress and carcinogenesis with focus on male reproductive system.

An HF exposure system for mice with improved efficiency.

Cell phone radiation effects on cytogenetic abnormalities of oral mucosal cells.

Sleep EEG alterations: effects of different pulse-modulated radio frequency electromagnetic fields.

Effects of exposure to DAMPS and GSM signals on ornithine decarboxylase (ODC) activity: II. SH-SY5Y human neuroblastoma cells.

Design, optimization, realization, and analysis of an in vitro system for the exposure of embryonic stem cells at 1.71 GHz.

Cell physiological effects of radiofrequency electromagnetic fields.

Acute effect of exposure of mollusk single neuron to 900-MHz mobile phone radiation.

[Dependence of the non-thermal radiofrequency electromagnetic field bioeffects on the typological features of electroencephalogram in humans].

Age-dependent acute interference with stem and progenitor cell proliferation in the hippocampus after exposure to 1800 MHz electromagnetic radiation.

Biological effects of radiofrequency radiation: concepts and criteria.

Effects of radiofrequency electromagnetic fields on seed germination and root meristematic cells of *Allium cepa* L.

Effects of exposure to DAMPS and GSM signals on ornithine decarboxylase (ODC) activity: I. L-929 mouse fibroblasts.

An investigation of the effects of TETRA RF fields on intracellular calcium in neurones and cardiac myocytes.

Apoptotic cell death during *Drosophila* oogenesis is differentially increased by electromagnetic radiation depending on modulation, intensity and duration of exposure.

Biological effects of amplitude-modulated radiofrequency radiation.

Cell phone radiations affect early growth of *Vigna radiata* (mung bean) through biochemical alterations.

The use of FDTD in establishing in vitro experimentation conditions representative of lifelike cell phone radiation on the spermatozoa.

Effects of RF fields emitted from smart phones on cardio-respiratory parameters: a preliminary provocation study.

Exposure to 900 MHz electromagnetic field induces an unbalance between pro-apoptotic and pro-survival signals in T-lymphoblastoid leukemia CCRF-CEM cells.

Basis for optimization of in vitro exposure apparatus for health hazard evaluations of mobile communications.

In vitro effect of pulsed 900 MHz GSM radiation on mitochondrial membrane potential and motility of human spermatozoa.

The effect of pulsed 900-MHz GSM mobile phone radiation on the acrosome reaction, head morphometry and zona binding of human spermatozoa.

Prenatal exposure to radiofrequencies: effects of WiFi signals on thymocyte development and peripheral T cell compartment in an animal model.

Combined effects of flow-induced shear stress and electromagnetic field on neural differentiation of mesenchymal stem cells.

Long-term electromagnetic exposure of developing neuronal networks: A flexible experimental setup.

Influence of radiofrequency-electromagnetic waves from 3rd-generation cellular phones on fertilization and embryo development in mice.

Simulation of electromagnetic fields in the human body using Finite Integration Technique (FIT).

The implications of non-linear biological oscillations on human electrophysiology for electrohypersensitivity (EHS) and multiple chemical sensitivity (MCS).

Comparison of biological effects between continuous and intermittent exposure to GSM-900-MHz mobile phone radiation: Detection of apoptotic cell-death features.

[Effects of mobile phones and radar radiofrequencies on the eye].

Exposure to 1950-MHz TD-SCDMA electromagnetic fields affects the apoptosis of astrocytes via caspase-3-dependent pathway.

Intrauterine effects in animals exposed to radiofrequency and microwave fields.

Effect of cell phone radiation on neutrophil of mice.

In vitro effects of radiofrequency electromagnetic waves on bovine spermatozoa motility.

[Role of modulation in biological effects of electromagnetic radiation].

Numerical and experimental dosimetry of Petri dish exposure setups.

Effects of 2.45-GHz electromagnetic fields with a wide range of SARs on micronucleus formation in CHO-K1 cells.

Effect of cell phone usage on semen analysis in men attending infertility clinic: an observational study.

Modulation of oxidative phosphorylation (OXPHOS) by radiation- induced biophotons.

The possible global hazard of cell phone radiation on thyroid cells and hormones: a systematic review of evidences.

Radiofrequency-induced carcinogenesis: cellular calcium homeostasis changes as a triggering factor.

Mobile phone electromagnetic radiation affects Amyloid Precursor Protein and alpha-synuclein metabolism in SH-SY5Y cells.

Exposure to cell phone radiations produces biochemical changes in worker honey bees.

Human mesenchymal stem cells are sensitive to abnormal gravity and exhibit classic apoptotic features.

[Surface markers and functions of human dendritic cells exposed to mobile phone 1800 MHz electromagnetic fields].

Activation of the TRPV1 Thermoreceptor Induced by Modulated or Unmodulated 1800 MHz Radiofrequency Field Exposure.

Low power radiofrequency electromagnetic radiation for the treatment of pain due to osteoarthritis of the knee.

Calcium-binding proteins and GFAP immunoreactivity alterations in murine hippocampus after 1 month of exposure to 835 MHz radiofrequency at SAR values of 1.6 and 4.0 W/kg.

Alteration of glycine receptor immunoreactivity in the auditory brainstem of mice following three months of exposure to radiofrequency radiation at SAR 4.0 W/kg.

Radiofrequency (RF) effects on blood cells, cardiac, endocrine, and immunological functions.

Influence of electromagnetic waves, with maxima in the green or red range, on the morphofunctional properties of multipotent stem cells.

Can exposure to a terrestrial trunked radio (TETRA)-like signal cause symptoms? A randomised double-blind provocation study.

Potential protection of green tea polyphenols against 1800 MHz electromagnetic radiation-induced injury on rat cortical neurons.

Effects of 2450 MHz electromagnetic fields with a wide range of SARs on methylcholanthrene-induced transformation in C3H10T1/2 cells.

Assessment of intermittent UMTS electromagnetic field effects on blood circulation in the human auditory region using a near-infrared system.

Skin changes in "screen dermatitis" versus classical UV- and ionizing irradiation-related damage--similarities and differences.

Fourth Level Cluster 81 (673)

Theme - Adverse impacts of power-line EMF

--Leaf Cluster 9 (43)

Theme - Adverse effects of ELF magnetic field exposures

Titles



[Electromagnetic noise blocks the gap-junctional intercellular communication suppression induced by 50 Hz magnetic field].

Developmental effects of magnetic field (50 Hz) in combination with ionizing radiation and chemical teratogens.

The effect of extremely low frequency magnetic field on the conjunctiva and goblet cells.

Chronic exposure to an extremely low-frequency magnetic field induces depression-like behavior and corticosterone secretion without enhancement of the hypothalamic-pituitary-adrenal axis in mice.

Effect of coexposure to 50 Hz magnetic fields and an aneugen on human lymphocytes, determined by the cytokinesis block micronucleus assay.

[Superposition of noise magnetic fields inhibits clustering of fibroblast membrane surface receptors induced by 50 Hz magnetic fields in Chinese hamster lungs].

Extremely low frequency magnetic field induces hyperalgesia in mice modulated by nitric oxide synthesis.

The cardiovascular response to an acute 1800-microT, 60-Hz magnetic field exposure in humans.

Mouse early embryos obtained by natural breeding or in vitro fertilization display a differential sensitivity to extremely low-frequency electromagnetic fields.

Interaction of MF 50 Hz, 10 mT with high dose of X-rays: evaluation of embryotoxicity in chick embryos.

Effects on micronuclei formation of 60-Hz electromagnetic field exposure with ionizing radiation, hydrogen peroxide, or c-Myc overexpression.

Rodent cell transformation and immediate early gene expression following 60-Hz magnetic field exposure.

[A study on dose-effect of suppression to gap junctional intercellular communication function by 50-Hz magnetic fields].

Effect of magnetic field exposure on anchorage-independent growth of a promoter-sensitive mouse epidermal cell line (JB6).

Exposure to 60-Hz magnetic fields and proliferation of human astrocytoma cells in vitro.

Activation of Signaling Cascades by Weak Extremely Low Frequency Electromagnetic Fields.

Effects of ELF magnetic fields on protein expression profile of human breast cancer cell MCF7.

[Noise magnetic fields block co-suppression effect induced by power frequency magnetic field and phorbol ester].

The response of the human circulatory system to an acute 200- $\mu$ T, 60-Hz magnetic field exposure.

Exposure of *Drosophila melanogaster* embryonic cell cultures to 60-Hz sinusoidal magnetic fields: assessment of potential teratogenic effects.

Non-thermal effects of power-line magnetic fields (50 Hz) on gene expression levels of pluripotent embryonic stem cells-the role of tumour suppressor p53.

[Abnormal shift of connexin 43 gap-junction protein induced by 50 Hz electromagnetic fields in Chinese hamster lung cells].

[Effects of power frequency magnetic field on gap junction intercellular communication of astrocytes].

Mutation induction by high-density, 50-Hz magnetic fields in human MeWo cells exposed in the DNA synthesis phase.

Micronucleus induction in Syrian hamster embryo cells following exposure to 50 Hz magnetic fields, benzo(a)pyrene, and TPA in vitro.

[Estimation of magnetic radiation effects on leucocytes].

[Effects of electromagnetic noise on the enhancement of stress-activated protein kinase(SAPK) phosphorylation induced by 50 Hz magnetic fields].

Micronucleus formation in human amnion cells after exposure to 50 Hz MF applied horizontally and vertically.

Immune function and host defense in rodents exposed to 60-Hz magnetic fields.

Effects of 50-Hz magnetic field exposure on hormone secretion and apoptosis-related gene expression in human first trimester villous trophoblasts in vitro.

Effects of whole-body 50-Hz magnetic field exposure on mouse Leydig cells.

Superposition of an incoherent magnetic field inhibited EGF receptor clustering and phosphorylation induced by a 1.8 GHz pulse-modulated radiofrequency radiation.

Effects of 50 Hz sinusoidal magnetic fields on Hsp27, Hsp70, Hsp90 expression in porcine aortic endothelial cells (PAEC).

Effect of 60 Hz magnetic field exposure on c-fos expression in stimulated PC12 cells.

Immune markers and ornithine decarboxylase activity among electric utility workers.

Neural mass modeling of power-line magnetic fields effects on brain activity.

Modulation of natural killer cell function after exposure to 60 Hz magnetic fields: confirmation of the effect in mature B6C3F1 mice.

Alteration of tight and adherens junctions on 50-Hz magnetic field exposure in Madin Darby canine kidney (MDCK) cells.

Genome-wide transcription analysis of *Escherichia coli* in response to extremely low-frequency magnetic fields.

Real-time detection of stimulus response in cultured neurons by high-intensity intermediate-frequency magnetic field exposure.

Magnetic field desensitizes 5-HT(1B) receptor in brain: pharmacological and functional studies.

Influence of combined AC-DC magnetic fields on free radicals in organized and biological systems. Development of a model and application of the radical pair mechanism to radicals in micelles.

A 1.8-GHz radiofrequency radiation induces EGF receptor clustering and phosphorylation in cultured human amniotic (FL) cells.

--Leaf Cluster 17 (55)

Theme - Adverse impacts of EMF on mammary cancer development

Titles

Acceleration of mammary tumorigenesis by exposure of 7,12-dimethylbenz[a]anthracene-treated female rats in a 50-Hz, 100-microT magnetic field: replication study.

A histopathological study on alterations in DMBA-induced mammary carcinogenesis in rats with 50 Hz, 100 muT magnetic field exposure.

Effects of magnetic fields on mammary tumor development induced by 7,12-dimethylbenz(a)anthracene in rats.

Significant differences in the effects of magnetic field exposure on 7,12-dimethylbenz(a)anthracene-induced mammary carcinogenesis in two substrains of Sprague-Dawley rats.

Effects of weak alternating magnetic fields on nocturnal melatonin production and mammary carcinogenesis in rats.

Do cocarcinogenic effects of ELF electromagnetic fields require repeated long-term interaction with carcinogens? Characteristics of positive studies using the DMBA breast cancer model in rats.

Effect of 26 week magnetic field exposures in a DMBA initiation-promotion mammary gland model in Sprague-Dawley rats.

Effect of 13 week magnetic field exposures on DMBA-initiated mammary gland carcinomas in female Sprague-Dawley rats.

Effects of GSM-900 microwaves on DMBA-induced mammary gland tumors in female Sprague-Dawley rats.

[Effects of mobile-phone microwave on dimethylbenz (a) anthracene induced mammary carcinoma development in rats].

Effects of 900 MHz GSM wireless communication signals on DMBA-induced mammary tumors in rats.

Developmental toxicity evaluation of ELF magnetic fields in Sprague-Dawley rats.

Developmental toxicity study of 60 Hz (power frequency) magnetic fields in rats.

In vivo exposure of rats to a weak alternating magnetic field increases ornithine decarboxylase activity in the mammary gland by a similar extent as the carcinogen DMBA.

A study on skin tumour formation in mice with 50 Hz magnetic field exposure.

Rat liver foci study on coexposure with 50 Hz magnetic fields and known carcinogens.

5-Iododeoxyuridine-125I incorporation in vivo after exposure to a 50 Hz magnetic field.

Study on potential effects of "902-MHz GSM-type Wireless Communication Signals" on DMBA-induced mammary tumours in Sprague-Dawley rats.

Anxiogenic effect of chronic exposure to extremely low frequency magnetic field in adult rats.

Acute and subchronic toxicity of 20 kHz and 60 kHz magnetic fields in rats.

Results of lifespan exposure to continuous and intermittent extremely low frequency electromagnetic fields (ELFEMF) administered alone to Sprague Dawley rats.

Chronic, low-level (1.0 W/kg) exposure of mice prone to mammary cancer to 2450 MHz microwaves.

Acute effects of 50 Hz magnetic field exposure on human visual task and cardiovascular performance.

Cancer promotion in a mouse-skin model by a 60-Hz magnetic field: II. Tumor development and immune response.

Repeated exposure of C3H/HeJ mice to ultra-wideband electromagnetic pulses: lack of effects on mammary tumors.

[Effects of chronic exposure of power frequency magnetic field on neurobehavior in rats].

Multigeneration reproductive toxicity assessment of 60-Hz magnetic fields using a continuous breeding protocol in rats.

Assessing the potential carcinogenic activity of magnetic fields using animal models.

Evaluation of the potential carcinogenicity of 60 Hz linear sinusoidal continuous-wave magnetic fields in Fischer F344 rats.

Effect of exposure to extremely low electro-magnetic field during prenatal period on mice spleen.

Effects of magnetic field exposure on the development of lung fibrosis elicited by industrial pollutants.

Effect of radiofrequency radiation exposure on mouse skin tumorigenesis initiated by 7,12-dimethylbenz[alpha]anthracene.

Recent experimental data on Extremely Low Frequency (ELF) magnetic field carcinogenic risk: open questions.

Extremely low-frequency magnetic fields modulate nitric oxide signaling in rat brain.

[Modifying effect of light and electromagnetic field on development of mammary tumors induced by N-nitrosomethyl urea in female rats].

Effects of subchronic extremely low-frequency electromagnetic field exposure on biochemical parameters in rats.

Effects of gestational exposure to a video display terminal-like magnetic field (20-kHz) on CBA/S mice.

Evaluation of the developmental toxicity of 60 Hz magnetic fields and harmonic frequencies in Sprague-Dawley rats.

Testing electromagnetic fields for potential carcinogenic activity: a critical review of animal models.

Effects of aluminum and extremely low frequency electromagnetic radiation on oxidative stress and memory in brain of mice.

Skeletal muscle HSP72 and norepinephrine response to static magnetic field in rat.

Effect of chronic exposure to a GSM-like signal (mobile phone) on survival of female Sprague-Dawley rats: modulatory effects by month of birth and possibly stage of the solar cycle.

Long-term exposure of Sprague Dawley rats to 20 kHz triangular magnetic fields.

Spontaneous and nitrosourea-induced primary tumors of the central nervous system in Fischer 344 rats chronically exposed to 836 MHz modulated microwaves.

In vivo studies of the effect of magnetic field exposure on ontogeny of choline acetyltransferase in the rat brain.

Spontaneous and nitrosourea-induced primary tumors of the central nervous system in Fischer 344 rats exposed to frequency-modulated microwave fields.

Toxicity bioassay in Sprague-Dawley rats exposed to 20 kHz triangular magnetic field for 90 days.

A cerebral primitive neuroectodermal tumor in a squirrel monkey (*Saimiri sciureus*).

Indication of cocarcinogenic potential of chronic UMTS-modulated radiofrequency exposure in an ethylnitrosourea mouse model.

A case of hepatocellular carcinoma rupturing after angiography.

A case of recurring hepatocellular carcinoma with a solitary Virchow's lymph node metastasis.

Benzodiazepine system is involved in hyperalgesia in rats induced by the exposure to extremely low frequency magnetic fields.

[A case report of primary hepatic carcinoid with lymph node metastasis--treatment of hepatic arterial infusion to post-reoperative liver and radiation to metastasis of para-aortic lymph nodes].

Effects of mobile phone radiation on UV-induced skin tumourigenesis in ornithine decarboxylase transgenic and non-transgenic mice.

[A case of renal cell carcinoma in a horseshoe kidney].

--Leaf Cluster 6 (67)

Theme - Adverse health effects of magnetic fields associated with magnetic resonance imaging

Titles

Menometrorrhagia in magnetic resonance imaging operators with copper intrauterine contraceptive devices (IUDS): a case report.

Safety issues in magnetic resonance imaging.

[Magnetic resonance imaging : Recent studies on biological effects of static magnetic and highfrequency electromagnetic fields].

A review of the current use of magnetic resonance imaging in pregnancy and safety implications for the fetus.

Retrospective assessment of exposure to static magnetic fields during production and development of magnetic resonance imaging systems.

[Safety of magnetic resonance imaging in patients with implanted cardiovascular devices].

Implantable pulse generators (pacemakers) and electrodes: safety in the magnetic resonance imaging scanner environment.

Health risk assessment of occupational exposure to a magnetic field from magnetic resonance imaging devices.

Calculation of radiofrequency electromagnetic fields and their effects in MRI of human subjects.

Biological effects of exposure to magnetic resonance imaging: an overview.

The safety of MRI. Considerations for site planning and clinical use.

Interference with cardiac pacemakers by magnetic resonance imaging: are there irreversible changes at 0.5 Tesla?

Evaluation of occupational exposure in magnetic resonance sites.

Safety of strong, static magnetic fields.

Guidelines and recommendations for MR imaging safety and patient management. III.  
Questionnaire for screening patients before MR procedures. The SMRI Safety Committee.

Safety concerns related to magnetic field exposure.

Occupational exposure of healthcare and research staff to static magnetic stray fields from 1.5-7 Tesla MRI scanners is associated with reporting of transient symptoms.

Magnetic resonance imaging safety: implications for cardiovascular patients.

Exposure classification of MRI workers in epidemiological studies.

MRI magnetic field stimulates rotational sensors of the brain.

[Exposure to static magnetic field and health hazards during the operation of magnetic resonance scanners].

The effects of 1.5T magnetic resonance imaging on early murine in-vitro embryo development.

Effect of electromagnetic field accompanying the magnetic resonance imaging on human heart rate variability - a pilot study.

A comprehensive analysis of MRI research risks: in support of full disclosure.

Exposure to time varying magnetic fields associated with magnetic resonance imaging reduces fentanyl-induced analgesia in mice.

MRI effects on craniofacial size and crown-rump length in C57BL/6J mice in 1.5T fields.

RF-EMF exposure of fetus and mother during magnetic resonance imaging.

Effects of static magnetic fields on cognition, vital signs, and sensory perception: a meta-analysis.

Pilot study investigating the effect of the static magnetic field from a 9.4-T MRI on the vestibular system.

Exposure to static and time-varying magnetic fields from working in the static magnetic stray fields of MRI scanners: a comprehensive survey in the Netherlands.

Safety considerations in MR imaging.

Human exposure to 4.0-Tesla magnetic fields in a whole-body scanner.

Vestibular stimulation by magnetic fields.

EMF exposure variation among MRI sequences from pediatric examination protocols.

Adaptive suppression of power line interference in ultra-low field magnetic resonance imaging in an unshielded environment.

Exposure, health complaints and cognitive performance among employees of an MRI scanners manufacturing department.

[ECG changes caused by the effect of static magnetic fields of nuclear magnetic resonance tomography using magnets with a field power of 0.5 to 4.0 Telsa].

Development of hypertension after long-term exposure to static magnetic fields among workers from a magnetic resonance imaging device manufacturing facility.

An improved quasi-static finite-difference scheme for induced field evaluation in MRI based on the biconjugate gradient method.

A trail of artificial vestibular stimulation: electricity, heat, and magnet.

Prediction of specific absorption rate in mother and fetus associated with MRI examinations during pregnancy.

Effect of 1.5 tesla nuclear magnetic resonance imaging scanner on implanted permanent pacemakers.

MRI safety: everyone's job.

MR procedures: biologic effects, safety, and patient care.

Operational safety issues in MRI.

Biologic effects and potential hazards of nuclear magnetic imaging.

Novel mechanistic model and computational approximation for electromagnetic safety evaluations of electrically short implants.

[Possible mutagenic effects of magnetic fields].

[Effect of a static magnetic field (3.5 T) on the reproductive behavior of mice, on the embryo and fetal development and on selected hematologic parameters].

[Bacterial mutation in high magnetic fields and radiofrequency radiation].

Neurophysiology: vertigo in MRI machines.

Complex magnetic field exposure system for in vitro experiments at intermediate frequencies.

Magnetic-field-induced vertigo: a theoretical and experimental investigation.



Effects of magnetic stray fields from a 7 tesla MRI scanner on neurocognition: a double-blind randomised crossover study.

Effect of a 0.5-T static magnetic field on conduction in guinea pig spinal cord.

Cognitive, cardiac, and physiological safety studies in ultra high field magnetic resonance imaging.

Magnetic resonance imaging of the chest. Where we stand.

Exposure to static magnetic fields and risk of accidents among a cohort of workers from a medical imaging device manufacturing facility.

MR safety: past, present, and future from a historical perspective.

Pacemaker reed switch behavior in 0.5, 1.5, and 3.0 Tesla magnetic resonance imaging units: are reed switches always closed in strong magnetic fields?

Offline impedance measurements for detection and mitigation of dangerous implant interactions: an RF safety prescreen.

[Do strong static magnetic fields in NMR tomography modify tissue perfusion?].

Aneurysm clips: evaluation of magnetic field interactions and translational attraction by use of "long-bore" and "short-bore" 3.0-T MR imaging systems.

Modeling of the internal fields distribution in human inner hearing system exposed to 900 and 1800 MHz.

Safety aspects of switched gradient fields.

Effect on germination and early growth characteristics in sunflower (*Helianthus annuus*) seeds exposed to static magnetic field.

INFLUENCE OF STATIC ELECTRICITY ON RADON MEASUREMENT USING PASSIVE DETECTORS.

--Leaf Cluster 32 (139)

Theme - Health risks of power-line electromagnetic fields on humans

Titles

An examination of underlying physical principles. The interaction of power-line electromagnetic fields with the human body.

The establishment of frequency dependent limits for electric and magnetic fields and evaluation of indirect effects.

Health risks of electric and magnetic fields caused by high-voltage systems in Finland.

Electric field induced in the human body by uniform 50 Hz electric or magnetic fields: bibliography analysis and method for conservatively deriving measurable limits.

#### LEVELS OF EXTREMELY LOW-FREQUENCY ELECTRIC AND MAGNETIC FIELDS FROM OVERHEAD POWER LINES IN THE OUTDOOR ENVIRONMENT OF RAMALLAH CITY-PALESTINE.

Exposure of workers in the electric power industry to electric and magnetic fields.

Comparison of cardiac-induced endogenous fields and power frequency induced exogenous fields in an anatomical model of the human body.

Influence of 50 Hz electric and magnetic fields on the human heart.

Physiologic and dosimetric considerations for limiting electric fields induced in the body by movement in a static magnetic field.

The influence of 50 Hz electric and magnetic fields on the extrasystoles of human heart.

Computational estimation of magnetically induced electric fields in a rotating head.

[Evaluation of reports on environmental measurements of electromagnetic fields generated by high voltage transmission lines and substations].

Intensity of electric and magnetic fields from power lines within the business district of 60 Ontario communities.

Current densities in a pregnant woman model induced by simultaneous ELF electric and magnetic field exposure.

Basic restrictions in EMF exposure guidelines.

Numerical dosimetry at power-line frequencies using anatomically based models.

Impedance method computation of induced currents in a simple model of a child exposed to electromagnetic fields of an electric blanket.

[Effects of electromagnetic field emitted by electric blankets on brain catecholamine in fetal mice].

[Practical aspects of taking measurements of electromagnetic fields in the surrounding of overhead transmission lines].

Electric and magnetic field exposures for people living near a 735-kilovolt power line.

Nerves in a human body exposed to low-frequency electromagnetic fields.

Current densities and total contact currents for 110 and 220 kV power line tasks.

Evaluation and measurement of magnetic field exposure at a typical high-voltage substation and its power lines.

Current densities measured in human models exposed to 60-Hz electric fields.

Assessment of exposure to intermediate frequency electric fields and contact currents from a plasma ball.

Fetal exposure to low frequency electric and magnetic fields.

Dealing with uncertainty in formulating occupational and public exposure limits.

Limiting electric fields of HVDC overhead power lines.

Electric field prediction for a human body-electric machine system.

Evaluation of long-term exposure to the magnetic field produced from power lines.

Exposure Modelling of Extremely Low-Frequency Magnetic Fields from Overhead Power Lines and Its Validation by Measurements.

Comparison of cardiac and 60 Hz magnetically induced electric fields measured in anesthetized rats.

Summary and evaluation of guidelines for occupational exposure to power frequency electric and magnetic fields.

Effects of high-intensity power-frequency electric fields on implanted modern multiprogrammable cardiac pacemakers.

Evaluation of current densities and total contact currents in occupational exposure at 400 kV substations and power lines.

A system for simultaneous exposure of small animals to 60-Hz electric and magnetic fields.

Comparison of electric field exposure measurement methods under power lines.

Quandaries in the application of the ICNIRP low frequency basic restriction on current density.

Human body exposure to power lines: relation of induced quantities to external magnetic fields.

Measurement and Modeling of Personal Exposure to the Electric and Magnetic Fields in the Vicinity of High Voltage Power Lines.

Effects of electric and magnetic fields from high-power lines on female urinary excretion of 6-sulfatoxymelatonin.

60-Hertz electric-field exposures in transmission line towers.

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Pacemaker interference by magnetic fields at power line frequencies.

Non-Hodgkin's lymphoma among electric utility workers in Ontario: the evaluation of alternate indices of exposure to 60 Hz electric and magnetic fields.

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Influence of human model resolution on computed currents induced in organs by 60-Hz magnetic fields.

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The interference threshold of cardiac pacemakers in electric 50 Hz fields.

Active medical implants and occupational safety--measurement and numerical calculation of interference voltage.

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Effects of a high-voltage direct-current transmission line on beef cattle production.

Acute effects of ELF electromagnetic fields: a field study of linesmen working with 400 kV power lines.

[Diseases in animals associated with exposure to electric and magnetic fields of 50/60 Hz: report of a case].

Powerline frequency electric and magnetic fields: a pilot study of risk perception.

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Implantable cardioverter defibrillators in electric and magnetic fields of 400 kV power lines.

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An In Situ and In Silico Evaluation of Biophysical Effects of 27 MHz Electromagnetic Whole Body Humans Exposure Expressed by the Limb Current.

Interference with the pacemakers of two workers at electricity substations.

Sensitivity to electricity in the catfish, *Parasilurus asotus*.

Electric and magnetic fields generated by ac power lines: an application of advanced modelling tools in order to predict exposure levels.

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Human perception of electric fields and ion currents associated with high-voltage DC transmission lines.

[An experimental study of the sciatic nerve injury by high voltage electricity in rabbits].

Magnetic induction at 60 Hz in the human heart: a comparison between the in situ and isolated scenarios.

Exposure guidelines for low-frequency electric and magnetic fields: report from the Brussels workshop.

Power lines and ionizing radiation.

COMPUTATIONAL ASSESSMENT OF PREGNANT WOMAN MODELS EXPOSED TO UNIFORM ELF-MAGNETIC FIELDS: COMPLIANCE WITH THE EUROPEAN CURRENT EXPOSURE REGULATIONS FOR THE GENERAL PUBLIC AND OCCUPATIONAL EXPOSURES AT 50 Hz.

[Exposure of workers to electric and magnetic fields from radiofrequency dielectric heaters to process polyvinyl chloride material].

Effects of 50 Hz electric currents on vigilance and concentration.

Can disturbances in the atmospheric electric field created by powerline corona ions disrupt melatonin production in the pineal gland?

Experimental and numeric investigation about electromagnetic interference between implantable cardiac pacemaker and magnetic fields at power line frequency.

SAR changes in a human head model for plane wave exposure (500 - 2500 MHz) and a comparison with IEEE 2005 safety limits.

The possible consequences for cognitive functions of external electric fields at power line frequency on hippocampal CA1 pyramidal neurons.

Interference of 16.7-Hz electromagnetic fields on measured electrocardiogram.

Biological effects of a 765-kV transmission line: exposures and thresholds in honeybee colonies.

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Electric fields in bone marrow substructures at power-line frequencies.

Analysis of the relationship between electromagnetic radiation characteristics and urban functions in highly populated urban areas.

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[Clinical analysis of brain injury in patients injured by high voltage electricity].

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A Shear-Mode Piezoelectric Heterostructure for Electric Current Sensing in Electric Power Grids.

Provocation of electric hypersensitivity under everyday conditions.

Chronic exposure of primates to 60-Hz electric and magnetic fields: I. Exposure system and measurements of general health and performance.

Low-voltage electricity-induced lung injury.

Biophysical cancer transformation pathway.

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[Injuries caused by electricity].

Compound injury from high-voltage electricity.

Exposure to static electric fields leads to changes in biogenic amine levels in the brains of *Drosophila*.

Effects of electric field reduction in visual display units on skin symptoms.

Do induction loops pose a hazard to health?

Effects of concurrent exposure to 60 Hz electric and magnetic fields on the social behavior of baboons.

Assessment of motor pathways by magnetic stimulation in human and veterinary medicine.

Cow sensitivity to electricity during milking.

Characteristics and potential human health hazards of charged aerosols generated by high-voltage power lines.

Elimination of power line interference from ECG signals using recurrent neural networks.

Neuroelectric mechanisms applied to low frequency electric and magnetic field exposure guidelines--part II: non sinusoidal waveforms.

Electromagnetic field strength levels surrounding electronic article surveillance (EAS) systems.

Suppression of power-line interference by analog notch filtering in the ECG signal for heart rate variability analysis: to do or not to do?

Return to arc welding following defibrillator implantation.

Fracture due to shock from domestic electricity supply.

Cascading failures in ac electricity grids.

Renal artery thrombosis due to high voltage electricity.

The potential of electricity transmission corridors in forested areas as bumblebee habitat.

--Leaf Cluster 34 (188)

Theme - Adverse effects of low-frequency electromagnetic fields on humans

Titles

An evaluation of the existing evidence on the carcinogenic potential of extremely low frequency magnetic fields.

Possible mechanisms by which extremely low frequency magnetic fields affect opioid function.

Effects of 60 Hz magnetic fields on teenagers and adults.

Do extremely low frequency magnetic fields enhance the effects of environmental carcinogens? A meta-analysis of experimental studies.

Biological interactions and potential health effects of extremely-low-frequency magnetic fields from power lines and other common sources.

Effects of extremely low-frequency magnetic field on growth and differentiation of human mesenchymal stem cells.

[Morphological characteristics and various theories on the mechanism of biological effect of magnetic fields].

Developmental effects of extremely low frequency electric and magnetic fields.



[Very low frequency electric and magnetic fields and the immune system].

Concern that "EMF" magnetic fields from power lines cause cancer.

Effects of low-frequency magnetic fields on embryonic development and pregnancy.

Perspectives on health effects of electric and magnetic fields.

Assessment of ELF magnetic fields produced by independent power lines.

Low-frequency magnetic fields and cancer. What you should know and what to tell your patients.

Extremely low frequency magnetic field (50 Hz, 0.5 mT) modifies fitness components and locomotor activity of *Drosophila subobscura*.

Extremely low frequency magnetic field effects on metabolite of *Aspergillus niger*.

Extremely-low frequency magnetic field effects on sulfate reducing bacteria viability.

Extremely low frequency (ELF) magnetic fields and apoptosis: a review.

Variability and consistency of electric and magnetic field occupational exposure measurements.

The genotoxic potential of electric and magnetic fields: an update.

Power frequency electromagnetic fields and health. Where's the evidence?

Interaction of static and extremely low frequency electric and magnetic fields with living systems: health effects and research needs.

[Biological influences of electromagnetic fields].

[Biological and health effects on electric and magnetic fields at extremely low frequencies].

[Biological effects of nonionizing radiation: low frequency electromagnetic fields].

Extremely low-frequency magnetic fields of transformers and possible biological and health effects.

EMF and health.

[Evaluation of the effects of electric and magnetic fields in humans].

Induction of kinetochore-positive and kinetochore-negative micronuclei in CHO cells by ELF magnetic fields and/or X-rays.

Epidemiological studies of work with video display terminals and adverse pregnancy outcomes (1984-1992).

Possible health hazards from exposure to power-frequency electric and magnetic fields--a COMAR Technical Information Statement.

Extremely low frequency (ELF) magnetic fields enhance chemically induced formation of apurinic/apyrimidinic (AP) sites in A172 cells.

Occupational exposure to intermediate frequency and extremely low frequency magnetic fields among personnel working near electronic article surveillance systems.

[The role of free radicals in mechanisms of biological function exposed to weak, constant and net magnetic fields].

Behavioural evidence that magnetic field effects in the land snail, *Cepaea nemoralis*, might not depend on magnetite or induced electric currents.

The effect of a 50 Hz magnetic field on cognitive function in humans.

Exposure assessment for electric and magnetic fields.

Assessment of occupational exposure to extremely low frequency magnetic fields in hospital personnel.

Origins of electromagnetic hypersensitivity to 60 Hz magnetic fields: A provocation study.

Exposure to magnetic fields of railway engine drivers: a case study in Italy.

Acute exposure to 50-Hz magnetic fields increases interleukin-6 in young healthy men.

A review of the literature on potential reproductive and developmental toxicity of electric and magnetic fields.

[Influence of low magnetic field on lipid peroxidation].

50-Hz magnetic field exposure system for small animals.

Typical exposure of children to EMF: exposimetry and dosimetry.

[Risks of electromagnetic fields for humans].

Low-frequency pulsed electromagnetic field exposure can alter neuroprocessing in humans.

A critical review of the genotoxic potential of electric and magnetic fields.

Occupational exposures of pharmacists and pharmaceutical assistants to 60 Hz magnetic fields.

Evaluation of in vitro effects of 50 and 60 Hz magnetic fields in regional EMF exposure facilities.

Exposure system to study hypotheses of ELF and RF electromagnetic field interactions of mobile phones with the central nervous system.

Exposure of welders and other metal workers to ELF magnetic fields.

Safety of the magnetic field generated by a neuronal magnetic stimulator: evaluation of possible mutagenic effects.

Exposure of high resolution fetuses in advanced pregnant woman models at different stages of pregnancy to uniform magnetic fields at the frequency of 50 Hz.

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Food and Drug Administration low-level extremely-low-frequency magnetic field exposure facility.

Analyses of magnetic-field peak-exposure summary measures.

Increased resorptions in CBA mice exposed to low-frequency magnetic fields: an attempt to replicate earlier observations.

Cancer promotion in a mouse-skin model by a 60-Hz magnetic field: I. Experimental design and exposure system.

Influence of weak static and 50 Hz magnetic fields on the redox activity of cytochrome-C oxidase.

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Effects of information and 50 Hz magnetic fields on cognitive performance and reported symptoms.

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The wonders of magnetism.

Human exposure to 60-Hz magnetic fields: neurophysiological effects.

Effects of extremely low-frequency magnetic field exposure on cognitive functions: results of a meta-analysis.

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Human electrophysiological and cognitive effects of exposure to ELF magnetic and ELF modulated RF and microwave fields: a review of recent studies.

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Cardiac autonomic control mechanisms in power-frequency magnetic fields: a multistudy analysis.

Magnetic fields of video display terminals and pregnancy outcome.

[Exposure to low electromagnetic fields and the carcinogenesis process].

[Sister chromatid exchange (SCE) and high-frequency cells in workers professionally exposed to extremely low-frequency magnetic fields (ELF)].

Bio-effects of high magnetic fields: a study using a simple animal model.

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Evaluation of residential exposure to intermediate frequency magnetic fields.

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The effect of 60-Hz magnetic fields on co-promotion of chemically induced skin tumors on SENCAR mice: a discussion of three studies.

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Individual subject sensitivity to extremely low frequency magnetic field.

Assessment of magnetic field exposures for a mortality study at a uranium enrichment plant.

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Biological effects of extremely low-frequency electromagnetic fields: in vivo studies.

Effects in rodents of a 1-month exposure to magnetic fields (200-1200 Gauss).

Symptoms of the musculoskeletal system and exposure to magnetic fields in an aluminium plant.

Children's exposure to magnetic fields produced by U.S. television sets used for viewing programs and playing video games.

Provocation study of persons with perceived electrical hypersensitivity and controls using magnetic field exposure and recording of electrophysiological characteristics.

Implantable cardioverter defibrillator and 50-Hz electric and magnetic fields exposure in the workplace.

A study of heart rate and heart rate variability in human subjects exposed to occupational levels of 50 Hz circularly polarised magnetic fields.

Measuring exposed magnetic fields of welders in working time.

Intermittent exposures to nanoTesla range, 7 Hz, amplitude-modulated magnetic fields increase regeneration rates in planarian.

Cancer from exposure to 50/60 Hz electric and magnetic fields--a major scientific debate.

Chronic or intractable medical problems associated with prolonged exposure to unsuspected harmful environmental electric, magnetic or electro-magnetic fields radiating in the bedroom or workplace and their exacerbation by intake of harmful light and heavy metals from common sources.

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Possible cocarcinogenic effects of ELF electromagnetic fields may require repeated long-term interaction with known carcinogenic factors.

Psychological effects of chronic exposure to 50 Hz magnetic fields in humans living near extra-high-voltage transmission lines.

Effects of short term exposure to 60 Hz electromagnetic fields on interleukin 1 and interleukin 6 production by peritoneal exudate cells.

Apoptosis in haemopoietic progenitor cells exposed to extremely low-frequency magnetic fields.

ELF magnetic fields in a city environment.

Assessing compliance with 60-hertz magnetic-field exposure guidelines.

[Epidemiological study of populations exposed to high levels of 50 Hz magnetic fields].

Temporally incoherent magnetic fields mitigate the response of biological systems to temporally coherent magnetic fields.

Evaluation of potential health effects of 10 kHz magnetic fields: a short-term mouse toxicology study.

Magnetic fields and radical reactions: recent developments and their role in nature.

Ambient 60-Hz magnetic flux density in an urban neighborhood.

Brief exposure to a 50 Hz, 100 microT magnetic field: effects on reaction time, accuracy, and recognition memory.

The influence of a temporary magnetic field on chicken hatching.

Characterization of Children's Exposure to Extremely Low Frequency Magnetic Fields by Stochastic Modeling.

Natural killer cell activity decreases in workers occupationally exposed to extremely low frequency magnetic fields exceeding 1 microT.

A quick and easy method for checking compliance of multi-frequency magnetic fields with ICNIRP's guidelines.

Measurement of low frequency magnetic fields from digital cellular telephones.

Magnetic fields of video display terminals and spontaneous abortion.

Epidemiologic studies of electric and magnetic fields and cancer: a case study of distortions by the media.

Non-ionizing electromagnetic radiation: a study of carcinogenic and cancer treatment potential.

Electromagnetic field exposure and cancer: a review of epidemiologic evidence.

[State of peripheral blood of technical personnel exposed to constant magnetic fields].

Magnetic field exposure and arrhythmic risk: evaluation in railway drivers.

Prevalence of self-reported hypersensitivity to electric or magnetic fields in a population-based questionnaire survey.

Involvement of eddy currents in the mutagenicity of ELF magnetic fields.

The effects of weak magnetic fields on radical pairs.

Urban exposure to ELF magnetic field due to high-, medium- and low-voltage electricity supply networks.

[The effect of low-frequency electromagnetic fields on the development of experimental mammary tumors].

ECG changes in humans exposed to 50 Hz magnetic fields.

On the role of the interactions of ions with external magnetic fields in physiologic processes and their importance in chronobiology.

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Some non neoplastic effects of ELF magnetic fields in experimental animals.

Alternate indices of electric and magnetic field exposures among Ontario electrical utility workers.

[The effect of electromagnetic fields on living organisms: plants, birds and animals].

Calcium homeostasis and low-frequency magnetic and electric field exposure: A systematic review and meta-analysis of in vitro studies.

Exposure to magnetic field harmonics in the vicinity of indoor distribution substations.

Comparison between personal exposure to 60 Hz magnetic fields and stationary home measurements for people living near and away from a 735 kV power line.

A 60 Hz electric and magnetic field exposure facility for nonhuman primates: design and operational data during experiments.

Reduction of laser-induced retinal injury applying the combination of the 3D variable electric and magnetic fields in "vivo".

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Speculations on the influence of electromagnetism on genomic and associated structures.

Methodology of a study on the French population exposure to 50 Hz magnetic fields.

Hypersensitivity of human subjects to environmental electric and magnetic field exposure: a review of the literature.

MYC mRNA abundance is unchanged in subcultures of HL60 cells exposed to power-line frequency magnetic fields.

Do naturally occurring magnetic nanoparticles in the human body mediate increased risk of childhood leukaemia with EMF exposure?

Free radical mechanism for the effects of environmental electromagnetic fields on biological systems.

Facility for chronic exposure of rats to ELF magnetic fields.

Dynamic characteristics of membrane ions in multfield configurations of low-frequency electromagnetic radiation.

Flight deck magnetic fields in commercial aircraft.

Cardiovascular alterations in Macaca monkeys exposed to stationary magnetic fields: experimental observations and theoretical analysis.

Personal power-frequency magnetic field exposure in women recruited at an infertility clinic: association with physical activity and temporal variability.

Evaluating exposure cutpoint bias in epidemiologic studies of electric and magnetic fields.

Specific patterns of weak (1 microTesla) transcerebral complex magnetic fields differentially affect depression, fatigue, and confusion in normal volunteers.

Effects of 50 Hz magnetic field exposure on human heart rate variability with passive tilting.

Comment on "designing EMF experiments: what is required to characterize 'exposure'?"

[Effect of high intensity magnetic field on the processes of early growth in plant seeds and development of honeybees].

Low-frequency electromagnetic radiation enhances the induction of rat mammary tumors by nitrosomethyl urea.

Possible disruption of remote viewing by complex weak magnetic fields around the stimulus site and the possibility of accessing real phase space: a pilot study.

60 Hertz magnetic field exposure assessment for an investigation of leukemia in telephone lineworkers.

The heliogeophysical aspects of circumpolar health.

The effects of continuous exposure to 20-kHz sawtooth magnetic fields on the litters of CD-1 mice.

[Magnetic field on the deranged accommodation of visual detector terminal operators].

Macro- and trace element concentrations in blood plasma and cerebrospinal fluid of dairy cows exposed to electric and magnetic fields.

Assessment of occupational exposure patterns by frequency-domain analysis of time series data.

Field enhancement of nonreciprocal electromagnetic wave supported by magnetic surface plasmon.

Residential magnetic field measurements in France: comparison of indoor and outdoor measurements.

Sleep EEG alterations: effects of pulsed magnetic fields versus pulse-modulated radio frequency electromagnetic fields.

Hypothesis on a casual link between EMF and an evolutionary class of cancer and spontaneous abortion.

Exposure to alternating electromagnetic fields and effects on the visual and visuomotor systems.

Statistical review of the henhouse experiments: the effects of a pulsed magnetic field on chick embryos.



A pilot study on the reproductive risks of maternal exposure to magnetic fields from electronic article surveillance systems.

How do honeybees use their magnetic compass? Can they see the North?

Temporal trends and misclassification in residential 60 Hz magnetic field measurements.

The precautionary principle and electric and magnetic fields.

[Assessment of exposure to extremely low frequency magnetic field emitted from monitors].

Anthropogenic electromagnetic noise disrupts magnetic compass orientation in a migratory bird.

A comparison of rheumatoid arthritis and fibromyalgia patients and healthy controls exposed to a pulsed (200 microT) magnetic field: effects on normal standing balance.

An Investigation on the Effect of Extremely Low Frequency Pulsed Electromagnetic Fields on Human Electrocardiograms (ECGs).

Patient reactions to some electromagnetic fields from dental chair and unit: a pilot study.

Occupational 50 Hz magnetic field exposure measurements among female sewing machine operators in Hungary.

Anatomical localization of human detection of weak electromagnetic radiation: experiments with dowsers.

Paroxysmal itching in multiple sclerosis during treatment with external magnetic fields.

Natural very-low-frequency sferics and headache.

Nanoscale Design of Nano-Sized Particles in Shape-Memory Polymer Nanocomposites Driven by Electricity.

Effect of the alternative magnetic stimulation on peripheral circulation for regenerative medicine.

Influence of 50-Hz electromagnetic field on anurian (*Xenopus laevis*) metamorphosis.

--Leaf Cluster 40 (116)

Theme - Adverse effects of low-frequency magnetic fields on rodents

Titles

Influence of 60-Hertz magnetic fields on leukemia.

Long-term exposure of male and female mice to 50 Hz magnetic field: effects on fertility.

Effects of extremely low-frequency electromagnetic fields (ELF-EMF) exposure on B6C3F1 mice.

Deficits in spatial learning after exposure of mice to a 50 Hz magnetic field.

Eight-week toxicity study of 60 Hz magnetic fields in F344 rats and B6C3F1 mice.

Dominant lethal studies in male mice after exposure to a 50-Hz electric field.

Long term effects of a 50 Hz electric field on the life-expectancy of mice.

Effect of a 9 mT pulsed magnetic field on C3H/Bi female mice with mammary carcinoma. A comparison between the 12 Hz and the 460 Hz frequencies.

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in F344/N rats.

Effects of power frequency alternating magnetic fields on reproduction and pre-natal development of mice.

Hematopoietic neoplasia in C57BL/6 mice exposed to split-dose ionizing radiation and circularly polarized 60 Hz magnetic fields.

A gross morphologic, histologic, hematologic, and blood chemistry study of adult and neonatal mice chronically exposed to high magnetic fields.

Behavioral effects of long-term exposure to magnetic fields in rats.

Behavioral studies with mice exposed to DC and 60-Hz magnetic fields.

Carcinogenicity test of 50 Hz sinusoidal magnetic fields in rats.

Dominant lethal studies in male mice after exposure to a 50 Hz magnetic field.

Toxic effects of 50 Hz electromagnetic field on memory consolidation in male and female mice.

Behavioral sensitivity of rats to extremely-low-frequency magnetic fields.

Rats are not aversive when exposed to 60-Hz magnetic fields at 3.03 mT.

Effects of low-frequency magnetic fields on fetal development in rats.

Effect of pulsed magnetic fields on leukemia-prone AKR mice. No-effect on mortality through five generations.

Teratogenic effect of broad-band electromagnetic field on neonatal mice (*Mus musculus*).

Effect of a magnetic field on ascorbate system in mice.

Spatial learning deficit in the rat after exposure to a 60 Hz magnetic field.

Biologic effects of prolonged exposure to ELF electromagnetic fields in rats: II. 50 Hz magnetic fields.

Neurodevelopmental anomalies of the hippocampus in rats exposed to weak intensity complex magnetic fields throughout gestation.

Assessment of biological changes of continuous whole body exposure to static magnetic field and extremely low frequency electromagnetic fields in mice.

[VDT pulse magnetic field enhances teratogenic effect of ara-c in mice].

Electric field exposure and evidence of stress in mice.

Subchronic in vivo effects of a high static magnetic field (9.4 T) in rats.

Exposure to a theta-burst patterned magnetic field impairs memory acquisition and consolidation for contextual but not discrete conditioned fear in rats.

Radial maze proficiency of adult Wistar rats given prenatal complex magnetic field treatments.

Lymphoma development of simultaneously combined exposure to two radiofrequency signals in AKR/J mice.

Teratogenic effects of static magnetic field on mouse fetuses.

Effect of electric field in conditioned aversion response.

Acute exposure to a 50 Hz magnetic field impairs consolidation of spatial memory in rats.

Effects of radiofrequency electromagnetic fields (UMTS) on reproduction and development of mice: a multi-generation study.

Combined effects of complex magnetic fields and agmatine for contextual fear learning deficits in rats.

Enhanced mortality of rat pups following inductions of epileptic seizures after perinatal exposures to 5 nT, 7 Hz magnetic fields.

DEXA analysis on the bones of rats exposed in utero and neonatally to static and 50 Hz electric fields.

Gender- and age-specific impairment of rat performance in the Morris water maze following prenatal exposure to an MRI magnetic field.

Repeated exposure attenuates the behavioral response of rats to static high magnetic fields.

Metallothionein content increased in the liver of mice exposed to magnetic fields.

[Alternating magnetic field damages the reproductive function of murine testes].

Initial exposure to 30 kV/m or 60 kV/m 60 Hz electric fields produces temporary cessation of operant behavior of nonhuman primates.

Extremely low-frequency magnetic fields can impair spermatogenesis recovery after reversible testicular damage induced by heat.

Teratological evaluation of mouse fetuses exposed to a 20 kHz EMF.

Fetal loss in mice exposed to magnetic fields during early pregnancy.

Effects of pulsed magnetic fields on the developing mouse embryo.

The effect of the prenatal and post-natal long-term exposure to 50 Hz electric field on growth, pubertal development and IGF-1 levels in female Wistar rats.

Carcinogenicity study of GSM and DCS wireless communication signals in B6C3F1 mice.

Lymphoma induced in mice chronically exposed to very strong low-frequency electromagnetic field.

Short-term memory in mice is affected by mobile phone radiation.

Nonhuman primates will not respond to turn off strong 60 Hz electric fields.

[Effects of 1800 MHz GSM-like exposure on the gonadal function and hematological parameters of male mice].

Detection thresholds for 60 Hz electric fields by nonhuman primates.

Effects of exposure to a 50 Hz electric field on plasma levels of lactate, glucose, free Fatty acids, triglycerides and creatine phosphokinase activity in hind-limb ischemic rats.

Transient and cumulative memory impairments induced by GSM 1.8 GHz cell phone signal in a mouse model.

The effect of very low dose pulsed magnetic waves on cochlea.

Lymphoma development in mice chronically exposed to UMTS-modulated radiofrequency electromagnetic fields.

Effects of combined ferrous sulphate administration and exposure to static magnetic field on spatial learning and motor abilities in rats.

Autism-relevant social abnormalities in mice exposed perinatally to extremely low frequency electromagnetic fields.

Urinary 6-sulphatoxymelatonin excretion is increased in rats after 24 hours of exposure to vertical 50 Hz, 100 microT magnetic field.

Developmental effects of perinatal exposure to extremely weak 7 Hz magnetic fields and nitric oxide modulation in the Wistar albino rat.

Developmental profiles of growth-associated protein (Gap43), Ngfb, Bdnf and Ntf4 mRNA levels in the rat forebrain after exposure to 60 Hz magnetic fields.

Prenatal exposures to LTP-patterned magnetic fields: quantitative effects on specific limbic structures and acquisition of contextually conditioned fear.

Effects of exposure to a 60-kV/m, 60-Hz electric field on the social behavior of baboons.

Effects of a 60 Hz magnetic field on central cholinergic systems of the rat.

Electromagnetic waves of 900 MHz in acute pentylenetetrazole model in ontogenesis in mice.

Reduced litter sizes following 48-h of prenatal exposure to 5 nT to 10 nT, 0.5 Hz magnetic fields: implications for sudden infant deaths.

Effects of Electromagnetic Radiation from Smartphones on Learning Ability and Hippocampal Progenitor Cell Proliferation in Mice.

Rats avoid exposure to HVdc electric fields: a dose response study.

Biological effects of long-duration, high-field (4 T) MRI on growth and development in the mouse.

Behavioral in-effectiveness of high frequency electromagnetic field in mice.

Does static electric field from ultra-high voltage direct-current transmission lines affect male reproductive capacity? Evidence from a laboratory study on male mice.

Carcinogenicity study of 217 Hz pulsed 900 MHz electromagnetic fields in Pim1 transgenic mice.

Five-tesla static magnetic fields suppress food and water consumption and weight gain in mice.

[The effect of alternating electric field of industrial frequency on testicles of white mice].

Theta-gamma coupling in hippocampus during working memory deficits induced by low frequency electromagnetic field exposure.

[An ultrastructural analysis of the testes in mice subjected to long-term exposure to a 17-kHz electrical field].

Evaluation of mouse embryos produced in vitro after electromagnetic waves exposure; Morphometric study.

Biological accounts emerging from some kinds of electromagnetic waves in the environment.

Effect of electromagnetic waves on sensitivity of fungi of the genus *Candida* to miconazole.

Effects of exposure to static magnetic field on motor skills and iron levels in plasma and brain of rats.

Morphometric and structural study of the pineal gland of the Wistar rat subjected to the pulse action of a 52 Gauss, (50 Hz) magnetic field. Evolutive analysis over 21 days.

Direct suppressive effects of weak magnetic fields (50 Hz and 16 2/3 Hz) on melatonin synthesis in the pineal gland of Djungarian hamsters (*Phodopus sungorus*).

Effect of a 20 kHz sawtooth magnetic field exposure on the estrous cycle in mice.

[Pathomorphological reactions of the cerebral cortex nerve elements during treatment with an alternating magnetic field].

[Effect of an electric field of industrial frequency on selected biochemical parameters in the guinea pig liver].

Alterations in the rat electrocardiogram induced by stationary magnetic fields.

Effect of ELF electric field on some on biochemistry characters in the rat serum.

Repeated application of an electric field increases BDNF in the brain, enhances spatial learning, and induces infarct tolerance.

Pulsed magnetic field from video display terminals enhances teratogenic effects of cytosine arabinoside in mice.

Fetal radiofrequency radiation exposure from 800-1900 mhz-rated cellular telephones affects neurodevelopment and behavior in mice.

Liver and spleen morphology, ceruloplasmin activity and iron content in serum of guinea pigs exposed to the magnetic field.

[Effects of pregnant exposure to electromagnetic field emitted by electric blankets on brain catecholamine and behavior in offspring mice].

Variable E-cadherin expression in a MNU-induced colon tumor model in rats which exposed with 50 Hz frequency sinusoidal magnetic field.

Low frequency electromagnetic radiation and hearing.

Pretraining exposure to physiologically patterned electromagnetic stimulation attenuates fear-conditioned analgesia.

Influence of combined DC and AC magnetic fields on rat behavior.

Radiofrequency fields and teratogenesis.

Chronic exposure of primates to 60-Hz electric and magnetic fields: II. Neurochemical effects.

[Biological effects of pulsing electromagnetic fields (PEMFs) on ICR mice].

Effects of Simulated Mobile Phone Electromagnetic Radiation on Fertilization and Embryo Development.

Effect of low frequency, low amplitude magnetic fields on the permeability of cationic liposomes entrapping carbonic anhydrase: I. Evidence for charged lipid involvement.

The influences of extremely low frequency magnetic fields on drug-induced convulsion in mouse.

Effects of pulsed magnetic field treatment of soybean seeds on calli growth, cell damage, and biochemical changes under salt stress.

What is the impact of electromagnetic waves on epileptic seizures?

Intensity threshold for 60-Hz magnetically induced behavioral changes in rats.

Neuritin reverses deficits in murine novel object associative recognition memory caused by exposure to extremely low-frequency (50 Hz) electromagnetic fields.

[Standardization of electromagnetic fields of 3-30 MHz with reference to the time factor].

[Biological effects of the action of permanent magnetic fields of various intensities].

The influence of low intensity 50 Hz electromagnetic field exposure on blood Na, K and Cl concentrations in humans.

Effects of exposure of animals to ultra-wideband pulses.

A controlled trial of daily left prefrontal cortex TMS for treating depression.

[The reaction of the systems of hormonal mediator regulation to a weak geomagnetic field against a background of ionizing radiation exposure].

--Leaf Cluster 2 (27)

Theme - Effects of electromagnetic fields on chicken embryos

Titles

Effects of sinusoidal electromagnetic fields on histopathology and structures of brains of preincubated white Leghorn chicken embryos.

Teratogenic effects of sinusoidal extremely low frequency electromagnetic fields on morphology of 24 hr chick embryos.

Effects of MR exposure at 1.5 T on early embryonic development of the chick.

Histopathological and ultrastructural studies on the effects of electromagnetic fields on the liver of preincubated white Leghorn chicken embryo.

Study of potential health effects of electromagnetic fields of telephony and Wi-Fi, using chicken embryo development as animal model.

Development of preincubated chicken eggs following exposure to 50 Hz electromagnetic fields with 1.33-7.32 mT flux densities.

Effect of electric power network frequency magnetic field on embryonic development of *Ascaris suum* (Nematoda).

Development of chicken embryos in a pulsed magnetic field.

Influence of continuous electromagnetic fields on the stage, weight and stature of the chick embryo.

Growth Retardation Of Chick Embryo Exposed To A Low Dose Of Electromagnetic Waves.

Effects of the ELF-MFs on the development of spleens of preincubated chicken embryos.

Effects of exposing chicken eggs to a cell phone in "call" position over the entire incubation period.

Effects of 50 Hz electromagnetic fields on the histology, apoptosis, and expression of c-Fos and beta-catenin on the livers of preincubated white Leghorn chicken embryos.

Chick embryo development can be irreversibly altered by early exposure to weak extremely-low-frequency magnetic fields.

Effects of static electromagnetic fields on chick embryo pineal gland development.

Survival Assessment of Mouse Preimplantation Embryos After Exposure to Cell Phone Radiation.

Effect of ambient levels of power-line-frequency electric fields on a developing vertebrate.

Lethal and teratogenic effects of long-term low-intensity radio frequency radiation at 428 MHz on developing chick embryo.

Biological effects of continuous exposure of embryos and young chickens to electromagnetic fields emitted by video display units.

Effects of electromagnetic fields on fecundity in the chicken.

[The influence of ultrasound and constant magnetic field on gametes, zygotes, and embryos of the sea urchin].

Developmental changes in *Drosophila melanogaster* following exposure to alternating electromagnetic fields.

Effect of exposure to radio frequency radiation emitted by cell phone on the developing dorsal root ganglion of chick embryo: a light microscopic study.

First cell cycles of sea urchin *Paracentrotus lividus* are dramatically impaired by exposure to extremely low-frequency electromagnetic field.

Assessment of the effects of electromagnetic field modification on egg-laying hens in commercial flocks as indicated by production measures.

Superimposing spatially coherent electromagnetic noise inhibits field-induced abnormalities in developing chick embryos.

Sex-linked recessive lethal test of *Drosophila melanogaster* after exposure to 50-Hz magnetic fields.

--Leaf Cluster 12 (38)

Theme - Impact of static and low-frequency magnetic fields on melatonin secretion

Titles

Geomagnetic activity and human melatonin metabolite excretion.



Melatonin suppression by static and extremely low frequency electromagnetic fields: relationship to the reported increased incidence of cancer.

Human melatonin during continuous magnetic field exposure.

The influence of long-term exposure of mice to randomly varied power frequency magnetic fields on their nocturnal melatonin secretion patterns.

Geomagnetic disturbances are associated with reduced nocturnal excretion of a melatonin metabolite in humans.

Melatonin metabolite levels in workers exposed to 60-Hz magnetic fields: work in substations and with 3-phase conductors.

Magnetic fields and pineal function in humans: evaluation of nocturnal acute exposure to extremely low frequency magnetic fields on serum melatonin and urinary 6-sulfatoxymelatonin circadian rhythms.

Nocturnal excretion of a urinary melatonin metabolite among electric utility workers.

Multi-night exposure to 60 Hz magnetic fields: effects on melatonin and its enzymatic metabolite.

Chronic exposure to 2.9 mT, 40 Hz magnetic field reduces melatonin concentrations in humans.

Is melatonin the hormonal missing link between magnetic field effects and human diseases?

Chronic exposure to ELF magnetic fields during night sleep with electric sheet: effects on diurnal melatonin rhythms in men.

Reduced excretion of a melatonin metabolite in workers exposed to 60 Hz magnetic fields.

Melatonin and magnetic fields.

Examination of the melatonin hypothesis in women exposed at night to EMF or bright light.

Effects of 60-Hz magnetic field exposure on nocturnal 6-sulfatoxymelatonin, estrogens, luteinizing hormone, and follicle-stimulating hormone in healthy reproductive-age women: results of a crossover trial.

Increases in geomagnetic activity are associated with increases in thyroxine levels in a single patient: implications for melatonin levels.

Rapid-onset/offset, variably scheduled 60 Hz electric and magnetic field exposure reduces nocturnal serum melatonin concentration in nonhuman primates.

Nocturnal 6-hydroxymelatonin sulfate excretion in female workers exposed to magnetic fields.

Acute exposure to 50 Hz magnetic fields with harmonics and transient components: lack of effects on nighttime hormonal secretion in men.

Age-dependent association of exposure to television screen with children's urinary melatonin excretion?

Effects of electric and magnetic fields on nocturnal melatonin concentrations in dairy cows.

Relationship between amyloid beta protein and melatonin metabolite in a study of electric utility workers.

Non-linear relation of heart rate variability during exercise recovery with local geomagnetic activity.

Graded response of heart rate variability, associated with an alteration of geomagnetic activity in a subarctic area.

Evaluation of the nocturnal levels of urinary biogenic amines in men exposed overnight to 50-Hz magnetic field.

Nocturnal exposure to intermittent 60 Hz magnetic fields alters human cardiac rhythm.

[Biological effects produced by the influence of low frequency electromagnetic fields on hormone secretion].

Circasemiannual chronomics: half-yearly biospheric changes in their own right and as a circannual waveform.

Endocrine functions in young men exposed for one night to a 50-Hz magnetic field. A circadian study of pituitary, thyroid and adrenocortical hormones.

Effects of exposure to 16.7 Hz magnetic fields on urinary 6-hydroxymelatonin sulfate excretion of Swiss railway workers.

Chronic exposure to ELF fields may induce depression.

[Dependence of acoustic-motor reaction of healthy individuals from geomagnetic activity].

Is motivation influenced by geomagnetic activity?

Is geomagnetic activity a risk factor for sudden unexplained death in epilepsies?

[Exacerbation of hypertension and disturbances of the geomagnetic field].

Magnetic storm effect on the circulation of rabbits.

Exercise testing in the evaluation of human responses to powerline frequency fields.

Fourth Level Cluster 85 (540)

Theme - Adverse impacts of low-frequency EMF, emphasizing cancer and neurodegenerative diseases

--Leaf Cluster 4 (97)

Theme - Exposure to power lines and risk of childhood cancer

Titles

Distance from residence to power line and risk of childhood leukemia: a population-based case-control study in Denmark.

Living near overhead high voltage transmission power lines as a risk factor for childhood acute lymphoblastic leukemia: a case-control study.

Residential exposure to electric power transmission lines and risk of lymphoproliferative and myeloproliferative disorders: a case-control study.

Epidemiological study of power lines and childhood cancer in the UK: further analyses.

Exposure to Electromagnetic Fields of High Voltage Overhead Power Lines and Female Infertility.

Acute childhood leukemias and exposure to magnetic fields generated by high voltage overhead power lines - a risk factor in Iran.

Childhood cancer in relation to distance from high voltage power lines in England and Wales: a case-control study.

Residential mobility of populations near UK power lines and implications for childhood leukaemia.

Electromagnetic fields and cancer in children residing near Norwegian high-voltage power lines.

Magnetic fields and cancer in children residing near Swedish high-voltage power lines.

Exposure of children to residential magnetic fields in Norway: is proximity to power lines an adequate predictor of exposure?

Residential exposure to magnetic fields generated by 110-400 kV power lines in Finland.

Childhood cancer and magnetic fields from high-voltage power lines in England and Wales: a case-control study.

Estimating magnetic fields of homes near transmission lines in the California Power Line Study.

Proximity to overhead power lines and childhood leukaemia: an international pooled analysis.

Childhood leukaemia and distance from power lines in California: a population-based case-control study.

Childhood leukemia risk in the California Power Line Study: Magnetic fields versus distance from power lines.

Residential distance to high-voltage power lines and risk of neurodegenerative diseases: a Danish population-based case-control study.

Residential proximity to high-voltage power lines and risk of childhood hematological malignancies.

Magnetic fields and leukemia--risk for adults living close to power lines.

Overhead electricity power lines and childhood leukemia: a registry-based, case-control study.

Preterm birth among women living within 600 meters of high voltage overhead Power Lines: a case-control study.

Are children living near high-voltage power lines at increased risk of acute lymphoblastic leukemia?

Health responses to a new high-voltage power line route: design of a quasi-experimental prospective field study in the Netherlands.

Reanalysis of risks of childhood leukaemia with distance from overhead power lines in the UK.

Adult cancers near high-voltage overhead power lines.

Methods used to estimate residential exposure to 50 Hz magnetic fields from overhead power lines in an epidemiological study in France.

Magnetic fields of high voltage power lines and risk of cancer in Finnish adults: nationwide cohort study.

Risks of leukaemia among residents close to high voltage transmission electric lines.

Childhood leukaemia close to high-voltage power lines--the Geocap study, 2002-2007.

Risk of cancer in Finnish children living close to power lines.

Exposure to magnetic fields and childhood acute lymphocytic leukemia in Sao Paulo, Brazil.

"These Power Lines Make Me Ill": A Typology of Residents' Health Responses to a New High-Voltage Power Line.

Increased risk of childhood acute lymphoblastic leukemia (ALL) by prenatal and postnatal exposure to high voltage power lines: a case control study in Isfahan, Iran.

[Childhood leukaemia in a residential area with a high-voltage power line: approach according to the Dutch Community Health Services' guideline 'Cancer Clusters'].

Magnetic fields and childhood cancer: an epidemiological investigation of the effects of high-voltage underground cables.

Epidemiologic study of residential proximity to transmission lines and childhood cancer in California: description of design, epidemiologic methods and study population.

Residence near power lines and the risk of birth defects.

Leukaemia and residence near electricity transmission equipment: a case-control study.

Adult mortality from leukemia, brain cancer, amyotrophic lateral sclerosis and magnetic fields from power lines: a case-control study in Brazil.

Residential and occupational exposure to 50 Hz magnetic fields and malignant melanoma: a population based study.

Distance to high-voltage power lines and risk of childhood leukemia--an analysis of confounding by and interaction with other potential risk factors.

Residential and occupational exposure to 50 Hz magnetic fields and hematological cancers in Norway.

Childhood cancer and residential proximity to power lines. UK Childhood Cancer Study Investigators.

[Environmental exposure to electromagnetic fields and the risk of cancer].

Residential magnetic fields, contact voltage and their relationship: the effects of distribution unbalance and residential proximity to a transmission line.

Magnetic fields, leukemia, and central nervous system tumors in Swedish adults residing near high-voltage power lines.

Residential distance from high-voltage overhead power lines and risk of Alzheimer's dementia and Parkinson's disease: a population-based case-control study in a metropolitan area of Northern Italy.

Maternal exposure to magnetic fields from high-voltage power lines and the risk of birth defects.

Magnetic fields exposure from high-voltage power lines and risk of amyotrophic lateral sclerosis in two Italian populations.

Residence near power lines and mortality from neurodegenerative diseases: longitudinal study of the Swiss population.

Symptom reporting after the introduction of a new high-voltage power line: a prospective field study.

Risk of hematological malignancies associated with magnetic fields exposure from power lines: a case-control study in two municipalities of northern Italy.

Nocebo responses to high-voltage power lines: Evidence from a prospective field study.

Role of Electromagnetic Field Exposure in Childhood Acute Lymphoblastic Leukemia and No Impact of Urinary Alpha- Amylase--a Case Control Study in Tehran, Iran.

Residence near high voltage facilities and risk of cancer in children.

[Residence close to high-tension electric power lines and its association with leukemia in children].

Relation between suicide and the electromagnetic field of overhead power lines.

Methods used to calculate exposures in two epidemiological studies of power lines in the UK.

Risk of selected birth defects by maternal residence close to power lines during pregnancy.

The effects of electric power lines on the breeding ecology of greater sage-grouse.

Birth defects and high voltage power lines: an exploratory study based on registry data.

[Electromagnetic fields from high-voltage installations and cancer in childhood].

Understanding Local Policy Elites' Perceptions on the Benefits and Risks Associated with High-Voltage Power Line Installations in the State of Arkansas.

Maternal residential proximity to sources of extremely low frequency electromagnetic fields and adverse birth outcomes in a UK cohort.

Experimental validation of a statistical model for evaluating the past or future magnetic field exposures of a population living near power lines.

Residential exposure to overhead high-voltage lines and the risk of testicular cancer: results of a population-based case-control study in Hamburg (Germany).

Childhood cancer and exposure to corona ions from power lines: an epidemiological test.

[Epidemiological studies on neurotic disturbances, anxiety and depression disorders in a population living near an overhead high voltage transmission line (400 kV)].

Magnetic fields of transmission lines and depression.

Power lines and the geomagnetic field.

The relationship between residential proximity to extremely low frequency power transmission lines and adverse birth outcomes.

Effect of Power Line Interference on Microphone Calibration Measurements Made at or Near Harmonics of the Power Line Frequency.

Maternal proximity to extremely low frequency electromagnetic fields and risk of birth defects.

Morbidity experience in populations residentially exposed to 50 hz magnetic fields: methodology and preliminary findings of a cohort study.

Case-control study on maternal residential proximity to high voltage power lines and congenital anomalies in France.

Case-only study of interactions between DNA repair genes (hMLH1, APEX1, MGMT, XRCC1 and XPD) and low-frequency electromagnetic fields in childhood acute leukemia.

Environmental justice: a contrary finding for the case of high-voltage electric power transmission lines.

Comparison of Two Methods for Judging Distances Near Overhead Power Lines.

Relative contribution of residential and occupational magnetic field exposure over twenty-four hours among people living close to and far from a power line.

Depressive symptomatology in women and residential proximity to high-voltage transmission lines.

Childhood cancer occurrence in relation to power line configurations: a study of potential selection bias in case-control studies.

Power lines, roads, and avian nest survival: effects on predator identity and predation intensity.

Symptom prevalence and worry about high voltage transmission lines.

Re-examining the association between residential exposure to magnetic fields from power lines and childhood asthma in the Danish National Birth Cohort.

Comparison of three different ways of measuring distances between residences and high voltage power lines.

Association between high voltage overhead transmission lines and mental health: a cross-sectional study.

Residential proximity to electromagnetic field sources and birth weight: Minimizing residual confounding using multiple imputation and propensity score matching.

[Health effects of electromagnetic fields].

Association between exposure to electromagnetic fields from high voltage transmission lines and neurobehavioral function in children.

Theory of oncogene activation by chemicals and antioncogene inactivation by radiations - possible carcinogenic effect of power-lines.

Radiofrequency field exposure and cancer: what do the laboratory studies suggest?

Cancer cluster among young Indian adults living near power transmission lines in Bom Jesus do Tocantins, Para, Brazil.

The Origin and Role of Trust in Local Policy Elites' Perceptions of High-Voltage Power Line Installations in the State of Arkansas.

A note on the charging of aerosols by overhead line corona.

[Heliogeophysical correlates of early biodemographic variables in the south of western Siberia].

Experimental evidence of a potentially increased thrombo-embolic disease risk by domestic electromagnetic field exposure.

--Leaf Cluster 15 (131)

Theme - Residential magnetic fields and childhood leukemia

Titles

A pooled analysis of magnetic fields, wire codes, and childhood leukemia. Childhood Leukemia-EMF Study Group.

Residential magnetic fields predicted from wiring configurations: II. Relationships To childhood leukemia.

Childhood leukemia and personal monitoring of residential exposures to electric and magnetic fields in Ontario, Canada.

Residential exposure to magnetic fields and acute lymphoblastic leukemia in children.

A case-control study of childhood leukemia in southern Ontario, Canada, and exposure to magnetic fields in residences.

Do studies of wire code and childhood leukemia point towards or away from magnetic fields as the causal agent?

Case-control study of childhood cancer and exposure to 60-Hz magnetic fields.

Power-frequency electric and magnetic fields and risk of childhood leukemia in Canada.

Exposure to residential electric and magnetic fields and risk of childhood leukemia.

Magnetic field exposure assessment in a case-control study of childhood leukemia.

Assessment of selection bias in the Canadian case-control study of residential magnetic field exposure and childhood leukemia.

Childhood leukemia and electromagnetic fields: results of a population-based case-control study in Germany.

[Infantile leukemia and exposure to 50/60 Hz magnetic fields: review of epidemiologic evidence in 2000].

Factors that explain the power line configuration wiring code-childhood leukemia association: what would they look like?

Electric and magnetic fields at power frequencies.

Residential magnetic field exposure and childhood brain cancer: a meta-analysis.

Childhood cancer in relation to a modified residential wire code.

Occupational and residential magnetic field exposure and leukemia and central nervous system tumors.

A pooled analysis of magnetic fields and childhood leukaemia.



Electrical power lines and childhood leukemia: a study from Greece.

Childhood leukemia, electric and magnetic fields, and temporal trends.

Residential mobility and childhood leukemia.

Residential wire codes: reproducibility and relation with measured magnetic fields.

Childhood leukemia: electric and magnetic fields as possible risk factors.

Childhood leukemia and magnetic fields in Japan: a case-control study of childhood leukemia and residential power-frequency magnetic fields in Japan.

Hypothesis: the risk of childhood leukemia is related to combinations of power-frequency and static magnetic fields.

Selection bias from differential residential mobility as an explanation for associations of wire codes with childhood cancer.

Do confounding or selection factors of residential wiring codes and magnetic fields distort findings of electromagnetic fields studies?

Residential magnetic fields and childhood leukemia: a meta-analysis.

Residential magnetic fields as a risk factor for childhood acute leukaemia: results from a German population-based case-control study.

The residential case-specular method to study wire codes, magnetic fields, and disease.

Wire codes, magnetic fields, and childhood cancer.

Residential EMF exposure and childhood leukemia: meta-analysis and population attributable risk.

The potential impact of bias in studies of residential exposure to magnetic fields and childhood leukemia.

Magnetic fields and childhood cancer--a pooled analysis of two Scandinavian studies.

Do magnetic fields cause increased risk of childhood leukemia via melatonin disruption?

[Electromagnetic residential fields and childhood cancers: state of epidemiological research].

[Synthesis of the epidemiological evidence concerning childhood leukemia in relation to exposure to 50 Hz. electric and magnetic fields].

Childhood leukemia and magnetic fields in infant incubators.

Electromagnetic fields and cancer risks.

[Risk of childhood leukemia and environmental exposure to ELF electromagnetic fields].

Magnetic fields and acute leukemia in children with Down syndrome.

Residential exposure to electromagnetic fields and childhood leukaemia: a meta-analysis.

Combined risk estimates for two German population-based case-control studies on residential magnetic fields and childhood acute leukemia.

Magnetic fields and acute lymphoblastic leukemia in children: a systematic review of case-control studies.

Adult and childhood leukemia near a high-power radio station in Rome, Italy.

Residential proximity to electricity transmission and distribution equipment and risk of childhood leukemia, childhood lymphoma, and childhood nervous system tumors: systematic review, evaluation, and meta-analysis.

Variation in cancer risk estimates for exposure to powerline frequency electromagnetic fields: a meta-analysis comparing EMF measurement methods.

Maternal occupational exposure to extremely low frequency magnetic fields during pregnancy and childhood leukemia.

Residential magnetic fields predicted from wiring configurations: I. Exposure model.

Estimating exposure in studies of residential magnetic fields and cancer: importance of short-term variability, time interval between diagnosis and measurement, and distance to power line.

Childhood leukemia in relation to radio frequency electromagnetic fields in the vicinity of TV and radio broadcast transmitters.

Pooled analysis of recent studies on magnetic fields and childhood leukaemia.

Occupational electric and magnetic field exposure and leukemia. A meta-analysis.

Description of a new computer wire coding method and its application to evaluate potential control selection bias in the Savitz et al. childhood cancer study.

Aetiology of childhood leukemia.

Maternal occupational exposure to electromagnetic fields before, during, and after pregnancy in relation to risks of childhood cancers: findings from the Oxford Survey of Childhood Cancers, 1953-1981 deaths.

Exposure to power-frequency magnetic fields and the risk of childhood cancer. UK Childhood Cancer Study Investigators.

Exposure to magnetic fields and survival after diagnosis of childhood leukemia: a German cohort study.

A case-control pilot study of traffic exposures and early childhood leukemia using a geographic information system.

Influence of power frequency electric and magnetic fields on human health.

Rate of occurrence of transient magnetic field events in U.S. residences.

Epidemiologic studies of electric and magnetic fields and cancer: strategies for extending knowledge.

Suggestion of concomitant changes of electric power consumption and childhood leukemia in Greece.

Association between childhood acute lymphoblastic leukemia and use of electrical appliances during pregnancy and childhood.

Nighttime exposure to electromagnetic fields and childhood leukemia: an extended pooled analysis.

The possible role of contact current in cancer risk associated with residential magnetic fields.

Leukemia in electric utility workers: the evaluation of alternative indices of exposure to 60 Hz electric and magnetic fields.

Exposure to radio-frequency electromagnetic fields from broadcast transmitters and risk of childhood cancer: a census-based cohort study.

Leukemia and lymphoma incidence in rodents exposed to low-frequency magnetic fields.

Do power frequency magnetic fields cause leukemia in children?

Viral contacts confound studies of childhood leukemia and high-voltage transmission lines.

Residential exposure to magnetic fields and risk of canine lymphoma.

[Occupational and residential exposure to electric and magnetic field and its relationship on acute myeloid leukemia in adults - A Meta-analysis].

Acute nonlymphocytic leukemia and residential exposure to power frequency magnetic fields.

Modification of the 1979 "Denver wire code" for different wire or plumbing types.

Risk of childhood leukemia in areas passed by high power lines.

Risk factors for leukemia in Thailand.

Determinants of power-frequency magnetic fields in residences located away from overhead power lines.

Risk of leukemia in children living near high-voltage transmission lines.

Los Angeles study of residential magnetic fields and childhood brain tumors.

Residential electric consumption and childhood cancer in Canada (1971-1986)

Selection bias and its implications for case-control studies: a case study of magnetic field exposure and childhood leukaemia.

Extremely low-frequency magnetic fields and childhood acute lymphoblastic leukemia: an exploratory analysis of alternative exposure metrics.

Childhood brain tumors and residential electromagnetic fields (EMF).

Power-frequency magnetic fields and childhood brain tumors: a case-control study in Japan.

Electromagnetic field exposures and childhood leukaemia in New Zealand.

Childhood cancer in relation to indicators of magnetic fields from ground current sources.

[A review of epidemiological studies on the relationship of residential electromagnetic exposure to cancer].

Investigation of the sources of residential power frequency magnetic field exposure in the UK Childhood Cancer Study.

Electric and magnetic fields and health outcomes--an overview.

Estimation of population attributable fractions from fitted incidence ratios and exposure survey data, with an application to electromagnetic fields and childhood leukemia.

The determinants of Canadian children's personal exposures to magnetic fields.

Correlation of year-to-year magnetic field exposure metrics among children in a leukemia survival study.

Contact voltage measured in residences: implications to the association between magnetic fields and childhood leukemia.

Exposure to power frequency electric fields and the risk of childhood cancer in the UK.

Investigation of increased incidence in childhood leukemia near radio towers in Hawaii: preliminary observations.

Adult glioma in relation to residential power frequency electromagnetic field exposures in the San Francisco Bay area.

A precautionary public health protection strategy for the possible risk of childhood leukaemia from exposure to power frequency magnetic fields.

[Leukemia mortality and incidence of infantile leukemia near the Vatican Radio Station of Rome].

A pooled analysis of extremely low-frequency magnetic fields and childhood brain tumors.

Health effects of magnetic fields generated from power lines: new clues for an old puzzle.

Association of childhood cancer with residential traffic density.

Designs and analyses for exploring the relationship of magnetic fields to childhood leukaemia: a pilot project for the Danish National Birth Cohort.

A Bayesian approach to hazard identification. The case of electromagnetic fields and cancer.

[Risk of neoplastic diseases in conditions of exposure to power magnetic fields--epidemiologic investigations].

Potential motion related bias in the worn dosimeter measurements of two childhood leukemia studies.

Early pregnancy loss and exposure to 50-Hz magnetic fields.

Extra low frequency electric and magnetic fields in the bedplace of children diagnosed with leukaemia: a case-control study.

Environmental factors and childhood acute leukemias and lymphomas.

Are the stray 60-Hz electromagnetic fields associated with the distribution and use of electric power a significant cause of cancer?

An alternate hypothesis for the association between electrical wiring configurations and cancer.

Magnetic field exposure and long-term survival among children with leukaemia.

Decreased survival for childhood leukemia in proximity to television towers.

Exposure to electromagnetic fields and risk of leukemia.

An evaluation of exposure metrics in an epidemiologic study on radio and television broadcast transmitters and the risk of childhood leukemia.

[Meta-analysis and its application in epidemiology].

Does our electricity distribution system pose a serious risk to public health?

Magnetic fields and leukaemia risks in UK electricity supply workers.

Childhood incidence of acute lymphoblastic leukaemia and exposure to broadcast radiation in Sydney--a second look.

50-Hz electromagnetic environment and the incidence of childhood tumors in Stockholm County.

Assessment of non-response bias in a survey of residential magnetic field exposure in Taiwan.

The relative merits of contemporary measurements and historical calculated fields in the Swedish childhood cancer study.

A population-based case-control study of radiofrequency exposure in relation to childhood neoplasm.

A unified approach to the analysis of case-distribution (case-only) studies.

A richer conceptualization of "exposure" for epidemiological studies of the "EMF mixture".

High incidence of acute leukemia in the proximity of some industrial facilities in El Bierzo, northwestern Spain.

Exposure measurement errors, risk estimate and statistical power in case-control studies using dichotomous analysis of a continuous exposure variable.

Deaths from electricity.

RF personal exposimetry on employees of elementary schools, kindergartens and day nurseries as a proxy for child exposures.

Attributable fractions: bias from broad definition of exposure.

--Leaf Cluster 13 (113)

Theme - Electromagnetic fields and cancer, especially breast cancer

Titles

Breast cancer and electromagnetic fields--a review.

Follow-up of radio and telegraph operators with exposure to electromagnetic fields and risk of breast cancer.

Electric power, pineal function, and the risk of breast cancer.

Electric blanket use and breast cancer in the Nurses' Health Study.

Electric blanket or mattress cover use and breast cancer incidence in women 50-79 years of age.

Electric blanket use and breast cancer risk among younger women.

Electric blanket use and breast cancer on Long Island.

Risk of premenopausal breast cancer and use of electric blankets.

Occupational exposure to electromagnetic field and breast cancer risk in a large, population-based, case-control study in the United States.

The relationship between electromagnetic field and light exposures to melatonin and breast cancer risk: a review of the relevant literature.

Residential and occupational exposures to 50-Hz magnetic fields and breast cancer in women: a population-based study.

Use of electric blankets and risk of postmenopausal breast cancer.

Electromagnetic fields and male breast cancer.

Environmental factors and breast cancer.

Electromagnetic fields and female breast cancer.

Environmental risk factors and female breast cancer.

Occupational and residential magnetic field exposure and breast cancer in females.

Role of melatonin on electromagnetic radiation-induced oxidative stress and Ca<sup>2+</sup> signaling molecular pathways in breast cancer.

Occupational exposures to extremely low frequency magnetic fields and postmenopausal breast cancer.

Population-based case-control study of occupational exposure to electromagnetic fields and breast cancer.

Exposure to electromagnetic fields from use of electric blankets and other in-home electrical appliances and breast cancer risk.

Residential magnetic field exposure and breast cancer risk: a nested case-control study from a multiethnic cohort in Los Angeles County, California.

Evaluation of potential confounders in planning a study of occupational magnetic field exposure and female breast cancer.

Risk for leukaemia and brain and breast cancer among Danish utility workers: a second follow-up.

Breast cancer and electric power.

Residential exposure to 60-Hertz magnetic fields and adult cancers in Taiwan.

Occupational exposure to magnetic fields in relation to male breast cancer and testicular cancer: a Swedish case-control study.

The melatonin hypothesis: electric power and breast cancer.

Incidence of breast cancer in a Norwegian cohort of women with potential workplace exposure to 50 Hz magnetic fields.

Magnetic fields and breast cancer in Swedish adults residing near high-voltage power lines.

Electromagnetic fields and breast cancer on Long Island: a case-control study.

Occupational magnetic fields and female breast cancer: a case-control study using Swedish population registers and new exposure data.

A meta-analysis of epidemiologic studies of electric and magnetic fields and breast cancer in women and men.

Residential magnetic fields and the risk of breast cancer.

A cluster of male breast cancer in office workers.

Induction of tamoxifen resistance in breast cancer cells by ELF electromagnetic fields.

Electromagnetic field exposure and male breast cancer risk: a meta-analysis of 18 studies.

Relationship between exposure to extremely low-frequency electromagnetic fields and breast cancer risk: a meta-analysis.

Shift work, light at night, and breast cancer on Long Island, New York.

Extremely low-frequency electromagnetic fields exposure and female breast cancer risk: a meta-analysis based on 24,338 cases and 60,628 controls.

Use of electric bedding devices and risk of breast cancer in African-American women.

Epidemiological appraisal of studies of residential exposure to power frequency magnetic fields and adult cancers.

Magnetic fields and mammary cancer in rodents: a critical review and evaluation of published literature.

Breast cancer, occupation, and exposure to electromagnetic fields among Swedish men.

[Risk of cancer among Danish electricity workers. A cohort study].

Meta-analysis of extremely low frequency electromagnetic fields and cancer risk: a pooled analysis of epidemiologic studies.

Occupational magnetic field exposure and site-specific cancer incidence: a Swedish cohort study.

Risk of cancer among Danish utility workers--a nationwide cohort study.

Occupational exposures associated with male breast cancer.

Incidence of cancer in persons with occupational exposure to electromagnetic fields in Denmark.

Cancer incidence in California flight attendants (United States).

Overview of epidemiologic research on electric and magnetic fields and cancer.

Exposure to extremely low frequency magnetic fields among working women and homemakers.

Endometrial cancer incidence in relation to electric blanket use.

[Carcinogenic risk of extremely-low-frequency electromagnetic fields: state of the art].

Increased incidence of cancer in a cohort of office workers exposed to strong magnetic fields.

Socioeconomic status, social mobility and cancer occurrence during working life: a case-control study among French electricity and gas workers.

Extremely low frequency electromagnetic fields (EMF) and brain cancer in adults and children: review and comment.

Incidence of cancer in the vicinity of Korean AM radio transmitters.

Cancer incidence and magnetic field exposure in industries using resistance welding in Sweden.

Use of electric blankets and risk of testicular cancer.



Use of electric blankets and association with prevalence of endometrial cancer.

Personal radio use and cancer risks among 48,518 British police officers and staff from the Airwave Health Monitoring Study.

[Use of cellular telephones and risk of cancer. A Danish cohort study].

Cancer incidence near radio and television transmitters in Great Britain. I. Sutton Coldfield transmitter.

Cancer incidence among Norwegian airline pilots.

Radio-frequency radiation exposure from AM radio transmitters and childhood leukemia and brain cancer.

Biologically based epidemiological studies of electric power and cancer.

Cancer incidence vs. FM radio transmitter density.

A new electromagnetic exposure metric: high frequency voltage transients associated with increased cancer incidence in teachers in a California school.

Primary brain cancer in adults and the use of common household appliances: a case-control study.

Extremely low frequency electromagnetic fields and cancer: the epidemiologic evidence.

Cancer incidence near radio and television transmitters in Great Britain. II. All high power transmitters.

Epidemiological studies of radio frequency exposures and human cancer.

Cancer mortality and residence near electricity transmission equipment: a retrospective cohort study.

Effects of 50- or 60-hertz, 100 microT magnetic field exposure in the DMBA mammary cancer model in Sprague-Dawley rats: possible explanations for different results from two laboratories.

Brain tumor risk in children in relation to use of electric blankets and water bed heaters. Results from the United States West Coast Childhood Brain Tumor Study.

Electromagnetic fields: a cancer promoter?

Prostate cancer in relation to the use of electric blanket or heated water bed.

Cancer in radar technicians exposed to radiofrequency/microwave radiation: sentinel episodes.

Brain cancer risk and electromagnetic fields (EMFs): assessing the geomagnetic component.

Incidence of Seminoma Cancer in Staffs that Worked in Electromagnetic Waves Station; Three Cases Report.

Incidence of cancer in Norwegian workers potentially exposed to electromagnetic fields.

Human cancer from environmental pollutants: the epidemiological evidence.

Electric blanket use during pregnancy in relation to the risk of congenital urinary tract anomalies among women with a history of subfertility.

Magnetic field exposure related to cancer subtypes.

Increasing incidence of thyroid cancer in the Nordic countries with main focus on Swedish data.

[Electromagnetic fields: is there any probability of the risk of cancer?].

Electric Blanket Use and Risk of Thyroid Cancer in the Women's Health Initiative Observational Cohort.

Epidemiology and aetiological factors of male breast cancer: a ten years retrospective study in eastern Turkey.

Radio frequency radiation-related cancer: assessing causation in the occupational/military setting.

Spontaneous abortion and exposure to electric blankets and heated water beds.

[Environment and cancer risk].

[Geomagnetic field variation in early ontogenesis as a risk factor for oncopathology].

Cancer in the electric power industry.

The use of electric bed heaters and the risk of clinically recognized spontaneous abortion.

The role of household electromagnetic fields in the development of mammary tumors in women: clinical case-record observations.

[Evaluation of genotoxic and/or co-genotoxic effects in cells exposed in vitro to extremely-low frequency electromagnetic fields].

Trends in incidence of primary brain cancer in New Zealand, 1995 to 2010.

Myelogenous leukemia and electric blanket use.

Panel exploring pro and con arguments as to whether EMFs cause childhood brain cancer.

[Recent data from the literature on the biological and pathologic effects of electromagnetic radiation, radio waves and stray currents].

Chronic toxicity/oncogenicity evaluation of 60 Hz (power frequency) magnetic fields in B6C3F1 mice.

Biological effects of power-frequency fields as they relate to carcinogenesis.

[Age diseases depending on geomagnetic field activity inside the womb period].

[Enhancement of efficacy of neoadjuvant polychemotherapy in combined treatment of lung cancer].

Cancer versus FM radio polarization types.

Genetic damage in humans exposed to extremely low-frequency electromagnetic fields.

[Male breast tumors in railway engine drivers: investigation of 5 cases].

Exposure to electromagnetic fields during pregnancy with emphasis on electrically heated beds: association with birthweight and intrauterine growth retardation.

Melanoma incidence and frequency modulation (FM) broadcasting.

Malignant melanoma of the skin - not a sunshine story!

Multimodal treatment of hepatocellular carcinoma.

--Leaf Cluster 18 (62)

Theme - Mortality studies of electrical utility workers, focusing on electromagnetic field exposures

Titles

Magnetic field exposure in relation to leukemia and brain cancer mortality among electric utility workers.

A mortality study of electrical utility workers in Quebec.

Cohort and nested case-control studies of hematopoietic cancers and brain cancer among electric utility workers.

[Cancer mortality among electricity utility workers in a the state of Sao Paulo, Brazil].

Radiofrequency exposure and mortality from cancer of the brain and lymphatic/hematopoietic systems.

Magnetic field exposure and neurodegenerative disease mortality among electric utility workers.

Exposure to electromagnetic fields and suicide among electric utility workers: a nested case-control study.

[Preliminary study of cause-specific mortality of a population exposed to 50 Hz magnetic fields, in a district of Rome municipality].

Exposure to electromagnetic fields and suicide among electric utility workers: a nested case-control study.

Mortality from brain cancer and leukaemia among electrical workers.

Mortality in workers exposed to electromagnetic fields.

Comparative analyses of the studies of magnetic fields and cancer in electric utility workers: studies from France, Canada, and the United States.

Leukemia following occupational exposure to 60-Hz electric and magnetic fields among Ontario electric utility workers.

Mortality from amyotrophic lateral sclerosis, other chronic disorders, and electric shocks among utility workers.

Electromagnetic fields and health effects--epidemiologic studies of cancer, diseases of the central nervous system and arrhythmia-related heart disease.

Mortality of workers exposed to ionizing radiation at the French National Electricity Company.

Association between exposure to pulsed electromagnetic fields and cancer in electric utility workers in Quebec, Canada, and France.

[Mortality of personnel operating electric power objects with 500 kV voltage].

Electromagnetic fields, polychlorinated biphenyls, and prostate cancer mortality in electric utility workers.

Mortality of plastic-ware workers exposed to radiofrequencies.

Mortality among workers in the geothermal power plants at Larderello, Italy.

A population-based cohort study of occupational exposure to magnetic fields and cardiovascular disease mortality.

Exposure to 50-Hz electric field and incidence of leukemia, brain tumors, and other cancers among French electric utility workers.

Cancer in Korean war navy technicians: mortality survey after 40 years.

[Occupational exposure to electromagnetic fields and its health effects in electric energy workers].

Leukemia, brain tumors, and exposure to extremely low frequency electromagnetic fields in Swiss railway employees.

Electric and magnetic field exposure and brain cancer: a review.

[Remote effects of occupational and non-occupational exposure to electromagnetic fields of power-line frequency. Epidemiological studies].

Occupational exposures and brain cancer mortality: a preliminary study of east Texas residents.

[Mortality of people residing near electric power supply line with voltage of 500 kV].

Cancer incidence and mortality and proximity to TV towers.

Cardiovascular mortality and exposure to extremely low frequency magnetic fields: a cohort study of Swiss railway workers.

Mortality of persons resident in the vicinity of electricity transmission facilities.

A case cohort study of suicide in relation to exposure to electric and magnetic fields among electrical utility workers.

Mortality from neurodegenerative disease and exposure to extremely low-frequency magnetic fields: 31 years of observations on Swiss railway employees.

Refinements in magnetic field exposure assignment for a case-cohort study of electrical utility workers.

Leukaemia, brain tumours and exposure to extremely low frequency magnetic fields: cohort study of Swiss railway employees.

Magnetic field exposure and cardiovascular disease mortality among electric utility workers.

[Mortality indices for hemoblastoses in Rivno Province before and after the accident at the Chernobyl Atomic Electric Power Station].

Incidence of cancer among workers in Norwegian hydroelectric power companies.

Fatal occupational injuries among electric power company workers.

Exposure to electromagnetic fields and the risk of leukemia.

Biological effects on human health due to radiofrequency/microwave exposure: a synopsis of cohort studies.

Increased mortality in amateur radio operators due to lymphatic and hematopoietic malignancies.

Risk of severe cardiac arrhythmia in male utility workers: a nationwide danish cohort study.

Occupational magnetic field exposure, cardiovascular disease mortality, and potential confounding by smoking.

Invited commentary: electromagnetic fields and cancer in railway workers.

Multiple sclerosis among utility workers.

Annals of conflicting results: looking back on electromagnetic field research.

Ecological study on residences in the vicinity of AM radio broadcasting towers and cancer death: preliminary observations in Korea.

Feasibility of a cohort study on health risks caused by occupational exposure to radiofrequency electromagnetic fields.

[An epidemiological study of cancer morbidity and mortality among the population living in areas close to thermal and atomic electric power stations].

Practical limitations of epidemiologic methods.

Causes of death among Belgian professional military radar operators: a 37-year retrospective cohort study.

Effects upon health of occupational exposure to microwave radiation (radar).

Leukemia in telephone linemen.

Cancer incidence among welders: possible effects of exposure to extremely low frequency electromagnetic radiation (ELF) and to welding fumes.

Uncertainty in the relation between exposure to magnetic fields and brain cancer due to assessment and assignment of exposure and analytical methods in dose-response modeling.

Accidental deaths caused by electricity in Sweden, 1975-2000.

Cancer morbidity in subjects occupationally exposed to high frequency (radiofrequency and microwave) electromagnetic radiation.

Pregnancy outcomes after paternal radiofrequency field exposure aboard fast patrol boats.

Home and leisure injuries among the French electricity and gas company active employees: circumstances and short-term consequences.

--Leaf Cluster 27 (137)

Theme - Occupational exposure to electromagnetic fields, emphasizing neurodegenerative disease and cancer

Titles

Occupational exposures and the risk of amyotrophic lateral sclerosis.

Dementia and occupational exposure to magnetic fields.

Occupational exposure to magnetic fields in case-referent studies of neurodegenerative diseases.

Amyotrophic lateral sclerosis and occupational exposure to electromagnetic fields.

Occupational Exposures and Neurodegenerative Diseases-A Systematic Literature Review and Meta-Analyses.

Occupational magnetic field exposure and neurodegenerative disease.

Association between extremely low-frequency electromagnetic fields occupations and amyotrophic lateral sclerosis: a meta-analysis.

Paternal occupational exposure to electro-magnetic fields as a risk factor for cancer in children and young adults: a case-control study from the North of England.

Occupational exposure and amyotrophic lateral sclerosis in a prospective cohort.

Neurodegenerative diseases in welders and other workers exposed to high levels of magnetic fields.

Parental occupational exposure to magnetic fields and childhood cancer (Sweden).

Association between occupational exposure to power frequency electromagnetic fields and amyotrophic lateral sclerosis: a review.

Magnetic field exposure and neurodegenerative diseases--recent epidemiological studies.

Occupational and residential exposure to electromagnetic fields and risk of brain tumors in adults: a case-control study in Gironde, France.

Electrical occupations and neurodegenerative disease: analysis of U.S. mortality data.

Occupational exposure to magnetic fields and brain tumours in central Sweden.

Occupational exposure to extremely low frequency electric and magnetic fields and Alzheimer disease: a meta-analysis.

Amyotrophic Lateral Sclerosis and Occupational Exposures: A Systematic Literature Review and Meta-Analyses.

Case-Control Study on Occupational Exposure to Extremely Low-Frequency Electromagnetic Fields and the Association with Meningioma.

Occupational exposure to extremely low frequency magnetic fields and risk of Alzheimer disease: A systematic review and meta-analysis.

Occupational exposure to electromagnetic fields and Alzheimer disease.

Risk of childhood acute lymphoblastic leukaemia following parental occupational exposure to extremely low frequency electromagnetic fields.

Brain cancer and occupational exposure to magnetic fields among men: results from a Canadian population-based case-control study.

Occupational exposure to high-frequency electromagnetic fields and brain tumor risk in the INTEROCC study: An individualized assessment approach.

Occupational exposure to power frequency magnetic fields and risk of non-Hodgkin lymphoma.

Parental occupational exposure to extremely low frequency magnetic fields and childhood cancer: a German case-control study.

[News in occupational cancers].

Exposure to magnetic fields among electrical workers in relation to leukemia risk in Los Angeles County.

Occupational exposure to magnetic fields and the risk of brain tumors.

Occupational electric and magnetic field exposure and brain cancer: a meta-analysis.

Risk factors for Alzheimer disease: a population-based case-control study in Istanbul, Turkey.

Acute leukemia in electrical workers: a New Zealand case-control study.

Brain tumor risk in offspring of men occupationally exposed to electric and magnetic fields.

Work related etiology of amyotrophic lateral sclerosis (ALS): a meta-analysis.

Occupational exposure to low frequency magnetic fields and the risk of low grade and high grade glioma.

Occupational magnetic field exposure among women in Stockholm County, Sweden.

Occupational risk factors for cancer of the central nervous system: a case-control study on death certificates from 24 U.S. states.

Are occupational, hobby, or lifestyle exposures associated with Philadelphia chromosome positive chronic myeloid leukaemia?

Berkson error adjustment and other exposure surrogates in occupational case-control studies, with application to the Canadian INTEROCC study.

Paternal occupational exposure to radiofrequency electromagnetic fields and risk of adverse pregnancy outcome.

Electromagnetic field exposures and childhood cancers in New Zealand.

Occupational exposure to electromagnetic fields and acute leukaemia: analysis of a case-control study.

Maternal occupational exposure to extremely low frequency magnetic fields and the risk of brain cancer in the offspring.

Elevated risk of Alzheimer's disease among workers with likely electromagnetic field exposure.

[Epidemiological risk assessment of pathology development in occupational exposure to radiofrequency electromagnetic fields].

Review of the epidemiologic literature on EMF and Health.

Occupational risk factors in Alzheimer's disease: a review assessing the quality of published epidemiological studies.

Exposure to extremely low frequency electromagnetic fields and the risk of malignant diseases--an evaluation of epidemiological and experimental findings.

Interactions between occupational exposure to extremely low frequency magnetic fields and chemicals for brain tumour risk in the INTEROCC study.

The effect of male occupational exposure in infertile couples in Norway.



[Amyotrophic lateral sclerosis and exposure to metals and other occupational/environmental hazardous materials: state of the art].

Occupational exposure to radio frequency/microwave radiation and the risk of brain tumors: Interphone Study Group, Germany.

Relationships between occupational history and serum concentrations of organochlorine compounds in exocrine pancreatic cancer.

Risk agents related to work and amyotrophic lateral sclerosis: An occupational medicine focus.

[A case-control study on the risk factors of Alzheimer's disease in military elderly men].

Occupational exposures obtained by questionnaire in clinical practice and their association with semen quality.

Leukemia and occupational exposure to electromagnetic fields: review of epidemiologic surveys.

Occupational exposure to ionizing and non-ionizing radiation and risk of non-Hodgkin lymphoma.

Case-control study on occupational exposure to extremely low-frequency electromagnetic fields and glioma risk.

Risk of birth defects by parental occupational exposure to 50 Hz electromagnetic fields: a population based study.

Environmental risk factors for non-Hodgkin's lymphoma: a population-based case-control study in Languedoc-Roussillon, France.

Exposure to electromagnetic fields and risk of central nervous system disease in utility workers.

[Exposure to electromagnetic fields and risk of central nervous system diseases among employees at Danish electric companies].

Neurodegenerative diseases, suicide and depressive symptoms in relation to EMF.

Occupations with exposure to electromagnetic fields: a possible risk factor for Alzheimer's disease.

Occupational risk factors for lung cancer in the French electricity and gas industry: a case-control survey nested in a cohort of active employees.

Parental occupational exposures to electromagnetic fields and radiation and the incidence of neuroblastoma in offspring.

Occupational exposure to ionizing radiation and electromagnetic fields in relation to the risk of thyroid cancer in Sweden.

[Parental occupational exposures and autism spectrum disorder in children].

Acute leukaemia in workers exposed to electromagnetic fields.

Parental heat exposure and risk of childhood brain tumor: a Children's Oncology Group study.

Occupational magnetic field exposure and the risk of acoustic neuroma.

Leukemia risk and occupational electric field exposure in Los Angeles County, California.

Neurodegenerative disease and magnetic field exposure in UK electricity supply workers.

Occupational exposure to low frequency magnetic fields and dementia: a case-control study.

Occupation and malignant lymphoma: a population based case control study in Germany.

A nested case-control study of residential and personal magnetic field measures and miscarriages.

Need for a European approach to the effects of extremely low-frequency electromagnetic fields on cancer. ELF-EMF European Feasibility Study Group.

Incidence of leukaemia and brain tumours in some "electrical occupations".

A population-based prospective cohort study of personal exposure to magnetic fields during pregnancy and the risk of miscarriage.

Risk of cognitive impairment in relation to elevated exposure to electromagnetic fields.

Occupational factors of anxiety and depressive disorders in the French National Electricity and Gas Company. The Anxiety-Depression Group.

Occupational electromagnetic field exposures associated with sleep quality: a cross-sectional study.

Testicular cancer and electromagnetic fields (EMF) in the workplace: results of a population-based case-control study in Germany.

Occupational exposure to electromagnetic fields and the occurrence of brain tumors. An analysis of possible associations.

Occupational magnetic field exposure and myocardial infarction incidence.

Magnetic fields and brain tumour risks in UK electricity supply workers.

[The potential hazard for the development of leukemia from exposure to electromagnetic radiation (a review of the literature)].

Neuroblastoma and paternal occupation. A case-control analysis.

Self-reported electrical appliance use and risk of adult brain tumors.

Non-specific physical symptoms and electromagnetic field exposure in the general population: can we get more specific? A systematic review.

Occupational risk factors for acute leukaemia: a case-control study.

Occupational hazards for the male reproductive system.

Amyotrophic lateral sclerosis and environmental factors.

Environmental risk factors for brain tumors.

Occupational exposure to electromagnetic fields and sex-differential risk of uveal melanoma.

Maternal cumulative exposure to extremely low frequency electromagnetic fields and pregnancy outcomes in the Elfe cohort.

[Non dietetic environmental risk factors in prostate cancer].

[Environmental risk factors and epidemiologic study].

[Paternal exposure to occupational electromagnetic radiation and sex ratio of the offspring: a meta-analysis].

[Occupational risk and its prophylaxis for female workers engaged in radio-electronic instrument industry].

Interactive effect of chemical substances and occupational electromagnetic field exposure on the risk of gliomas and meningiomas in Swedish men.

[Delayed biological effect of electromagnetic fields action].

Prevalence of musculoskeletal disorders and related occupational causative factors among electricity linemen: A narrative review.

Paternal work in the power industry: effects on children at delivery.

Miscarriages among female physical therapists who report using radio- and microwave-frequency electromagnetic radiation.

Radiation exposure, socioeconomic status, and brain tumor risk in the US Air Force: a nested case-control study.

Risk factors, health risks, and risk management for aircraft personnel and frequent flyers.

Video display terminal use during pregnancy and reproductive outcome--a meta-analysis.

[Difficulties of expert testimony in microwave disease].

Radiofrequency electromagnetic fields; male infertility and sex ratio of offspring.

Exposure to magnetic fields and the risk of poor sperm quality.

Myeloid leukemias and myelodysplastic syndromes: chemical exposure, histologic subtype and cytogenetics in a case-control study.

[Evaluation of occupational risk caused by exposure to electromagnetic rays].

An apparently incongruous exposure-response relationship resulting from the use of job description to assess magnetic field exposure.

Carcinogenicity test in B6C3F1 mice after parental and prenatal exposure to 50 Hz magnetic fields.

Congenital malformations and exposure to high-frequency electromagnetic radiation among Danish physiotherapists.

[The IARC carcinogenicity evaluation of radio-frequency electromagnetic field: with special reference to epidemiology of mobile phone use and brain tumor risk].

Limitations of interview-based risk assessment of RF exposure from appliances.

Case-control study on uveal melanoma (RIFA): rationale and design.

Gender-specific reproductive outcome and exposure to high-frequency electromagnetic radiation among physiotherapists.

Search for teratogenic risks with the aid of malformation registries.

[Effect of early pregnancy electromagnetic field exposure on embryo growth ceasing].

Development and evaluation of a tool for retrospective exposure assessment of selected endocrine disrupting chemicals and EMF in the car manufacturing industry.

Environmental risk factors in the history of male patients of an infertility clinic.

Environmental exposure assessment in European birth cohorts: results from the ENRIECO project.

Maternal exposure to magnetic fields during pregnancy in relation to the risk of asthma in offspring.

Life styles, anxiety, expertise: the perception of risk from electromagnetic fields.

Epidemiologic evidence relevant to radar (microwave) effects.

Exposure to electromagnetic fields during pregnancy.

A literature review of medical side effects from radio-frequency energy in the human environment: involving cancer, tumors, and problems of the central nervous system.

Does exposure to computers affect the routine parameters of semen quality?

Gender ratio of offspring and exposure to shortwave radiation among female physiotherapists.

Clinical teratology.

Electricity and bones.

[A historic case of Wegener's granulomatosis: the physicist who discovered the electromagnetic waves: Heinrich Hertz].

A possible association between fetal/neonatal exposure to radiofrequency electromagnetic radiation and the increased incidence of autism spectrum disorders (ASD).

Fourth Level Cluster 83 (668)

Theme - Adverse effects of mobile phone use, especially brain tumors, and brain and neural function

--Leaf Cluster 30 (321)

Theme - Adverse health symptoms from mobile phone use

Titles

The risk of subjective symptoms in mobile phone users in Poland--an epidemiological study.

Problematic Use of Mobile Phones in Australia...Is It Getting Worse?

Use of mobile phones and cancer risk.

Health hazards of mobile phones: an Indian perspective.

Nomophobia: A Cross-sectional Study to Assess Mobile Phone Usage Among Dental Students.

Evidence-based policy? The use of mobile phones in hospital.

A survey study of the association between mobile phone use and daytime sleepiness in California high school students.

Electroencephalographic, personality, and executive function measures associated with frequent mobile phone use.

[Radiation from mobile phone and the health].

Is human saliva an indicator of the adverse health effects of using mobile phones?

Use of mobile phones by medical staff at Queen Elizabeth Hospital, Barbados: evidence for both benefit and harm.

Mobile phone induced sensorineural hearing loss.

[Mobile phones radiate--risk to the health?].

An international prospective cohort study of mobile phone users and health (COSMOS): Factors affecting validity of self-reported mobile phone use.

Mobile phone use and location of glioma: a case-case analysis.

Exposure to mobile phone electromagnetic fields and subjective symptoms: a double-blind study.

Adverse effects of excessive mobile phone use.

Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen (2A) (review).

Are mobile phones harmful?

[Subjective symptoms related to mobile phone use--a pilot study].

Mobile phone radiation and the risk of cancer; a review.

Review on health effects related to mobile phones. Part II: results and conclusions.

Effects of thirty minutes mobile phone use on the human sensory cortex.

Significance of micronuclei in buccal smears of mobile phone users: A comparative study.

[Psychophysiological indicators for children using mobile phones. Communication 1. Current state of the problem].

Audiologic disturbances in long-term mobile phone users.

Does chronic exposure to mobile phones affect cognition?

Mobile phones: influence on auditory and vestibular systems.

Cellular phones: are they detrimental?

Analysis of mobile phone use among young patients with brain tumors in Japan.

Association of mobile phone radiation with fatigue, headache, dizziness, tension and sleep disturbance in Saudi population.

Association between vestibular schwannomas and mobile phone use.

Acute effects of 3G mobile phone radiations on frontal haemodynamics during a cognitive task in teenagers and possible protective value of Om chanting.

Ethical considerations of mobile phone use by patients in KwaZulu-Natal: Obstacles for mHealth?

The use of cell phone and insight into its potential human health impacts.

Mobile phones, in combination with a computer locator system, improve the response times of emergency medical services in central London.

Mobile phone use, school electromagnetic field levels and related symptoms: a cross-sectional survey among 2150 high school students in Izmir.

Mobile phone related-hazards and subjective hearing and vision symptoms in the Saudi population.

Thermal effects of mobile phones on human auricle region.

Mobile phones and health: a literature overview.

Radiation from mobile phone systems: Is it perceived as a threat to people's health?

Child and Adolescent Use of Mobile Phones: An Unparalleled Complex Developmental Phenomenon.

Micronucleus frequency in buccal mucosa cells of mobile phone users.

Exposure of magnetic bacteria to simulated mobile phone-type RF radiation has no impact on mortality.

The assessment of electromagnetic field radiation exposure for mobile phone users.

Mobile phones: Reservoirs for the transmission of nosocomial pathogens.

Headache, tinnitus and hearing loss in the international Cohort Study of Mobile Phone Use and Health (COSMOS) in Sweden and Finland.

Analysis of ear side of mobile phone use in the general population of Japan.

Questionnaire-based evaluation of mobile phone interference with medical-electrical equipment in Swedish hospitals.

Mobile Phone-Use Habits Among Adolescents: Predictors of Intensive Use.

[Effect of stress and intensity of mobile phone use on the health and subjective symptoms in GSM workers].

Epidemiological risk assessment of mobile phones and cancer: where can we improve?

Impact of one's own mobile phone in stand-by mode on personal radiofrequency electromagnetic field exposure.

Mobile phones, radiofrequency fields, and health effects in children--epidemiological studies.

Self-reported mobile phone use and semen parameters among men from a fertility clinic.

Recall of mobile phone usage and laterality in young people: The multinational Mobi-Expo study.

Psychological factors associated with self-reported sensitivity to mobile phones.

Real versus Simulated Mobile Phone Exposures in Experimental Studies.

Time trends (1998-2007) in brain cancer incidence rates in relation to mobile phone use in England.

Neurological changes induced by a mobile phone.

Survey of mobile phone use and their chronic effects on the hearing of a student population.

Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults--a prospective cohort study.

[SAR values of mobile phones. Safety evaluation and risk perception].

Assessment of extremely low frequency magnetic field exposure from GSM mobile phones.

EEG Changes Due to Experimentally Induced 3G Mobile Phone Radiation.

Effects of thirty-minute mobile phone exposure on saccades.

Cell phone radiation exposure on brain and associated biological systems.

Effects of chronic exposure of electromagnetic fields from mobile phones on hearing in rats.

Do mobile 'phones have a detrimental impact on auditory function?

[Hearing level and intensive use of mobile phones].

Preliminary report: symptoms associated with mobile phone use.

Validation of exposure assessment and assessment of recruitment methods for a prospective cohort study of mobile phone users (COSMOS) in Finland: a pilot study.

Studying the effects of mobile phone use on the auditory system and the central nervous system: a review of the literature and future directions.

Mobile-phone pulse triggers evoked potentials.

Association between General Health and Mobile Phone Dependency among Medical University Students: A Cross-sectional Study in Iran.

Mobile phones and children: is precaution warranted?

[Determining health policy for sensible mobile phone use--current world status].

Comparison of cytotoxic and genotoxic effects of plutonium-239 alpha particles and mobile phone GSM 900 radiation in the Allium cepa test.

Mobile phones: time to rethink and limit usage.

Bedtime mobile phone use and sleep in adults.

Mobile phones and seizures: drug-resistant epilepsy is less common in mobile-phone-using patients.

Estimation of head tissue-specific exposure from mobile phones based on measurements in the homogeneous SAM head.

Mobile phones, heat shock proteins and cancer.

Can evidence change belief? Reported mobile phone sensitivity following individual feedback of an inability to discriminate active from sham signals.

Distribution of RF energy emitted by mobile phones in anatomical structures of the brain.



Association between mobile phone use and depressed mood in Japanese adolescents: a cross-sectional study.

Effects of thirty-minute mobile phone use on visuo-motor reaction time.

The controversy about a possible relationship between mobile phone use and cancer.

Association between Excessive Use of Mobile Phone and Insomnia and Depression among Japanese Adolescents.

Electromagnetic interference of GSM mobile phones with the implantable deep brain stimulator, ITREL-III.

Association between overuse of mobile phones on quality of sleep and general health among occupational health and safety students.

Effect of mobile phones on micronucleus frequency in human exfoliated oral mucosal cells.

A study on the effect of prolonged mobile phone use on pure tone audiometry thresholds of medical students of Sikkim.

Factors that influence the radiofrequency power output of GSM mobile phones.

Analysis of mobile phone design features affecting radiofrequency power absorbed in a human head phantom.

Does the Brain Detect 3G Mobile Phone Radiation Peaks? An Explorative In-Depth Analysis of an Experimental Study.

Effects of mobile phone use on brain tissue from the rat and a possible protective role of vitamin C - a preliminary study.

Effects of a 902 MHz mobile phone on cerebral blood flow in humans: a PET study.

Analysis of the influence of handset phone position on RF exposure of brain tissue.

Are thyroid dysfunctions related to stress or microwave exposure (900 MHz)?

Exposure to mobile phone electromagnetic field radiation, ringtone and vibration affects anxiety-like behaviour and oxidative stress biomarkers in albino wistar rats.

Clear policies on mobile phones vital.

Personal exposure to mobile phone frequencies and well-being in adults: a cross-sectional study based on dosimetry.

Self-report of physical symptoms associated with using mobile phones and other electrical devices.

Mobile phones as mediators of health behavior change in cardiovascular disease in developing countries.

Experimental and numerical assessment of low-frequency current distributions from UMTS and GSM mobile phones.

Are men talking their reproductive health away?

The effect of mobile phone to audiologic system.

The effects of 884 MHz GSM wireless communication signals on headache and other symptoms: an experimental provocation study.

Associations between problematic mobile phone use and psychological parameters in young adults.

Effects on auditory function of chronic exposure to electromagnetic fields from mobile phones.

Mobile phones are good for you, p0.36! Observations on Keetley, Wood, Spong and Stough (2006).

Cordless telephone use: implications for mobile phone research.

Mobile phone exposure and spatial memory.

Prevalence of subjective poor health symptoms associated with exposure to electromagnetic fields among university students.

Mobile phone headache: a double blind, sham-controlled provocation study.

Human short-term exposure to electromagnetic fields emitted by mobile phones decreases computer-assisted visual reaction time.

Evaluation of the effects of mobile phones on the neural tube development of chick embryos.

Mobile telephone use is associated with changes in cognitive function in young adolescents.

Mobile phone use, blood lead levels, and attention deficit hyperactivity symptoms in children: a longitudinal study.

Is mobile phone radiation genotoxic? An analysis of micronucleus frequency in exfoliated buccal cells.

Mobile Phone, Computer, and Internet Use Among Older Homeless Adults: Results from the HOPE HOME Cohort Study.

Mobile phones carry the personal microbiome of their owners.

Mobile phones and sex work in South India: the emerging role of mobile phones in condom use by female sex workers in two Indian states.

Spatial memory performance of Wistar rats exposed to mobile phone.

The effect of the duration of exposure to the electromagnetic field emitted by mobile phones on human attention.

Interference of GSM mobile phones with communication between Cardiac Rhythm Management devices and programmers: A combined in vivo and in vitro study.

Guidance for exposure design of human studies addressing health risk evaluations of mobile phones.

Exposure to non-ionizing electromagnetic fields emitted from mobile phones induced DNA damage in human ear canal hair follicle cells.

Effects of mobile phone radiofrequency on the structure and function of the normal human hemoglobin.

Impact of head morphology on local brain specific absorption rate from exposure to mobile phone radiation.

Can the Accuracy of Home Blood Glucose Monitors be affected by the Received Signal Strength of 900 MHz GSM Mobile Phones?

Are some people sensitive to mobile phone signals? Within participants double blind randomised provocation study.

Women's mobile phone use in birth suite: A West Australian perspective.

Effect of mobile telephones on sperm quality: a systematic review and meta-analysis.

Social behavioral testing and brain magnetic resonance imaging in chicks exposed to mobile phone radiation during development.

[Effects of electromagnetic fields emitted by cellular phone on auditory and vestibular labyrinth].

Mobile phone hygiene: potential risks posed by use in the clinics of an Indian dental school.

Impact of Adolescents' Screen Time and Nocturnal Mobile Phone-Related Awakenings on Sleep and General Health Symptoms: A Prospective Cohort Study.

The association between use of mobile phones after lights out and sleep disturbances among Japanese adolescents: a nationwide cross-sectional survey.

The influence of direct mobile phone radiation on sperm quality.

The effect of mobile phone on the number of Purkinje cells: a stereological study.

Some ocular symptoms experienced by users of mobile phones.

Radio frequency exposure in mobile phone users: implications for exposure assessment in epidemiological studies.

Mobile phone use facilitates memory in male, but not female, subjects.

Use of mobile phones and changes in cognitive function in adolescents.

Assessment of the radio-frequency electromagnetic fields induced in the human body from mobile phones used with hands-free kits.

An epidemiological review of mobile telephones and cancer.

Interaction of mobile phones with superficial passive metallic implants.

The effect of electromagnetic field emitted by a mobile phone on the inhibitory control of saccades.

Effects of GSM 900 MHz on middle cerebral artery blood flow assessed by transcranial Doppler sonography.

How to encourage children to use mobile phones safely.

Effects of electromagnetic fields from mobile phones on depression and anxiety after titanium mesh cranioplasty among patients with traumatic brain injury.

Individual differences in the effects of mobile phone exposure on human sleep: rethinking the problem.

[Correlation of health literacy and mobile phone use dependence with psychopathological symptoms in middle school students].

Acute effects of using a mobile phone on CNS functions.

Effect of electromagnetic fields emitted by cellular phones on the latency of evoked electrodermal activity.

Evaluation of the effect of using mobile phones on male fertility.

Effect of prenatal exposure to mobile phone on pyramidal cell numbers in the mouse hippocampus: a stereological study.

Mobile phone use on a young person's unit.

Mobile phones: are children at higher risk?

Effects of mobile phone radiation on reproduction and development in *Drosophila melanogaster*.

Quantitative changes in testicular structure and function in rat exposed to mobile phone radiation.

The effects of the duration of mobile phone use on heart rate variability parameters in healthy subjects.

Specific absorption rate variation in a brain phantom due to exposure by a 3G mobile phone: problems in dosimetry.

[Acute ear trauma caused by failure of mobile phone/cellular phone].

Assessment of auditory evoked potential in long-term mobile phone users.

Is exposure to personal music players a confounder in adolescent mobile phone use and hearing health studies?

Interference to medical equipment from mobile phones.

Identifying seasonal mobility profiles from anonymized and aggregated mobile phone data.  
Application in food security.

Effects of mobile phone electromagnetic fields: critical evaluation of behavioral and neurophysiological studies.

Estimation of RF energy absorbed in the brain from mobile phones in the Interphone Study.

[Electromagnetic fields in the vicinity of DECT cordless telephones and mobile phones].

Thermal effects of mobile phones on facial nerves and surrounding soft tissue.

Intraoperative observation of changes in cochlear nerve action potentials during exposure to electromagnetic fields generated by mobile phones.

An old issue and a new look: electromagnetic hypersensitivity caused by radiations emitted by GSM mobile phones.

Can mobile phone emissions affect auditory functions of cochlea or brain stem?

Influence on the mechanisms of generation of distortion product otoacoustic emissions of mobile phone exposure.

Does acute exposure to the electromagnetic field emitted by a mobile phone influence visual evoked potentials? A pilot study.

The estimation of 3D SAR distributions in the human head from mobile phone compliance testing data for epidemiological studies.

The acute auditory effects of exposure for 60 minutes to mobile`s electromagnetic field.

Long-term digital mobile phone use and cognitive decline in the elderly.

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Electrophysiological Assessment of the Impact of Mobile Phone Radiation on Cognition in Persons With Epilepsy.

Mobile phone affects cerebral blood flow in humans.

Association between mobile phone use and semen quality: a systemic review and meta-analysis.

Effects of Mobile Phones on Children's and Adolescents' Health: A Commentary.

[Activity of vestibular organ in people using mobile phones professionally].

Analysis of three-dimensional SAR distributions emitted by mobile phones in an epidemiological perspective.

Perception of the electromagnetic field emitted by a mobile phone.

[ Effects of electromagnetic fields generated by mobile phones on the nervous system].

Effects of high frequency electromagnetic field (EMF) emitted by mobile phones on the human motor cortex.

[Cellular phones and cancer: current status].

Local vasodilator response to mobile phones.

Electromagnetic hypersensitivity (EHS) and subjective health complaints associated with electromagnetic fields of mobile phone communication--a literature review published between 2000 and 2004.

Mobile phone types and SAR characteristics of the human brain.

Diverse radiofrequency sensitivity and radiofrequency effects of mobile or cordless phone near fields exposure in *Drosophila melanogaster*.

Biophysical evaluation of radiofrequency electromagnetic field effects on male reproductive pattern.

The semen quality of the mobile phone users.

Tinnitus and mobile phone use.

Association of excessive mobile phone use during pregnancy with birth weight: an adjunct study in Kumamoto of Japan Environment and Children's Study.

Is problematic mobile phone use explained by chronotype and personality?

Effects of mobile phone emissions on human brain activity and sleep variables.

Effect of Bluetooth headset and mobile phone electromagnetic fields on the human auditory nerve.

Cranial and postcranial skeletal variations induced in mouse embryos by mobile phone radiation.

Effects of exposure to a mobile phone on testicular function and structure in adult rabbit.

"MXing it up": how African adolescents may affect social change through mobile phone use.

Mobile-phone-based home exercise training program decreases systemic inflammation in COPD: a pilot study.

Effects of short-term radiation emitted by WCDMA mobile phones on teenagers and adults.

Diseases of modern living: neurological changes associated with mobile phones and radiofrequency radiation in humans.

GSM mobile phone radiation suppresses brain glucose metabolism.

The electromagnetic interference of mobile phones on the function of a gamma-camera.

Effects of mobile phone exposure on biochemical parameters of cord blood: A preliminary study.

[An analysis of the pathogenetic significance of irradiations from mobile phones].

Self-reported symptoms associated with exposure to electromagnetic fields: a questionnaire study.

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Mobile phone use and subjective symptoms. Comparison of symptoms experienced by users of analogue and digital mobile phones.

Acute effects of the electromagnetic waves emitted by mobile phones on attention in emergency physicians.

Multiple assessment methods of prenatal exposure to radio frequency radiation from telecommunication in the Mothers and Children's Environmental Health (MOCEH) study.

Mobile phone use and possible cancer risk: Current perspectives in India.

Symptomatic complex partial status epilepticus manifesting as utilization behavior of a mobile phone.

Genotoxic and carcinogenic effects of non-ionizing electromagnetic fields.

"Mate! I'm running 10 min late": An investigation into the self-regulation of mobile phone tasks while driving.

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Is there any exposure from a mobile phone in stand-by mode?

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Relationship between Mobile Phone Addiction and the Incidence of Poor and Short Sleep among Korean Adolescents: a Longitudinal Study of the Korean Children & Youth Panel Survey.

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Mobile phone use for contacting emergency services in life-threatening circumstances.

Effect of Mobile Phone-Induced Electromagnetic Field on Brain Hemodynamics and Human Stem Cell Functioning: Possible Mechanistic Link to Cancer Risk and Early Diagnostic Value of Electronphotonic Imaging.

Fetal and neonatal responses following maternal exposure to mobile phones.

Is the effect of mobile phone radiofrequency waves on human skin perfusion non-thermal?

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[Cell phone communication: hygienic characteristics, biological action, standardization (a review)].

Age-dependent tissue-specific exposure of cell phone users.

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Neuropsychological sequelae of digital mobile phone exposure in humans.

Effects of radiofrequency electromagnetic radiation (RF-EMF) on honey bee queen development and mating success.

Genotoxicity evaluation of electromagnetic fields generated by 835-MHz mobile phone frequency band.

A survey study on some neurological symptoms and sensations experienced by long term users of mobile phones.

Does evening exposure to mobile phone radiation affect subsequent melatonin production?

Nocebo as headache trigger: evidence from a sham-controlled provocation study with RF fields.

Mobile phones and elderly people: a noisy communication.

Recall of past use of mobile phone handsets.

Mobile phone use and willingness to pay for SMS for diabetes in Bangladesh.

Electromagnetic absorption in the head of adults and children due to mobile phone operation close to the head.

Preliminary evaluation of nanoscale biogenic magnetite-based ferromagnetic transduction mechanisms for mobile phone bioeffects.

[Mobile phones, web chat, and sex among Norwegian adolescents].



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Effects of the Effect of Ultra High Frequency Mobile Phone Radiation on Human Health.

Dosimetric comparison of the specific anthropomorphic mannequin (SAM) to 14 anatomical head models using a novel definition for the mobile phone positioning.

Can electromagnetic fields emitted by mobile phones stimulate the vestibular organ?

Analysis on the effect of the distances and inclination angles between human head and mobile phone on SAR.

The use of a 'phantom scalp' to assess the possible direct pickup of mobile phone handset emissions by electroencephalogram electrode leads.

[Change settings for visual analyzer of child users of mobile communication: longitudinal study].

Determinants of mobile phone output power in a multinational study: implications for exposure assessment.

Effects of electromagnetic radiation of mobile phones on the central nervous system.

Noncommunicable Disease Risk Factors and Mobile Phones: A Proposed Research Agenda.

Effect of mobile phone usage time on total antioxidant capacity of saliva and salivary immunoglobulin a.

Mobile cell-phones (M-phones) in telemicroscopy: increasing connectivity of isolated laboratories.

A new problem in inflammatory bladder diseases: use of mobile phones!

Effects of mobile phone exposure on metabolomics in the male and female reproductive systems.

The pattern of the electromagnetic field emitted by mobile phones in motor vehicle driving simulators.

Derangement of chick embryo retinal differentiation caused by radiofrequency electromagnetic fields.

Mobile-phone dispatch of laypersons for CPR in out-of-hospital cardiac arrest.

Numerical assessment of induced ELF currents in the human head due to the battery current of a digital mobile phone.

Moving the Agenda on Noncommunicable Diseases: Policy Implications of Mobile Phone Surveys in Low and Middle-Income Countries.

Effect of mobile phone use on salivary concentrations of protein, amylase, lipase, immunoglobulin A, lysozyme, lactoferrin, peroxidase and C-reactive protein of the parotid gland.

Wi-Fi technology--an uncontrolled global experiment on the health of mankind.

Phantom vibration and phantom ringing among mobile phone users: A systematic review of literature.

Structural and kinetic effects of mobile phone microwaves on acetylcholinesterase activity.

Tinnitus and cell phones: the role of electromagnetic radiofrequency radiation.

[Psychophysiological indicators for children using mobile phones. Communication 2. Results of four-year monitoring].

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Electromagnetic Fields of Mobile Phone Jammer Exposure on Blood Factors in Rats.

Effect of handheld mobile phone use on parotid gland salivary flow rate and volume.

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ELF exposure from mobile and cordless phones for the epidemiological MOBI-Kids study.

The Effect of Electromagnetic Radiation due to Mobile Phone Use on Thyroid Function in Medical Students Studying in a Medical College in South India.

Long-term mobile phone use and the risk of vestibular schwannoma: a Danish nationwide cohort study.

Cellular phones for reducing battlefield stress: rationale and a preliminary research.

Assessment of SAR and thermal changes near a cochlear implant system for mobile phone type exposures.

Evaluation of the mobile phone electromagnetic radiation on serum iron parameters in rats.

Asymmetries in hip mineralization in mobile cellular phone users.

Mobile Phone Use Behaviors and Postures on Public Transportation Systems.

Radiofrequency Electromagnetic Radiation and Memory Performance: Sources of Uncertainty in Epidemiological Cohort Studies.

The effects of multivitamin supplementation on mood and general well-being in healthy young adults. A laboratory and at-home mobile phone assessment.

[Monitor of ECG signal and heart rate using a mobile phone with Bluetooth communication protocol].

Safe use of mobile phones in hospitals.

Exposure to mobile phone radiation opens new horizons in Alzheimer's disease treatment.

[Mobile telephones: a 'new risk'].

Predicting the biological effects of mobile phone radiation absorbed energy linked to the MRI-obtained structure.

Metal-framed spectacles and implants and specific absorption rate among adults and children using mobile phones at 900/1800/2100 MHz.

Mobile telephones: a comparison of radiated power between 3G VoIP calls and 3G VoCS calls.

A framework for spatial interaction analysis based on large-scale mobile phone data.

Self-reported depression and anxiety symptoms and usage of computers and mobile phones among working-age Finns.

Motivating men who have sex with men to get tested for HIV through the internet and mobile phones: a qualitative study.

The influence of handheld mobile phones on human parotid gland secretion.

Acute effects of 30 minutes of exposure to a smartphone call on in vitro platelet function.

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Radiofrequency fields, transthyretin, and Alzheimer's disease.

Mobile phone mast effects on common frog (*Rana temporaria*) tadpoles: the city turned into a laboratory.

Analysis of RF exposure in the head tissues of children and adults.

SARs for pocket-mounted mobile telephones at 835 and 1900 MHz.

Intravital Computer Morphometry on Protozoa: A Method for Monitoring of the Morphofunctional Disorders in Cells Exposed in the Cell Phone Communication Electromagnetic Field.

Estimation of the SAR in the human head and body due to radiofrequency radiation exposure from handheld mobile phones with hands-free accessories.

Ants can be used as bio-indicators to reveal biological effects of electromagnetic waves from some wireless apparatus.

Regulating hearing aid compatibility of cell phones: results from a national survey.

Laughter counteracts enhancement of plasma neurotrophin levels and allergic skin wheal responses by mobile phone-mediated stress.

Recently published papers: take your predictions with a drop of saline... and breathe deeply before turning on your phone.

Interactions of problematic mobile phone use and psychopathological symptoms with unintentional injuries: a school-based sample of Chinese adolescents.

Critical comments on DNA breakage by mobile-phone electromagnetic fields [Dien et al., *Mutat. Res.* 583 (2005) 178-183].

Mobile phone-delivered reminders and incentives to improve childhood immunisation coverage and timeliness in Kenya (M-SIMU): a cluster randomised controlled trial.

Enhancement of allergic skin wheal responses in patients with atopic eczema/dermatitis syndrome by playing video games or by a frequently ringing mobile phone.

Pilot study of mobile phone technology in allergic rhinitis in European countries: the MASK-rhinitis study.

A closed-loop process to recover Li and Co compounds and to resynthesize LiCoO<sub>2</sub> from spent mobile phone batteries.

--Leaf Cluster 1 (36)

Theme - Effects of mobile phones on brain and neural function

Titles

Mobile phone use for 5 minutes can cause significant memory impairment in humans.

Association between mobile phone use and inattention in 7102 Chinese adolescents: a population-based cross-sectional study.

Clinical features of headache associated with mobile phone use: a cross-sectional study in university students.

Predictors of mobile telephone use and exposure analysis in Australian adolescents.

Acute Effect of Electromagnetic Waves Emitted from Mobile Phone on Visual Evoked Potential in Adult Male : A Preliminary Study.

Analysis of the mobile phone effect on the heart rate variability by using the largest Lyapunov exponent.

Mobile Phone Use and The Risk of Headache: A Systematic Review and Meta-analysis of Cross-sectional Studies.

Acute mobile phone effects on pre-attentive operation.

Effect Of Electromagnetic Waves Emitted From Mobile Phone On Brain Stem Auditory Evoked Potential In Adult Males.

Acute effects of radiofrequency electromagnetic field emitted by mobile phone on brain function.

Psychophysiological tests and provocation of subjects with mobile phone related symptoms.

The cardiac effects of a mobile phone positioned closest to the heart.

Electromagnetic field of mobile phones affects visual event related potential in patients with narcolepsy.

Acute mobile phone operation affects neural function in humans.

Use of mobile and cordless phones and cognition in Australian primary school children: a prospective cohort study.

Effect of mobile phone radiation on heart rate variability.

[Effects of radiation emitted from mobile phones on short- term heart rate variability parameters].

Mobile phone use and health symptoms in children.

The sensitivity of human event-related potentials and reaction time to mobile phone emitted electromagnetic fields.

Factors associated with mental health among high school students in Iran: Does mobile phone overuse associate with poor mental health?

Mobile phone effects on children's event-related oscillatory EEG during an auditory memory task.

Examining the effects of electromagnetic fields emitted by GSM mobile phones on human event-related potentials and performance during an auditory task.

Estimating transmitted power density from mobile phone: an epidemiological pilot study with a software modified phone.

"Nomophobia": impact of cell phone use interfering with symptoms and emotions of individuals with panic disorder compared with a control group.

Mobile phone use and exposures in children.

The effect of mobile phone electromagnetic fields on the alpha rhythm of human electroencephalogram.

Use of mobile and cordless phones and change in cognitive function: a prospective cohort analysis of Australian primary school children.

Neurophysiological effects of mobile phone electromagnetic fields on humans: a comprehensive review.

[Effect of mobile phone electromagnetic emission on characteristics of cerebral blood circulation and neurohumoral regulations in humans].

Effects of 2G and 3G mobile phones on human alpha rhythms: Resting EEG in adolescents, young adults, and the elderly.

Acute mobile phones exposure affects frontal cortex hemodynamics as evidenced by functional near-infrared spectroscopy.

Effects of exposure to a mobile phone on sexual behavior in adult male rabbit: an observational study.

Effects of concurrent caffeine and mobile phone exposure on local target probability processing in the human brain.

Some ocular symptoms and sensations experienced by long term users of mobile phones.

Nasal colonization and bacterial contamination of mobile phones carried by medical staff in the operating room.

Headache and sferics.

--Leaf Cluster 25 (68)

Theme - Effects of cell phone radiation on cognitive function and hearing

Titles

Effects of GSM cellular phones on human hearing: the European project "GUARD".

Effects of weak mobile phone - electromagnetic fields (GSM, UMTS) on event related potentials and cognitive functions.

Mobile phone emission modulates event-related desynchronization of alpha rhythms and cognitive-motor performance in healthy humans.

Effects of pulsed and continuous wave 902 MHz mobile phone exposure on brain oscillatory activity during cognitive processing.

Effects of electromagnetic field emitted by cellular phones on the EEG during a memory task.

Effects of weak mobile phone - electromagnetic fields (GSM, UMTS) on well-being and resting EEG.

Assessment of potential effects of the electromagnetic fields of mobile phones on hearing.

Effects of electromagnetic field emitted by cellular phones on the EEG during an auditory memory task: a double blind replication study.

Human brain wave activity during exposure to radiofrequency field emissions from mobile phones.

Effects of electromagnetic fields emitted by cellular phones on the electroencephalogram during a visual working memory task.

Effects of radiofrequency radiation emitted by cellular telephones on the cognitive functions of humans.

Cognitive effects of radiation emitted by cellular phones: the influence of exposure side and time.

Mobile phone emission modulates interhemispheric functional coupling of EEG alpha rhythms.

Effects of mobile phone exposure on time frequency fine structure of transiently evoked otoacoustic emissions.

[Effects of electromagnetic field from cellular phones on selected central nervous system functions: a literature review].

Effects of UMTS cellular phones on human hearing: results of the European project EMFnEAR.

Is the brain influenced by a phone call? An EEG study of resting wakefulness.

Effect of acute exposure to radiofrequency electromagnetic fields emitted by a mobile phone (GSM 900 MHz) on electrodermal responsiveness in healthy human.

Human brain activity during exposure to radiofrequency fields emitted by cellular phones.

Effects of exposure to electromagnetic fields emitted by GSM 900 and WCDMA mobile phones on cognitive function in young male subjects.

Preattentive auditory information processing under exposure to the 902 MHz GSM mobile phone electromagnetic field: a mismatch negativity (MMN) study.

Pulsed and continuous wave mobile phone exposure over left versus right hemisphere: effects on human cognitive function.

Mobile phone emission increases inter-hemispheric functional coupling of electroencephalographic alpha rhythms in epileptic patients.

Electromagnetic fields produced by GSM cellular phones and heart rate variability.

Effect of a 902 MHz electromagnetic field emitted by mobile phones on human cognitive function: A replication study.

The effects of mobile-phone electromagnetic fields on brain electrical activity: a critical analysis of the literature.

Hypersensitivity symptoms associated with exposure to cellular telephones: no causal link.

Nonlinear heart rate variability measures under electromagnetic fields produced by GSM cellular phones.

Mobile phone emission modulates inter-hemispheric functional coupling of EEG alpha rhythms in elderly compared to young subjects.

A study of the effects of cellular telephone microwave radiation on the auditory system in healthy men.

Cognitive effects of cellular phones: a possible role of non-radiofrequency radiation factors.

Comparison of the effects of continuous and pulsed mobile phone like RF exposure on the human EEG.

Mobile phones exposure induces changes of contingent negative variation in humans.

Investigation of potential effects of cellular phones on human auditory function by means of distortion product otoacoustic emissions.

Effects of microwaves emitted by cellular phones on human slow brain potentials.

Effects of radiofrequency electromagnetic fields on the human nervous system.

Variations in electroencephalography with mobile phone usage in medical students.

Effects of 2G and 3G mobile phones on performance and electrophysiology in adolescents, young adults and older adults.

The excretion of 6-hydroxymelatonin sulfate in healthy young men exposed to electromagnetic fields emitted by cellular phone -- an experimental study.

Gender related differences on the EEG during a simulated mobile phone signal.

Cellular Phone Irradiation of the Head Affects Heart Rate Variability Depending on Inspiration/Expiration Ratio.

Effects of RF exposure of teenagers and adults by CDMA cellular phones.

Effects of 900 MHz electromagnetic fields exposure on cochlear cells' functionality in rats: evaluation of distortion product otoacoustic emissions.

Effects of the acute exposure to the electromagnetic field of mobile phones on human auditory brainstem responses.

Do mobile phones pose a potential risk to autonomic modulation of the heart?

Effects of intensive and moderate cellular phone use on hearing function.

A meta-analysis for neurobehavioural effects due to electromagnetic field exposure emitted by GSM mobile phones.

Mobile phone emissions modulate brain excitability in patients with focal epilepsy.

Mobile phone emissions and human brain excitability.

Effects of pulsed electromagnetic fields on cognitive processes - a pilot study on pulsed field interference with cognitive regeneration.

Scalp localization of human auditory cortical activity modified by GSM electromagnetic fields.

Effect of 902 MHz mobile phone transmission on cognitive function in children.

Physiological effects of RF exposure on hypersensitive people by a cell phone.



Effects of mobile phone signals over BOLD response while performing a cognitive task.

Effect of electromagnetic field emitted by cellular phones on fetal heart rate patterns.

Effects of W-CDMA 1950 MHz EMF emitted by mobile phones on regional cerebral blood flow in humans.

Does acute exposure to mobile phones affect human attention?

Effects of GSM signals during exposure to event related potentials (ERPs).

The effect of GSM and TETRA mobile handset signals on blood pressure, catechol levels and heart rate variability.

Thermal effects of mobile phone RF fields on children: a provocation study.

Controversies on electromagnetic field exposure and the nervous systems of children.

The influence of the call with a mobile phone on heart rate variability parameters in healthy volunteers.

[A study on the biological effects of exposure mobile-phone frequency EMF].

Effects of Bluetooth device electromagnetic field on hearing: pilot study.

Evaluation in humans of the effects of radiocellular telephones on the circadian patterns of melatonin secretion, a chronobiological rhythm marker.

Comparison of earphone radiation recorded from hearing impaired subjects and a resistor network simulator.

[The influence of hypogeomagnetic field on bioelectric activity of the brain in epilepsy].

Non-ionizing radiofrequency electromagnetic waves traversing the head can be used to detect cerebrovascular autoregulation responses.

--Leaf Cluster 14 (93)

Theme - Myriad adverse health effects from cellphones

Titles

Cell phone use and acoustic neuroma: the need for standardized questionnaires and access to industry data.

Cell-phone use and self-reported hypertension: national health interview survey 2008.

Cell phones: modern man's nemesis?

Impact of cell phone use on men's semen parameters.

A preliminary examination of cell phone use and helping behavior.

Cell phone use and behavioural problems in young children.

An analysis of the impact of cell phone use on depressive symptoms among Japanese elders.

Cell phones and brain tumors: a review including the long-term epidemiologic data.

Prenatal and postnatal exposure to cell phone use and behavioral problems in children.

Maternal cell phone use during pregnancy and child behavioral problems in five birth cohorts.

Maternal cell phone use in early pregnancy and child's language, communication and motor skills at 3 and 5 years: the Norwegian mother and child cohort study (MoBa).

Cell phones and tumor: still in no man's land.

Cell phones and male infertility: a review of recent innovations in technology and consequences.

Prenatal exposure to cell phone use and neurodevelopment at 14 months.

The effects of cell phone use on peripheral vision.

Factors associated with cell phone use in adolescents in the community of Madrid (Spain).

The Impact of Using Cell Phones After Light-Out on Sleep Quality, Headache, Tiredness, and Distractibility Among Students of a University in North of Iran.

Prospective study of pregnancy outcomes after parental cell phone exposure: the Norwegian Mother and Child Cohort Study.

Prenatal and Postnatal Cell Phone Exposures and Headaches in Children.

Cell-Phone Addiction: A Review.

Ambulatory cell phone injuries in the United States: an emerging national concern.

[Cell Phones and Risk of brain and acoustic nerve tumours: the French INTERPHONE case-control study].

Cell phone usage and erectile function.

Real-world cell phone radiofrequency electromagnetic field exposures.

Cell phone exposures and hearing loss in children in the Danish National Birth Cohort.

Cell Phone Information Seeking Explains Blood Pressure in African American Women.

Habits of cell phone usage and sperm quality - does it warrant attention?

Maternal cell phone use during pregnancy and child cognition at age 5years in 3 birth cohorts.

Cell phones and male infertility: dissecting the relationship.

Augmentative and alternative communication and cell phone use: one off-the-shelf solution and some policy considerations.

Cell phones and cancer: what is the evidence for a connection?

Cancer risks related to low-level RF/MW exposures, including cell phones.

Effect of cell-phone radiofrequency on angiogenesis and cell invasion in human head and neck cancer cells.

Is health literacy related to health behaviors and cell phone usage patterns among the text4baby target population?

Cell phone use and risk of thyroid cancer: a population-based case-control study in Connecticut.

Cell phones and children: follow the precautionary road.

Association between number of cell phone contracts and brain tumor incidence in nineteen U.S. States.

Maternal cell phone and cordless phone use during pregnancy and behaviour problems in 5-year-old children.

The effect of cell phone use on postural balance and mobility in older compared to young adults.

Cell phones change the way we walk.

Effects of cell phone use on semen parameters: Results from the MARHCS cohort study in Chongqing, China.

Multidrug-Resistant Bacteria Associated with Cell Phones of Healthcare Professionals in Selected Hospitals in Saudi Arabia.

Effect of cell phone exposure on physiologic and hematologic parameters of male medical students of Bijapur (Karnataka) with reference to serum lipid profile.

General health of students of medical sciences and its relation to sleep quality, cell phone overuse, social networks and internet addiction.

The role of anxiety in the perception of technological hazards - a cross-sectional study on cell phones and masts.

Effect of Cell Phone Radiations on Orofacial Structures: A Systematic Review.

The association of sleep and late-night cell phone use among adolescents.

Cell Phone Use and Child and Adolescent Reading Proficiency.

Reach for your cell phone at your own risk: The cognitive costs of media choice for breaks.

Effects of cell phone radiofrequency signal exposure on brain glucose metabolism.

A forecasting method to reduce estimation bias in self-reported cell phone data.

The incidence rate and mortality of malignant brain tumors after 10 years of intensive cell phone use in Taiwan.

Abnormal responses of electronic pocket dosimeters caused by high frequency electromagnetic fields emitted from digital cellular telephones.

[Cell phones: health risks and prevention].

Does cell phone use increase the chances of parotid gland tumor development? A systematic review and meta-analysis.

Prevalence of problematic cell phone use in an adult population in Spain as assessed by the Mobile Phone Problem Use Scale (MPPUS).

Use of mobile phone during pregnancy and the risk of spontaneous abortion.

Cell phones: the psychosocial risks.

Prenatal cell phone use and developmental milestone delays among infants.

Associations of Maternal Cell-Phone Use During Pregnancy With Pregnancy Duration and Fetal Growth in 4 Birth Cohorts.

Effect of cell phone magnetic fields on adjustable cerebrospinal fluid shunt valves.

Combined effects of varicocele and cell phones on semen and hormonal parameters.

Chatting in the face of the eyewitness: The impact of extraneous cell-phone conversation on memory for a perpetrator.

Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices.

Effect of Mobile Phone Radiofrequency Electromagnetic Fields on.

Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality.

Is there a relationship between cell phone use and semen quality?

Cell phone-generated radio frequency electromagnetic field effects on the locomotor behaviors of the fishes *Poecilia reticulata* and *Danio rerio*.

Not So Smart: Cell Phone Use Hurts Our Patients and Profession.

Cell phone etiquette in the clinical arena: A professionalism imperative for healthcare.

Mobile Phones: Potential Sources of Nickel and Cobalt Exposure for Metal Allergic Patients.

[Risk perception of the general public of cell phone towers and cancer: trend and associated factors, 2005-2010].

Electromagnetic field and brain development.

Impacts of silver-coated antimicrobial screen covers on the cell-phone microbiome of resident physicians.

The effects of cell phone conversations on the attention and memory of bystanders.

Effects of cell-phone and text-message distractions on true and false recognition.

Vestibular schwannoma and cell-phones. Results, limits and perspectives of clinical studies.

The psychometric properties of cellular phone dependency questionnaire in students of Isfahan: A pilot study.

Multidrug-resistant bacteria isolated from cell phones in five intensive care units: Exploratory dispersion analysis.

[The health problems which can brought by 3G cell phones to our country].

Exposure limits: the underestimation of absorbed cell phone radiation, especially in children.

Do people understand IARC's 2B categorization of RF fields from cell phones?

Allergic Contact Dermatitis to a Cell Phone.

Impact of pinna compression on the RF absorption in the heads of adult and juvenile cell phone users.

Do cell phones, iPods/MP3 players, siblings and friends matter? Predictors of child body mass in a U.S. Southern Border City Middle School.

The role of cellular phone usage by parents in the increase in ASD occurrence: A hypothetical framework.

Psychophysiological patterns during cell phone text messaging: a preliminary study.

From sweeteners to cell phones-Cancer myths and beliefs among journalism undergraduates.

Can Fish and Cell Phones Teach Us about Our Health?

Cell Phone Counseling Improves Retention of Mothers With HIV Infection in Care and Infant HIV Testing in Kisumu, Kenya: A Randomized Controlled Study.

Association between problematic cellular phone use and suicide: the moderating effect of family function and depression.

Symptoms of problematic cellular phone use, functional impairment and its association with depression among adolescents in Southern Taiwan.

Adolescent in-school cellphone habits: a census of rules, survey of their effectiveness, and fertility implications.

--Leaf Cluster 7 (44)

Theme - Risks from cell phone use, especially brain tumors

Titles

Validation of self-reported cellular phone use.

Cellular phone use and brain tumor: a meta-analysis.

[Symptoms reported by mobile cellular telephone users].

Risk of pituitary tumors in cellular phone users: a case-control study.

Cellular and cordless telephone use and the association with brain tumors in different age groups.

Cellular phones, cordless phones, and the risks of glioma and meningioma (Interphone Study Group, Germany).

Use of cellular telephones and the risk for brain tumours: A case-control study.

Further aspects on cellular and cordless telephones and brain tumours.

Cellular phone use and risk of benign and malignant parotid gland tumors--a nationwide case-control study.

Cellular-telephone use and brain tumors.

[In vitro and in vivo study of electromagnetic compatibility of cellular phones and pacemakers].

Cellular and cordless telephones and the risk for brain tumours.

Cellular phones and their hazards: the current evidence.

Use of cellular telephones and brain tumour risk in urban and rural areas.

Case-control study on the use of cellular and cordless phones and the risk for malignant brain tumours.

Characteristics of excessive cellular phone use in Korean adolescents.

Use of cellular or cordless telephones and the risk for non-Hodgkin's lymphoma.

Cellular telephone use and risk of intratemporal facial nerve tumor.

[Study of the influence of cellular phones and personal computers on schoolchildren's health: hygienic aspects].

Cellular telephone use and time trends for brain, head and neck tumours.

[Experimental data on radiofrequency].

Assessment of radiofrequency exposure from cellular telephone daily use in an epidemiological study: German Validation study of the international case-control study of cancers of the brain--INTERPHONE-Study.

Use of cellular and cordless telephones and risk of testicular cancer.

[Cellular phones and public health].

Estimation of relative exposure levels for cellular phone users using a neural network.

Cellular phone and cellular phone accessory dermatitis due to nickel allergy: report of five cases.

[Health risks of mobile phones].

Brain cancer incidence trends in relation to cellular telephone use in the United States.

Cellular phones and risk of brain tumors.

Correlation between cellular phone use and epithelial parotid gland malignancies.

[On the evaluation of the influence of cellular phones on their users].

Mobile Phone Use and the Risk of Parotid Gland Tumors: A Retrospective Case-Control Study.

Behavioral support to parents through a cellular-phone website that provides the degree of urgency for medical attention of a child.

Risk perception and public concerns of electromagnetic waves from cellular phones in Korea.

Frequent cellular phone use modifies hypothalamic-pituitary-adrenal axis response to a cellular phone call after mental stress in healthy children and adolescents: A pilot study.

The relationship between adolescents' well-being and their wireless phone use: a cross-sectional study.

New Zealand adolescents' cellphone and cordless phone user-habits: are they at increased risk of brain tumours already? A cross-sectional study.

Prevalence of headache among handheld cellular telephone users in Singapore: a community study.

[The electromagnetic fields of cellular phones and the health of children and of teenagers (the situation requiring to take an urgent measure)].

Patterns of cellular phone use among young people in 12 countries: Implications for RF exposure.

Use of wireless telephones and serum S100B levels: a descriptive cross-sectional study among healthy Swedish adults aged 18-65 years.

Risks for central nervous system diseases among mobile phone subscribers: a Danish retrospective cohort study.

The effect of feedback on attitudes toward cellular phone use while driving: a comparison between novice and experienced drivers.

Radio frequency electromagnetic fields: cancer, mutagenesis, and genotoxicity.

--Leaf Cluster 8 (106)

Theme - Risk of brain tumors/acoustic neuromas from mobile phone use

## Titles

Mobile phone use and risk of glioma in 5 North European countries.

Mobile phone use and brain tumours in the CERENAT case-control study.

Use of mobile phones in Norway and risk of intracranial tumours.

Long-term mobile phone use and brain tumor risk.

Long-term use of cellular phones and brain tumours: increased risk associated with use for  $>$  or  $=10$  years.

Mobile phone use and risk of glioma in adults: case-control study.

A case-case study of mobile phone use and acoustic neuroma risk in Japan.

Risk of brain tumours in relation to estimated RF dose from mobile phones: results from five Interphone countries.

Mobile phone use and risk of acoustic neuroma: results of the Interphone case-control study in five North European countries.

Mobile phones, cordless phones and the risk for brain tumours.

Mobile phone use and the risk of acoustic neuroma.

Case-control study of the association between malignant brain tumours diagnosed between 2007 and 2009 and mobile and cordless phone use.

Mobile phone use and glioma risk: A systematic review and meta-analysis.

Mobile phone use and risk of brain neoplasms and other cancers: prospective study.

Pooled analysis of case-control studies on acoustic neuroma diagnosed 1997-2003 and 2007-2009 and use of mobile and cordless phones.

Long-term mobile phone use and acoustic neuroma risk.

Mobile phone use and risk of brain tumours: a systematic review of association between study quality, source of funding, and research outcomes.

Mobile phone use and incidence of brain tumour histological types, grading or anatomical location: a population-based ecological study.

Pooled analysis of case-control studies on malignant brain tumours and the use of mobile and cordless phones including living and deceased subjects.

Mobile phone use and acoustic neuroma risk in Japan.

Mobile phone use, exposure to radiofrequency electromagnetic field, and brain tumour: a case-control study.



Meta-analysis of long-term mobile phone use and the association with brain tumours.

The anatomical distribution of cerebral gliomas in mobile phone users.

Meningioma patients diagnosed 2007-2009 and the association with use of mobile and cordless phones: a case-control study.

Epidemiologic evidence on mobile phones and tumor risk: a review.

Acoustic neuroma risk in relation to mobile telephone use: results of the INTERPHONE international case-control study.

The Intracranial Distribution of Gliomas in Relation to Exposure From Mobile Phones: Analyses From the INTERPHONE Study.

Childhood brain tumour risk and its association with wireless phones: a commentary.

Mobile phone use and risk for intracranial tumors.

Meningioma and mobile phone use--a collaborative case-control study in five North European countries.

Mobile phone use and glioma risk: comparison of epidemiological study results with incidence trends in the United States.

The controversy about a possible relationship between mobile phone use and cancer.

Mobile phones and brain tumours: a review of epidemiological research.

Meta-analysis of association between mobile phone use and glioma risk.

Mobile phones and head tumours. The discrepancies in cause-effect relationships in the epidemiological studies - how do they arise?

Mobile phone use and brain tumors in children and adolescents: a multicenter case-control study.

Mobile phone use and risk of intracranial tumors: a consistency analysis.

Pituitary tumor risk in relation to mobile phone use: A case-control study.

[Long-term use of mobile phone and its association with glioma: a systematic review and meta-analysis].

Mobile phones, brain tumors, and the interphone study: where are we now?

[Motivation and significance of IARC classification for mobile phone].

Mobile telephones and cancer--a review of epidemiological evidence.

The INTERPHONE study: design, epidemiological methods, and description of the study population.

Evaluation of Mobile Phone and Cordless Phone Use and Glioma Risk Using the Bradford Hill Viewpoints from 1965 on Association or Causation.

Pooled analysis of Swedish case-control studies during 1997-2003 and 2007-2009 on meningioma risk associated with the use of mobile and cordless phones.

Meta-analysis of mobile phone use and intracranial tumors.

[Association between radiation from mobile phones and tumour risk in adults].

Probabilistic Multiple-Bias Modeling Applied to the Canadian Data From the Interphone Study of Mobile Phone Use and Risk of Glioma, Meningioma, Acoustic Neuroma, and Parotid Gland Tumors.

Childhood brain tumours and use of mobile phones: comparison of a case-control study with incidence data.

Medical exposure to ionising radiation and the risk of brain tumours: Interphone study group, Germany.

Recall bias in the assessment of exposure to mobile phones.

Lost in laterality: interpreting "preferred side of the head during mobile phone use and risk of brain tumour" associations.

Wireless Phone Use and Risk of Adult Glioma: Evidence from a Meta-Analysis.

Using the Hill viewpoints from 1965 for evaluating strengths of evidence of the risk for brain tumors associated with use of mobile and cordless phones.

Mobile phone use and risk for intracranial tumors and salivary gland tumors - A meta-analysis.

Use of mobile phones and risk of brain tumours: update of Danish cohort study.

Mobile phone use and risk of tumors: a meta-analysis.

[Mobile phones and head tumours: it is time to read and highlight data in a proper way].

Cellular telephones and risk for brain tumors: a population-based, incident case-control study.

Changes in brain glioma incidence and laterality correlates with use of mobile phones--a nationwide population based study in Israel.

Survival of glioma patients in relation to mobile phone use in Denmark, Finland and Sweden.

Mobile phone use and the risk for malignant brain tumors: a case-control study on deceased cases and controls.

A case-control study of risk of leukaemia in relation to mobile phone use.

Validation of self-reported start year of mobile phone use in a Swedish case-control study on radiofrequency fields and acoustic neuroma risk.

Environmental risk factors for sporadic acoustic neuroma (Interphone Study Group, Germany).

Use of mobile and cordless phones and survival of patients with glioma.

Impact of random and systematic recall errors and selection bias in case--control studies on mobile phone use and brain tumors in adolescents (CEFALO study).

Electromagnetic fields and brain tumours: a commentary.

[Radio and microwave frequency radiation and health--an analysis of the literature].

Long-term and frequent cellular phone use and risk of acoustic neuroma.

Validation of short term recall of mobile phone use for the Interphone study.

Systematic review of wireless phone use and brain cancer and other head tumors.

Mobile phone use and incidence of glioma in the Nordic countries 1979-2008: consistency check.

Selection bias due to differential participation in a case-control study of mobile phone use and brain tumors.

Decreased survival of glioma patients with astrocytoma grade IV (glioblastoma multiforme) associated with long-term use of mobile and cordless phones.

Quantifying the impact of selection bias caused by nonparticipation in a case-control study of mobile phone use.

Analyses of temporal and spatial patterns of glioblastoma multiforme and other brain cancer subtypes in relation to mobile phones using synthetic counterfactuals.

Estimating associations of mobile phone use and brain tumours taking into account laterality: a comparison and theoretical evaluation of applied methods.

Mobile phone use and risk of parotid gland tumor.

Epidemiology of brain tumors.

Review of four publications on the Danish cohort study on mobile phone subscribers and risk of brain tumors.

Evaluation of carcinogenic effects of electromagnetic fields (EMF).

Use of wireless phones and the risk of salivary gland tumours: a case-control study.

Epidemiology and etiology of gliomas.

Epidemiology of Intracranial Gliomas.

The effects of recall errors and of selection bias in epidemiologic studies of mobile phone use and cancer risk.

Time trend in incidence of malignant neoplasms of the central nervous system in relation to mobile phone use among young people in Japan.

A three-dimensional point process model for the spatial distribution of disease occurrence in relation to an exposure source.

[Risk of major lymphoma subtypes and use of mobile phones].

Simulation of the incidence of malignant brain tumors in birth cohorts that started using mobile phones when they first became popular in Japan.

Risks of carcinogenesis from electromagnetic radiation of mobile telephony devices.

Current state of our knowledge on brain tumor epidemiology.

Mobile phones, cordless phones and rates of brain tumors in different age groups in the Swedish National Inpatient Register and the Swedish Cancer Register during 1998-2015.

Has the incidence of brain cancer risen in Australia since the introduction of mobile phones 29 years ago?

Inferring the 1985-2014 impact of mobile phone use on selected brain cancer subtypes using Bayesian structural time series and synthetic controls.

Location of gliomas in relation to mobile telephone use: a case-case and case-specular analysis.

Mobile phone use and risk of uveal melanoma: results of the risk factors for uveal melanoma case-control study.

[The probability of developing brain tumours among users of cellular telephones (scientific information to the decision of the International Agency for Research on Cancer (IARC) announced on May 31, 2011)].

[Risk of neoplastic diseases in conditions of exposure to radio- and microwave fields--epidemiologic investigations].

Effects of alternative styles of risk information on EMF risk perception.

Medical students' risk perceptions on decreased attention, physical and social risks in using mobile phones and the factors related with their risk perceptions.

The possible role of radiofrequency radiation in the development of uveal melanoma.

Mobile phones and multiple sclerosis--a nationwide cohort study in Denmark.

Mobile phone use and the risk of skin cancer: a nationwide cohort study in Denmark.

Use of wireless phones and serum beta-trace protein in randomly recruited persons aged 18-65 years: a cross-sectional study.

Exposure to wireless phone emissions and serum beta-trace protein.

**Fourth Level Cluster 89 (869)**

**Theme - Human health risks from electromagnetic radiation, including adverse effects on implanted electronic devices, and possible protections**

--Leaf Cluster 0 (63)

Theme - Electromagnetic interference with cardiac pacemakers

Titles

The effects of mobile phones on pacemaker function.

[The effect of cell phones on pacemaker function].

Electromagnetic interference with implantable cardiac pacemakers by video capsule.

Influence of digital and analogue cellular telephones on implanted pacemakers.

[Pacemaker dysfunction during use of a mobile telephone].

Life after pacemaker implantation: management of common problems and environmental interactions.

[Cardiac pacemakers designed for magnetic resonance environment].

Interference with cardiac pacemakers by cellular telephones.

Pacemakers and magnetic resonance imaging: Current status and survey in Switzerland.

Influence of D-net (European GSM-Standard) cellular phones on pacemaker function in 50 patients with permanent pacemakers.

[Pacemaker dysfunction in the clinical practice].

Interference in pacemakers.

Interactions between pacemakers and security systems.

Electromagnetic interference with pacemakers caused by portable media players.

Electromagnetic compatibility of electronic implants--review of the literature.

Do European GSM mobile cellular phones pose a potential risk to pacemaker patients?

Electromagnetic interference in pacemakers in single-engine fixed-wing aircraft: a European perspective.

Pacemaker inhibition and asystole in a pacemaker dependent patient.

[Cardiac pacemaker dysfunction secondary to outside interference: a review].

Pacemakers: some of the risks and complications you are not warned about.

Is there a risk for interaction between mobile phones and single lead VDD pacemakers?

SAR evaluations of mobile phone close to a pacemaker implanted in human body.

[Is there any risk interaction between electromagnetic field generated by mobile phones and artificial pacemakers].

Electromagnetic interference with cardiac pacemakers and implantable cardioverter-defibrillators from low-frequency electromagnetic fields in vivo.

Induction ovens and electromagnetic interference: what is the risk for patients with implanted pacemakers?

Magnetic resonance imaging for patients with permanent pacemakers: initial clinical experience.

Magnetic interference of cardiac pacemakers from a surgical magnetic drape.

Electromagnetic compatibility study of the in-vitro interaction of wireless phones with cardiac pacemakers.

Do media players cause interference with pacemakers?

Electromagnetic interference of pacemakers by mobile phones.

Interference by cellular phones with permanent implanted pacemakers: an update.

Electrocardiographic "pacemaker pseudo-spikes" and radio frequency interference.

Pacemaker interference.

Reliability of electromagnetic filters of cardiac pacemakers tested by cellular telephone ringing.

Pacemaker interference by 60-Hz contact currents.

The effect of 50 Hz external electrical interference on implanted cardiac pacemakers.

Concerns about sources of electromagnetic interference in patients with pacemakers.

Selective interference with pacemaker activity by electrical dental devices.

Hospital pager systems may cause interference with pacemaker telemetry.

[Environment and permanent cardiac pacing].

Interference with cardiac pacing.

Electromagnetic interference of analog cellular telephones with pacemakers.

The effect of power frequency high intensity electric fields on implanted cardiac pacemakers.

The effect of radar on cardiac pacemakers.

Pacing in high field cardiac magnetic resonance imaging:.

Do induction cooktops interfere with cardiac pacemakers?

[Interference between cardiac pacemaker and electromagnetic anti-theft devices in stores].

[Effect of external electrical interference on pacemakers].

Effects of an increased air gap on the in vitro interaction of wireless phones with cardiac pacemakers.

Radiofrequency Scanning for Retained Surgical Items Can Cause Electromagnetic Interference and Pacing Inhibition if an Asynchronous Pacing Mode Is Not Applied.

Interference between mobile phones and pacemakers: a look inside.

[Electromagnetic interference of electrical dental equipment with cardiac pacemakers].

Electromagnetic interference of an external temporary pacemaker during maxillofacial and neck surgery.

Effect of electronic apex locators on cardiac pacemaker function.

Mode of operation induced by rapid external chest wall stimulation in patients with normally functioning QRS-inhibited (VVI) pacemakers.

Disturbances in the function of cardiac pacemaker caused by short wave and microwave diathermies and pulsed high frequency current.

[Cardiac Pacemakers, implantable defibrillators and IRM].

The safety of digital mobile cellular telephones with minute ventilation rate adaptive pacemakers.

Electromagnetic interference of implantable unipolar cardiac pacemakers by an induction oven.

[Health Council Report 'Radiofrequency electromagnetic fields (300 Hz-300 GHz). The Health Council of the Netherlands].

Characteristics of telemetry interference with pacemakers caused by digital media players.

Influence of mobile magnetic resonance imaging on implanted pacemakers.

[Compatibility of active implants in the professional environment].

--Leaf Cluster 16 (103)

Theme - Electromagnetic interference on implanted cardiac devices

Titles

Incidence of electromagnetic interference in implantable cardioverter defibrillators.

Effects of electromagnetic interference on implanted cardiac devices and their management.

Electromagnetic interference in cardiac rhythm management devices.

Surgical management of the patient with an implanted cardiac device: implications of electromagnetic interference.

Electromagnetic interference and implanted cardiac devices: the nonmedical environment (part I).

[The influence of non-ionizing electromagnetic fields on implantable cardiac medical devices].

Electromagnetic interference and implanted cardiac devices: the medical environment (part II).

Potential interference of small neodymium magnets with cardiac pacemakers and implantable cardioverter-defibrillators.

Implanted devices and electromagnetic interference: case presentations and review.

Are patients with cardiac implants protected against electromagnetic interference in daily life and occupational environment?

Safety of the colonoscope magnetic imaging device (ScopeGuide) in patients with implantable cardiac devices.

Intermittent, erratic behaviour of an implantable cardioverter defibrillator secondary to a hidden magnetic source of interference.

Shock whilst gardening--implantable defibrillators & lawn mowers.

An update on mobile phones interference with medical devices.

Characterization of electromagnetic interference of medical devices in the hospital due to cell phones.

Mobile phone interference with medical equipment and its clinical relevance: a systematic review.

Electromagnetic interference in implantable cardioverter defibrillators: present but rare.

Electromagnetic interference with implantable cardioverter-defibrillators at power frequency: an in vivo study.

Cellular phone interference with external cardiopulmonary monitoring devices.

Do airport metal detectors interfere with implantable pacemakers or cardioverter-defibrillators?

Electromagnetic interference of dental equipment with implantable cardioverter defibrillators.

Treatment of patients with cardiac pacemakers and implantable cardioverter-defibrillators during radiotherapy.

AANA Journal Course: update for nurse anesthetists. Arrhythmia management devices and electromagnetic interference.



In-vivo testing of digital cellular telephones in patients with implantable cardioverter-defibrillators.

[Magnets, pacemaker and defibrillator: fatal attraction?].

Induction ovens and electromagnetic interference: what is the risk for patients with implantable cardioverter defibrillators?

Electromagnetic Interference (EMI) and arrhythmic events in ICD patients undergoing gastrointestinal procedures.

Radiofrequency interference with medical devices. A technical information statement.

How do mobile phones affect electromedical devices?

Cell phones and electromagnetic interference revisited.

Patient safety and electromagnetic protection: a review.

[Return to work of a pacemaker bearing worker: the relationship between health problems and electromagnetic interferences].

Report of the American Medical Association (AMA) Council on Scientific Affairs and AMA recommendations to medical professional staff on the use of wireless radio-frequency equipment in hospitals.

Implantable cardioverter defibrillators and cellular telephones: is there any interference?

Wireless technologies and patient safety in hospitals.

[Magnetic resonance imaging in patients with pacemakers and implantable cardioverter-defibrillators: a systematic review].

[Medical implantable devices and electromagnetic compatibility].

Electromagnetic interference in critical care.

In vitro tests reveal sample radiofrequency identification readers inducing clinically significant electromagnetic interference to implantable pacemakers and implantable cardioverter-defibrillators.

[Do mobile telephones have adverse effects on the functions of implantable cardioverter defibrillators?].

A follow-up study of electromagnetic interference of cellular phones on electronic medical equipment in the emergency department.

Electromagnetic interference can cause hospital devices to malfunction, McGill group warns.

Electromagnetic interference from radio frequency identification inducing potentially hazardous incidents in critical care medical equipment.

Electromagnetic interference of endodontic equipments with cardiovascular implantable electronic device.

Is magnetic resonance safe in implanted cardiac devices patients?

Safety Considerations in Magnetic Resonance Imaging of Patients With Implanted Medical Devices.

Cardiac devices and electromagnetic interference revisited: new radiofrequency technologies and implications for dermatologic surgery.

State of the science: pacemaker and defibrillator interference from wireless communication devices.

Measurements of electromagnetic fields radiated from communication equipment and of environmental electromagnetic noise: impact on the use of communication equipment within the hospital.

Dosimetry of electromagnetic field exposure of an active armlet and its electromagnetic interference to the cardiac pacemakers using adult, child and infant models.

Implanted medical devices in workers exposed to radio-frequency radiation.

[Radiotherapy in patients with a pacemaker or an implantable cardioverter defibrillator].

Electromagnetic interference of communication devices on ECG machines.

Interference by new-generation mobile phones on critical care medical equipment.

[Use of mobile phones in hospitals do not jeopardise the safety of the patients].

Electromagnetic interference between external defibrillator and cardiac resynchronization therapy-pacemaker (CRT-P) devices.

Interference of electrical dental equipment with implantable cardioverter-defibrillators.

Electromagnetic interference of cardiac rhythmic monitoring devices to radio frequency identification: analytical analysis and mitigation methodology.

A practical procedure to prevent electromagnetic interference with electronic medical equipment.

Clinically significant magnetic interference of implanted cardiac devices by portable headphones.

Electromagnetic interference from GSM and TETRA phones with life-support medical devices.

Electromagnetic interference to infusion pumps. Update 2008 from GSM mobile phones.

Electronic article surveillance systems and interactions with implantable cardiac devices: risk of adverse interactions in public and commercial spaces.

Electromagnetic immunity of infusion pumps to GSM mobile phones: a systematic review.

Avoidance behaviors in patients with implantable cardioverter defibrillators.

Electromagnetic interference of implantable cardiac devices from a shoulder massage machine.

Deaths associated with implantable cardioverter defibrillator failure and deactivation reported in the United States Food and Drug Administration Manufacturer and User Facility Device Experience Database.

Cochlear implants: in vitro investigation of electromagnetic interference at MR imaging--compatibility and safety aspects.

Electromagnetic interference with electronic medical equipment induced by automatic conveyance systems.

Possible electromagnetic interference with electronic medical equipment by radio waves coming from outside the hospital.

Interactions between electronic article surveillance systems and implantable cardioverter-defibrillators.

Risk of cellular phone interference with an implantable loop recorder.

Interference of electrocardiographic recordings by a mobile telephone.

Electromagnetic interference with infusion pumps from GSM mobile phones.

An implanted spherical head model exposed to electromagnetic fields at a mobile communication frequency.

Biomedical concerns in wireless communications.

In vitro study of the electromagnetic interaction between wireless phones and an implantable neural stimulator.

Safety aspects of radiofrequency power deposition in magnetic resonance.

Electromagnetic interference of bone-anchored hearing aids by cellular phones revisited.

Fatal collision? Are wireless headsets a risk in treating patients?

Ventricular fibrillation induced by radiofrequency energy delivery for premature ventricular contractions arising from the right ventricular outflow tract: is implantable cardioverter defibrillator indicated?

Interaction of radio frequency electromagnetic fields and passive metallic implants--a brief review.

Use of mobile phones in ICU--why not ban?

Clinical testing of cellular phone ringing interference with automated external defibrillators.

Electromagnetic immunity of implantable pacemakers exposed to wi-fi devices.

Effect of digital cellular phones on tachyarrhythmia analysis of automated external defibrillators.

Interference with the operation of medical devices resulting from the use of radio frequency identification technology.

The impact of dental devices on neurostimulators.

Detection of refrigerator-associated 60 Hz alternating current as ventricular fibrillation by an implantable defibrillator.

Solutions to electromagnetic interference problems between cochlear implants and GSM phones.

[Electromagnetic fields of mobile telephone systems--thresholds, effects and risks for cochlear implant patients and healthy people].

[Interference testing in certification of medical equipment].

Assessment of the exposure to WLAN frequencies of a head model with a cochlear implant.

Mobile phones to improve the practice of neurology.

Is electromagnetic interference still a risk?

Cellular phone interference with the operation of mechanical ventilators.

[Electromagnetic fields in hospitals: wireless-LAN as a risk factor?].

[Influence of electromagnetic waves on portable electronic instruments in medicine].

Electromagnetic energy radiated from mobile phone alters electrocardiographic records of patients with ischemic heart disease.

Nullification of electromagnetic radiation: 50 Hz artifact during electroencephalogram recording.

Development of a silicon retinal implant: cortical evoked potentials following focal stimulation of the rabbit retina with light and electricity.

[Influence of the radiofrequency current on the left ventricular systolic function].

Smart phone: a popular device supports amylase activity assay in fisheries research.

--Leaf Cluster 5 (120)

Theme - Health risks from mobile phone base stations

Titles

Epidemiological evidence for a health risk from mobile phone base stations.

Mobile phone base stations and adverse health effects: phase 1 of a population-based, cross-sectional study in Germany.

Perception of mobile phone and base station risks.

Effect of mobile phone station on micronucleus frequency and chromosomal aberrations in human blood cells.

Public exposure to radio waves near GSM microcell and picocell base stations.

Mobile phone base stations and well-being--A meta-analysis.

Mobile phone base stations and adverse health effects: phase 2 of a cross-sectional study with measured radio frequency electromagnetic fields.

Assessment of exposure to mobile telecommunication electromagnetic fields.

Assessment of radiofrequency/microwave radiation emitted by the antennas of rooftop-mounted mobile phone base stations.

Electromagnetic field pattern in the environment of GSM base stations.

[Electromagnetic field of the mobile phone base station: case study].

Determination of exposure due to mobile phone base stations in an epidemiological study.

Variographic analysis of public exposure to electromagnetic radiation due to cellular base stations.

[Subjective symptoms reported by people living in the vicinity of cellular phone base stations: review].

Neurobehavioral effects among inhabitants around mobile phone base stations.

[Assessment of electromagnetic fields intensity emitted by cellular phone base stations in surrounding flats--a preliminary study].

Effects of short-term W-CDMA mobile phone base station exposure on women with or without mobile phone related symptoms.

Statistical analysis of electromagnetic radiation measurements in the vicinity of indoor microcell GSM/UMTS base stations in Serbia.

Estimates of Environmental Exposure to Radiofrequency Electromagnetic Fields and Risk of Lymphoma Subtypes.

[Level of microwave radiation from mobile phone base stations built in residential districts].

Do mobile phone base stations affect sleep of residents? Results from an experimental double-blind sham-controlled field study.

Effect of electromagnetic radiations from mobile phone base stations on general health and salivary function.

Use of portable exposure meters for comparing mobile phone base station radiation in different types of areas in the cities of Basel and Amsterdam.

[Investigation on the health of people living near mobile telephone relay stations: I/Incidence according to distance and sex].

Statistical analysis of electromagnetic radiation measurements in the vicinity of GSM/UMTS base station antenna masts.

Impact of radiofrequency radiation on DNA damage and antioxidants in peripheral blood lymphocytes of humans residing in the vicinity of mobile phone base stations.

Analysis of the effect of mobile phone base station antenna loading on localized SAR and its consequences for measurements.

Public safety assessment of electromagnetic radiation exposure from mobile base stations.

Survey of RF exposure levels from mobile telephone base stations in Australia.

Subjective complaints of people living near mobile phone base stations in Poland.

Time averaged transmitter power and exposure to electromagnetic fields from mobile phone base stations.

[Symptoms experienced by people in vicinity of base stations: II/ Incidences of age, duration of exposure, location of subjects in relation to the antennas and other electromagnetic factors].

[Danger of cellular telephones and their relay stations].

Mobile phone base stations and early childhood cancers: case-control study.

Exposure to non-ionizing electromagnetic radiation from mobile telephony and the association with psychiatric symptoms.

Feasibility of future epidemiological studies on possible health effects of mobile phone base stations.

Electromagnetic fields from mobile phone base station - variability analysis.

Assessment of RF radiation levels in the vicinity of 60 GSM mobile phone base stations in Iran.

Biological responses of mobile phone frequency exposure.

Radio frequency electromagnetic field compliance assessment of multi-band and MIMO equipped radio base stations.

A possible effect of electromagnetic radiation from mobile phone base stations on the number of breeding house sparrows (*Passer domesticus*).

Statistical analysis of electromagnetic radiation measurements in the vicinity of GSM/UMTS base station installed on buildings in Serbia.

A cross-sectional case control study on genetic damage in individuals residing in the vicinity of a mobile phone base station.

Does short-term exposure to mobile phone base station signals increase symptoms in individuals who report sensitivity to electromagnetic fields? A double-blind randomized provocation study.

Modeled and Perceived Exposure to Radiofrequency Electromagnetic Fields From Mobile-Phone Base Stations and the Development of Symptoms Over Time in a General Population Cohort.

Determination of safety distance limits for a human near a cellular base station antenna, adopting the IEEE standard or ICNIRP guidelines.

Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations.

Occupational exposure to base stations-compliance with EU directive 2004/40/EC.

Measurement and analysis of radiofrequency radiations from some mobile phone base stations in Ghana.

UMTS base station-like exposure, well-being, and cognitive performance.

Outdoor and indoor sources of residential radiofrequency electromagnetic fields, personal cell phone and cordless phone use, and cognitive function in 5-6 years old children.

[Increased occurrence of nuclear cataract in the calf after erection of a mobile phone base station].

Impact of a small cell on the RF-EMF exposure in a train.

A large-scale measurement, analysis and modelling of electromagnetic radiation levels in the vicinity of GSM/UMTS base stations in an urban area.

Determinants of exposure to electromagnetic fields from mobile phones.

Improving the efficiency of measurement procedures for assessing human exposure in the vicinity of mobile phone (GSM/DCS/UMTS) base stations.

Population exposure to electromagnetic fields generated by radio base stations: evaluation of the urban background by using provisional model and instrumental measurements.

On the safety assessment of human exposure in the proximity of cellular communications base-station antennas at 900, 1800 and 2170 MHz.

What input data are needed to accurately model electromagnetic fields from mobile phone base stations?

Methods of evaluating human exposure to electromagnetic fields radiated from operating base stations in Korea.

Non-specific physical symptoms in relation to actual and perceived proximity to mobile phone base stations and powerlines.

[Mobile communication: radiobiology problems and evaluation of danger].

Temporal and spatial variability of personal exposure to radio frequency electromagnetic fields.

The precautionary principle in the context of mobile phone and base station radiofrequency exposures.

Adolescents' risk perceptions on mobile phones and their base stations, their trust to authorities and incivility in using mobile phones: a cross-sectional survey on 2240 high school students in Izmir, Turkey.

Systematic review on the health effects of exposure to radiofrequency electromagnetic fields from mobile phone base stations.

Radiofrequency electromagnetic fields emitted from base stations of DECT cordless phones and the risk of glioma and meningioma (Interphone Study Group, Germany).

Mobile telecommunications and health: report of an investigation into an alleged cancer cluster in Sandwell, West Midlands.

Study of variations of radiofrequency power density from mobile phone base stations with distance.

Health risks from the use of mobile phones.

Mobile phones, mobile phone base stations and cancer: a review.

Animal carcinogenicity studies on radiofrequency fields related to mobile phones and base stations.

Association of Exposure to Radio-Frequency Electromagnetic Field Radiation (RF-EMFR) Generated by Mobile Phone Base Stations with Glycated Hemoglobin (HbA1c) and Risk of Type 2 Diabetes Mellitus.

Assessment of the temporal trend of the exposure of people to electromagnetic fields produced by base stations for mobile telephones.

Risk and benefit perceptions of mobile phone and base station technology in Bangladesh.

Clinically defined non-specific symptoms in the vicinity of mobile phone base stations: A retrospective before-after study.

Specific absorption rate and electric field measurements in the near field of six mobile phone base station antennas.

Output power levels from mobile phones in different geographical areas; implications for exposure assessment.

Influence of mobile phone traffic on base station exposure of the general public.



Residential exposure to RF-EMF from mobile phone base stations: Model predictions versus personal and home measurements.

Physics and biology of mobile telephony.

Longitudinal associations between risk appraisal of base stations for mobile phones, radio or television and non-specific symptoms.

Exposure assessment of mobile phone base station radiation in an outdoor environment using sequential surrogate modeling.

Exposure of farm workers to electromagnetic radiation from cellular network radio base stations situated on rural agricultural land.

Mobile phones. precautionary options.

Aggregated data from two double-blind base station provocation studies comparing individuals with idiopathic environmental intolerance with attribution to electromagnetic fields and controls.

GSM base stations: short-term effects on well-being.

Sensitivity to electricity--temporal changes in Austria.

How does long term exposure to base stations and mobile phones affect human hormone profiles?

Effects of exposure to GSM mobile phone base station signals on salivary cortisol, alpha-amylase, and immunoglobulin A.

Determinants and stability over time of perception of health risks related to mobile phone base stations.

[Cellular radio systems. Problems faced in assessing exposure to electromagnetic fields].

Effect of radiofrequency radiation on reproductive health.

Exposure assessment in front of a multi-band base station antenna.

Protect children from EMF.

Symptoms of ill health ascribed to electromagnetic field exposure--a questionnaire survey.

Spatial electromagnetic field intensity modelling of global system for mobile communication base stations in the Istanbul Technical University Ayazaga campus area.

[Protection against electromagnetic fields emitted by mobile phone facilities in Poland and the European Union countries].

Prevalence of nuclear cataract in Swiss veal calves and its possible association with mobile telephone antenna base stations.

[GSM fields and health: an updated literature review].

Knowledge and perceptions of the health effects of environmental hazards in the general population in Italy.

Dynamics of the public concern and risk communication program implementation.

Microwaves in the cold war: the Moscow embassy study and its interpretation. Review of a retrospective cohort study.

Health effects of living near mobile phone base transceiver station (BTS) antennae: a report from Isfahan, Iran.

Replication of heart rate variability provocation study with 2.4-GHz cordless phone confirms original findings.

[Reports on the impact of objects emitting electromagnetic fields on the environment: issues concerning their better understanding by non-specialists in telecommunication].

Cognitive and physiological responses in humans exposed to a TETRA base station signal in relation to perceived electromagnetic hypersensitivity.

Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil.

Are wireless phones safe? A review of the issue.

A novel method to assess human population exposure induced by a wireless cellular network.

[Metrology of pulse modulated electromagnetic fields with diode-type meters].

Radiofrequency radiation injures trees around mobile phone base stations.

Comparison of temporal realistic telecommunication base station exposure with worst-case estimation in two countries.

[Cellular telephones and their relay stations: a health risk?].

[Evaluation of the levels of radiofrequency electromagnetic fields in the territory of the city of Bari in outside and inside environments].

A geographical model of radio-frequency power density around mobile phone masts.

[Ecological aspects of electromagnetic radiation emitted by mobile stations of communication means].

Assessment of nuclear abnormalities in exfoliated cells from the oral epithelium of mobile phone users.

Occupational exposure to radiofrequency fields in antenna towers.

Joint minimization of uplink and downlink whole-body exposure dose in indoor wireless networks.

--Leaf Cluster 19 (84)

Theme - Electromagnetic hypersensitivity

Titles

Does electromagnetic hypersensitivity originate from placebo responses? Indications from a qualitative study.

Symptoms, personality traits, and stress in people with mobile phone-related symptoms and electromagnetic hypersensitivity.

Electromagnetic field induced biological effects in humans.

Development and evaluation of the electromagnetic hypersensitivity questionnaire.

Hypothesis on how to measure electromagnetic hypersensitivity.

[Subjective non-specific symptoms related with electromagnetic fields: description of 2 cases].

Characteristics of perceived electromagnetic hypersensitivity in the general population.

Electromagnetic hypersensitivity--an increasing challenge to the medical profession.

Idiopathic environmental intolerance attributed to electromagnetic fields (formerly 'electromagnetic hypersensitivity'): An updated systematic review of provocation studies.

Cognitive and neurobiological alterations in electromagnetic hypersensitive patients: results of a case-control study.

Becoming electro-hypersensitive: A replication study.

Hypersensitivity to RF fields emitted from CDMA cellular phones: a provocation study.

Electromagnetic hypersensitivity: fact or fiction?

IEI-EMF provocation case studies: A novel approach to testing sensitive individuals.

A systematic review of treatments for electromagnetic hypersensitivity.

[Hypersensitivity syndrome].

Electromagnetic hypersensitivity: a systematic review of provocation studies.

Symptom attribution and risk perception in individuals with idiopathic environmental intolerance to electromagnetic fields and in the general population.

Polluted places or polluted minds? An experimental sham-exposure study on background psychological factors of symptom formation in 'Idiopathic Environmental Intolerance attributed to electromagnetic fields'.

Is There a Connection Between Electrosensitivity and Electrosensibility? A Replication Study.

Idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF): a systematic review of identifying criteria.

Electromagnetic hypersensitivity (EHS) in occupational and primary health care: A nation-wide survey among general practitioners, occupational physicians and hygienists in the Netherlands.

"Hypersensitivity to Electricity" in the Office; Symptoms and Improvement.

Do people with idiopathic environmental intolerance attributed to electromagnetic fields display physiological effects when exposed to electromagnetic fields? A systematic review of provocation studies.

Hypersensitivity to electricity: working definition and additional characterization of the syndrome.

Are media warnings about the adverse health effects of modern life self-fulfilling? An experimental study on idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF).

Medical and social prognosis for patients with perceived hypersensitivity to electricity and skin symptoms related to the use of visual display terminals.

Blood laboratory findings in patients suffering from self-perceived electromagnetic hypersensitivity (EHS).

Representative survey on idiopathic environmental intolerance attributed to electromagnetic fields in Taiwan and comparison with the international literature.

Can explicit suggestions about the harmfulness of EMF exposure exacerbate a placebo response in healthy controls?

Idiopathic environmental intolerance attributed to electromagnetic fields: a content analysis of British newspaper reports.

A cognitive-behavioral treatment of patients suffering from "electric hypersensitivity". Subjective effects and reactions in a double-blind provocation study.

Development and evaluation of an electromagnetic hypersensitivity questionnaire for Japanese people.

Increasing levels of saliva alpha amylase in electrohypersensitive (EHS) patients.

Are media reports able to cause somatic symptoms attributed to WiFi radiation? An experimental test of the negative expectation hypothesis.

Electrical hypersensitivity in humans--fact or fiction?

Electromagnetic hypersensitivity: evidence for a novel neurological syndrome.

Effect of short exposure to radiofrequency electromagnetic fields on saliva biomarkers: a study on the electrohypersensitive individuals.

[Electromagnetic fields hypersensitivity].

Heavy metal exposure in patients suffering from electromagnetic hypersensitivity.

[Controversies around electromagnetic fields and electromagnetic hypersensitivity. The construction of "low noise" public problems].

Coping and self-image in patients with visual display terminal-related skin symptoms and perceived hypersensitivity to electricity.

Neurophysiological effects of flickering light in patients with perceived electrical hypersensitivity.

Effects of personalised exposure on self-rated electromagnetic hypersensitivity and sensibility - A double-blind randomised controlled trial.

Psychologic aspects of patients with symptoms presumed to be caused by electricity or visual display units.

Odontologic survey of referred patients with symptoms allegedly caused by electricity or visual display units.

Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder.

[Idiopathic environmental intolerance: 2 disabling entities to recognize].

Neurophysiological study of patients with perceived 'electrical hypersensitivity'.

Description of persons with symptoms presumed to be caused by electricity or visual display units--oral aspects.

Provocation with stress and electricity of patients with "sensitivity to electricity".

Functional brain MRI in patients complaining of electrohypersensitivity after long term exposure to electromagnetic fields.

Association of tinnitus and electromagnetic hypersensitivity: hints for a shared pathophysiology?

The microwave syndrome or electro-hypersensitivity: historical background.

[Pseudostenocardia due to exposure to "electrosmog"].

Altered cortical excitability in subjectively electrosensitive patients: results of a pilot study.

An assessment of the autonomic nervous system in the electrohypersensitive population: a heart rate variability and skin conductance study.

Provocation of the electromagnetic distress syndrome.

Skin problems from visual display units. Provocation of skin symptoms under experimental conditions.

Cognitive behavioural therapy for patients with electric sensitivity - a multidisciplinary approach in a controlled study.

Self-reporting of symptom development from exposure to radiofrequency fields of wireless smart meters in victoria, australia: a case series.

Improvement of gastroesophageal reflux symptoms after radiofrequency energy: a randomized, sham-controlled trial.

Does "electromagnetic pollution" cause illness? An inquiry among Austrian general practitioners.

"Struggle to obtain redress": Women's experiences of living with symptoms attributed to dental restorative materials and/or electromagnetic fields.

Environmental illness: fatigue and cholinesterase activity in patients reporting hypersensitivity to electricity.

The views of primary care physicians on health risks from electromagnetic fields.

Review of extensive workups of 34 patients overexposed to radiofrequency radiation.

Providing cell phone numbers and e-mail addresses to patients: The patient's perspective, a cross sectional study.

[Effects of millimetric electromagnetic waves on regional blood flow and effectiveness of multimodal therapy of patients with pulmonary tuberculosis].

Environmental illness: evaluation of salivary flow, symptoms, diseases, medications, and psychological factors.

30-MINUTES-TUMT. Use of the visual analogue scale to investigate patients' pain perception, different cocktail options and tolerability during 30 minutes' treatment.

Non-ionizing radiation exposure causing ill-health and alopecia areata.

Low-frequency pulsed electromagnetic field therapy in fibromyalgia: a randomized, double-blind, sham-controlled clinical study.

Electrohypersensitivity: a functional impairment due to an inaccessible environment.

Accidental exposure to electromagnetic fields from the radar of a naval ship: a descriptive study.

[Mechanism of biotropic effects of regional electromagnetic fields in patients with left ventricular ischemic dysfunction].

A comparison of percutaneous radiofrequency trigeminal neurolysis and microvascular decompression of the trigeminal nerve for the treatment of tic douloureux.

Medical aspects of radiofrequency radiation overexposure.

Prospective, randomized, single-blind, sham treatment-controlled study of the safety and efficacy of an electromagnetic field device for the treatment of chronic low back pain: a pilot study.

Atrial fibrillation therapies: lest we forget surgery.

Non-resection approaches for colorectal liver metastases.

[Indices of thrombocyte conductance and permeability in microwave fields in ischemic and hemorrhagic stroke patients].

Health care utilisation and attitudes towards health care in subjects reporting environmental annoyance from electricity and chemicals.

A primer of magnetic stimulation as a tool for neuropsychology.

--Leaf Cluster 43 (202)

Theme - Health risks from low-frequency electromagnetic fields

Titles

Health risks of electromagnetic fields. Part I: Evaluation and assessment of electric and magnetic fields.

The Bernal Lecture 2004 Are low-frequency electromagnetic fields a health hazard?

Electric and magnetic fields (EMF): what do we know about the health effects?

EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses.

[Non-thermal bioeffects of static and extremely low frequency electromagnetic fields].

Effects of extremely low frequency electromagnetic fields on health.

Exposure assessment for power frequency electric and magnetic fields (EMF) and its application to epidemiologic studies.

The question of health effects from exposure to electromagnetic fields.

[Influence of low frequency electromagnetic fields on the nervous system].

Biological responses to electromagnetic fields.

Teratogen update: electromagnetic fields.

Intrauterine effects of electromagnetic fields--(low frequency, mid-frequency RF, and microwave): review of epidemiologic studies.

The effects of electromagnetic fields from power lines on avian reproductive biology and physiology: a review.

The effects of extremely low-frequency magnetic fields on melatonin and cortisol, two marker rhythms of the circadian system.

The sensitivity of children to electromagnetic fields.

Electromagnetic fields and cancer: the cost of doing nothing.

Biological effects from electromagnetic field exposure and public exposure standards.

[Low frequency electromagnetic fields in the working environment--exposure and health effects. Elevated risk of cancer, reproductive hazards or other unwanted health effects?].

Designing EMF experiments: what is required to characterize "exposure"?

Electromagnetic fields and public health.

[Current state of knowledge on health and electromagnetic fields].

Health risks associated with residential exposure to extremely low frequency electromagnetic radiation.

Electromagnetic fields and health outcomes.

[Biological mechanisms and health effects of emf in view of requirements of reports on the impact of various installations on the environment].

[Exposure to low-frequency electromagnetic fields and pregnancy outcome: a review of the literature with particular attention to exposure to video terminals].

Fielding a current idea: exploring the public health impact of electromagnetic radiation.

A literature review: the cardiovascular effects of exposure to extremely low frequency electromagnetic fields.

Exposure to low-frequency electromagnetic fields--a health hazard?

Human disease resulting from exposure to electromagnetic fields.

Electromagnetic radiation.

Future needs of occupational epidemiology of extremely low frequency electric and magnetic fields: review and recommendations.

Comparative health risk assessment of electromagnetic fields.

[Effects of electromagnetic fields on health].

WHO health risk assessment process for static fields.

A review of cancer induction by extremely low frequency electromagnetic fields. Is there a plausible mechanism?

Reproductive and teratologic effects of electromagnetic fields.



Developing policy in the face of scientific uncertainty: interpreting 0.3 microT or 0.4 microT cutpoints from EMF epidemiologic studies.

[Electromagnetic fields--effects on health].

Biologic effects and health consequences of low and high (radio) frequency electromagnetic fields.

[Electromagnetic pollution (electrosmog)--potential hazards of our electromagnetic future].

Risk governance for mobile phones, power lines, and other EMF technologies.

[Bioeffects of electromagnetic fields--safety limits of each frequency band, especially less than radio one].

Setting prudent public health policy for electromagnetic field exposures.

Effects of extremely low frequency electromagnetic field on the health of workers in automotive industry.

Electromagnetic fields: low dose exposure, current update.

Effects of extremely low frequency electromagnetic fields on distortion product otoacoustic emissions in rabbits.

Exposure to extremely-low-frequency electromagnetic fields and radiofrequency radiation: cardiovascular effects in humans.

Effects of electromagnetic field exposure on the heart: a systematic review.

Current Understanding of the Health Effects of Electromagnetic Fields.

Personal digital assistant (PDA) cell phone units produce elevated extremely-low frequency electromagnetic field emissions.

Biological effects of low frequency electromagnetic fields.

Exposure to extremely low frequency electromagnetic fields during pregnancy and the risk of spontaneous abortion: a case-control study.

[Neurotic disturbances, depression and anxiety disorders in the population living in the vicinity of overhead high-voltage transmission line 400 kV. Epidemiological pilot study].

The effect of extremely low frequency electromagnetic fields on pregnancy and fetal growth, and development.

The Effects of Electromagnetic Field on the Endocrine System in Children and Adolescents.

EMF and current cancer concepts.

Attitudes about electric and magnetic fields: do scientists and other risk experts perceive risk similarly?

[Effects of extremely low frequency electromagnetic radiation on cardiovascular system of workers].

Perception of health risks of electromagnetic fields by MRI radiographers and airport security officers compared to the general Dutch working population: a cross sectional analysis.

[Electromagnetic poles and reproduction].

[Biophysical mechanisms of electromagnetic fields interaction and health effects].

Resveratrol may reverse the effects of long-term occupational exposure to electromagnetic fields on workers of a power plant.

ELF noise fields: a review.

[The health risks of exposure to electromagnetic fields in work environments].

Scientific panel on electromagnetic field health risks: consensus points, recommendations, and rationales.

Fundamental issues on electromagnetic fields (EMF).

Study of extremely low frequency electromagnetic fields in infant incubators.

Intensity-time dependence dosing criterion in the EMF exposure guidelines in Russia.

[Electromagnetic fields: their biological effects and regulation].

Can EMF exposure during development leave an imprint later in life?

Combined effects of electromagnetic fields on immune and nervous responses.

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Effects of noise and electromagnetic fields on reproductive outcomes.

Health and safety implications of exposure to electromagnetic fields in the frequency range 300 Hz to 10 MHz.

The role of electromagnetic fields in neurological disorders.

Biophysical estimation of the environmental importance of electromagnetic fields.

[Biological effects of electromagnetic fields].

Effects of electromagnetic fields exposure on plasma hormonal and inflammatory pathway biomarkers in male workers of a power plant.

The epidemiology of exposure to electromagnetic fields: an overview of the recent literature.

Microwave electromagnetic field regulates gene expression in T-lymphoblastoid leukemia CCRF-CEM cell line exposed to 900 MHz.

Effects of 60 Hz electromagnetic field exposure on APP695 transcription levels in differentiating human neuroblastoma cells.

Ambiguous evidence and institutional interpretation: an alternative view of electric and magnetic fields.

[Combined biological effect of electromagnetic fields and chemical substances (toxic)].

EMFs: cutting through the controversy.

The effect of chronic exposure to extremely low-frequency electromagnetic fields on sleep quality, stress, depression and anxiety.

[Norms and standards for radiofrequency electromagnetic fields in Latin America: guidelines for exposure limits and measurement protocols].

Health risk assessment of electromagnetic fields: a conflict between the precautionary principle and environmental medicine methodology.

[Constant low-frequency electrical and electromagnetic fields (biological action and hygienic evaluation)].

[Electrical field exposure and human health. Risk assessment and problems relative to bureaucratic procedures and to the role of institutional organizations in control and prevention].

Possible health effects of EMF.

Electromagnetic fields enhance chemically-induced hyperploidy in mammalian oocytes.

Electromagnetic field exposure assessment in Europe radiofrequency fields (10 MHz-6 GHz).

Exposure of the critically ill patient to extremely low-frequency electromagnetic fields in the intensive care environment.

Biological effects of electromagnetic fields on vertebrates. A review.

Electromagnetic effects on people.

Time-dependent hematological changes in workers exposed to electromagnetic fields.

Characterisation of exposure to non-ionising electromagnetic fields in the Spanish INMA birth cohort: study protocol.

Electromagnetic fields in neonatal incubators: the reasons for an alert.

[Electromagnetic fields and people's health].

Electromagnetic fields: mechanism, cell signaling, other bioprocesses, toxicity, radicals, antioxidants and beneficial effects.

Project NEMESIS: perception of a 50 Hz electric and magnetic field at low intensities (laboratory experiment).

Non-ionising electromagnetic environments on manned spacecraft.

Health hazards and electromagnetic fields.

The design, construction and calibration of a carefully controlled source for exposure of mammalian cells to extremely low-frequency electromagnetic fields.

[HEALTH STATUS OF ELECTROTECHNICAL PERSONNEL EXPOSED TO THE COMBINED IMPACT OF ELECTROMAGNETIC FIELDS OF 50 HZ AND CHEMICALS].

EMF recommendations specific for children?

[Electromagnetic fields emitted in radio- and microwave- frequency range: equipment and methods for the environment protection and survey measurements].

Health-Economics Analyses Applied to ELF Electric and Magnetic Fields.

Alterations in human EEG activity caused by extremely low frequency electromagnetic fields.

Adverse human reproductive outcomes and electromagnetic fields: a brief summary of the epidemiologic literature.

Nonionizing electromagnetic fields and cancer: a review.

Recommended minimal requirements and development guidelines for exposure setups of bio-experiments addressing the health risk concern of wireless communications.

Genetic damage in mammalian somatic cells exposed to extremely low frequency electromagnetic fields: a meta-analysis of data from 87 publications (1990-2007).

Health effects of low-level electromagnetic fields: phantom or not-so-phantom risk?

"Dirty electricity": what, where, and should we care?

Basic problems of diversely reported biological effects of radio frequency fields.

Investigation of the spinal cord as a natural receptor antenna for incident electromagnetic waves and possible impact on the central nervous system.

Assessment of electromagnetic field levels from surrounding high-tension overhead power lines for proposed land use.

Effects of electromagnetic fields on photophasic circulating melatonin levels in American kestrels.

How dangerous are mobile phones, transmission masts, and electricity pylons?

Understanding the effects of electromagnetic field emissions from Marine Renewable Energy Devices (MREDs) on the commercially important edible crab, *Cancer pagurus* (L.).

Actual and perceived exposure to electromagnetic fields and non-specific physical symptoms: an epidemiological study based on self-reported data and electronic medical records.

Is newborn melatonin production influenced by magnetic fields produced by incubators?

Does exposure to environmental radiofrequency electromagnetic fields cause cognitive and behavioral effects in 10-year-old boys?

Cardiovascular diseases and the work environment. A critical review of the epidemiologic literature on nonchemical factors.

Public health hazards from electricity-producing plants.

[*Saccharomyces cerevisiae* as a model organism for studying the carcinogenicity of non-ionizing electromagnetic fields and radiation].

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[The role of chemical and physical factors in cancer development].

[Possible outer hair cells hazards from occupational exposure to very low frequency electric and magnetic fields: a pilot study].

Effects of electromagnetic fields on the reproductive success of American kestrels.

A 50-Hz electromagnetic field impairs sleep.

A structured literature review for risk assessment: EMF and human health risk.

Is MRI imaging in pediatric age totally safe? A critical reprisal.

Health effects of microwave exposures: a review of the recent (1995-1998) literature.

Epidemiological studies of human exposures to radiofrequency radiation. A critical review.

Human adverse reproductive outcomes and electromagnetic field exposures: review of epidemiologic studies.

The infant incubator in the neonatal intensive care unit: unresolved issues and future developments.

Biologic effects of low-level electromagnetic fields: current issues and controversies.

[Non-thermal electromagnetic fields and estimation of the convulsive syndrome probable development].

[The precautionary principle: scientific evidence and decision processes].

Study of self-reported hypersensitivity to electromagnetic fields in California.

Occupational EMF exposure from radar at X and Ku frequency band and plasma catecholamine levels.

Clustering of excess health concerns for electromagnetic fields among health personnel: A quantitative and qualitative approach.

Biological effects of environmental electromagnetic fields: molecular mechanisms.

[Biological effects of exposure to electromagnetic fields: introduction].

Effects of low-level radio-frequency (3kHz to 300GHz) energy on human cardiovascular, reproductive, immune, and other systems: a review of the recent literature.

Human performance and physiology: a statistical power analysis of ELF electromagnetic field research.

Psychological studies in nonionizing electromagnetic energy research.

Potential emotional and cognitive disorders associated with exposure to EMFs. A review.

Electric power plant emissions and public health.

Electromagnetic fields produced by incubators influence heart rate variability in newborns.

Study of human neurovegetative and hematologic effects of environmental low-frequency (50-Hz) electromagnetic fields produced by transformers.

[The influence of occupational environment and professional factors on the risk of cardiovascular disease].

Synergistic health effects between chemical pollutants and electromagnetic fields.

Effect of short-term 50 Hz electromagnetic field exposure on the behavior of rats.

Estimating air pollution and health loss embodied in electricity transfers: An inter-provincial analysis in China.

Alternative functional relationships between ELF field exposure and possible health effects: report on an expert workshop.

[Impact of electromagnetic fields on a computer user].

Mechanisms of electromagnetic interaction with cellular systems.

Opinion on potential health effects of exposure to electromagnetic fields.

Electromagnetic hypersensitivity: biological effects of dirty electricity with emphasis on diabetes and multiple sclerosis.

The "Moscow signal" epidemiological study, 40 years on.

Effects of EMF emissions from undersea electric cables on coral reef fish.

Exposure to electric power generator noise among small scale business operators in selected communities in Ibadan, Nigeria.

Northern cardiometeopathies.

EMF-cancer link: the ferritin hypothesis.

Effect of occupational EMF exposure from radar at two different frequency bands on plasma melatonin and serotonin levels.

Dirty electricity, chronic stress, neurotransmitters and disease.

[The perceptibility of a microwave field under experimental conditions].

Women growing older with environmental sensitivities: A grounded theory model of meeting one's needs.

A perspective on environmental health in the USSR: research and practice.

[Clinical variants of the disease caused by exposure to radio-frequency electromagnetic fields].

Work environment and cardiovascular diseases. A short review of the literature.

Noise, impulse noise, and other physical factors: combined effects on hearing.

[Characteristics of electromagnetic situation in Far North regions].

Fifty Hertz electromagnetic field exposure stimulates secretion of beta-amyloid peptide in cultured human neuroglioma.

[Ethical values in the regulation of the exposure to electromagnetic fields].

[Ecological significance of electromagnetic fields: the 20th century--century of electricity, the 21st--century of magnetism].

[Video display terminals: their electromagnetic safety].

Male proportion in offspring of parents exposed to strong static and extremely low-frequency electromagnetic fields in Norway.

Video display terminals: risk of electromagnetic radiation.

[The evaluation of the exposure of seamstresses to electromagnetic fields, emitted by sewing machines].

Scientometric study of the effects of exposure to non-ionizing electromagnetic fields on fertility: A contribution to understanding the reasons of partial failure.

[Influences of solar and geomagnetic activity on health status of people with various nosological forms of diseases].

Earthing: health implications of reconnecting the human body to the Earth's surface electrons.

Prevalence of annoyance attributed to electrical equipment and smells in a Swedish population, and relationship with subjective health and daily functioning.

Fetal loss associated with two seasonal sources of electromagnetic field exposure.

Use of kappa statistic in determining validity of quality filtering for meta-analysis: a case study of the health effects of electromagnetic radiation.

[Health risks from the use of NMR tomography and in vivo NMR spectroscopy].

Geomagnetics and society interact in weekly and broader multiseptans underlying health and environmental integrity.

[Contribution of physical factors to the complex anthropogenic load in an industrial town].

Evidence that dirty electricity is causing the worldwide epidemics of obesity and diabetes.

Possible effects of electric blankets and heated waterbeds on fetal development.

Environmental variables and the risk of disease.

[The use of geographic information technologies in the sanitary control of an environmental electromagnetic field].

[Personal computer: physical factors, effect on the user].

A low cost, re-usable electricity-free infant warmer: evaluation of safety, effectiveness and feasibility.

Iatrogenic environmental hazards in the neonatal intensive care unit.

Space weather and human deaths distribution: 25 years' observation (Lithuania, 1989-2013).

Acute myocardial infarction (AMI) (n=11026) on days of zero geomagnetic activity (GMA) and the following week: differences at months of maximal and minimal solar activity (SA) in solar cycles 23 and 24.

Current strategies in the management of atrial fibrillation.

--Leaf Cluster 33 (91)

Theme - Health risks to workers in different occupations

Titles

[Levels of occupational exposure to extremely low frequency magnetic fields among workers in different jobs].

[Occupational exposure to 50 Hz magnetic fields in workers employed in various jobs].

[Exposure to electromagnetic fields with frequencies of 50 Hz and changes in the circulatory system in workers at electrical power stations].

Absenteeism and mortality of workers exposed to electromagnetic fields in the French Electricity Company.

[Evaluation of selected parameters of circulatory system function in various occupational groups exposed to high frequency electromagnetic fields. II. Electrocardiographic changes].

[Fitness of workers with particular sensitivity to non-ionizing radiation].



Health of workers exposed to electric fields.

[Health protection of workers occupationally exposed to effects of electromagnetic fields in Poland and in the European Union member states].

[Occupational exposure to electromagnetic fields of extremely low frequency (with particular regard to power plants) and the health status of workers, based on a literature review].

A biomonitoring study of genotoxic risk to workers of transformers and distribution line stations.

[Health effects of occupational exposure to electromagnetic fields in view of studies performed in Poland and abroad].

[Evaluation of the genotoxicity of the extremely low frequency-magnetic fields (ELF-MF) in workers exposed for professional reasons].

[Evaluation of selected parameters of circulatory system function in various occupational groups of workers exposed to high frequency electromagnetic fields].

[Health status of railway workers using magnetic powder flaw detectors].

[Health effects of occupational exposure to static magnetic fields used in magnetic resonance imaging: a review].

Health problems among workers of iron welding machines: an effect of electromagnetic fields.

[Health and work ability of workers of the electricity sector in Sao Paulo].

[Hygienic assessment of working conditions and functional resistance in electric power station workers].

Should the threshold limit value for power frequency (60 Hz) magnetic fields be changed? Perceptions among scientists and other risk experts.

Prevalence of depression among electrical workers.

[Health status of the workers exposed to strong, constant magnetic fields].

[Observations of changes in neurobehavioral functions in workers exposed to high-frequency radiation].

Occupational exposure to electromagnetic fields of uninterruptible power supply industry workers.

Neurovegetative disturbances in workers exposed to 50 Hz electromagnetic fields.

[Possible consequence on measures for the protection of electromagnetic fields exposed workers].

Extremely low frequency-magnetic fields (ELF-EMF) occupational exposure and natural killer activity in peripheral blood lymphocytes.

Evaluation of chromosomal alteration in electrical workers occupationally exposed to low frequency of electro magnetic field (EMFs) in Coimbatore population, India.

Injuries among electric power industry workers, 1995-2013.

Health status of personnel occupationally exposed to radiowaves.

[Effect of exposure to extremely low-frequency electromagnetic fields on liver function of workers].

[Evaluation of selected functional circulation parameters of workers from various occupational groups exposed to electromagnetic fields of high frequency. III. 24-h monitoring of arterial blood pressure (ABP)].

Depression in high voltage power line workers.

[A methodological approach to studying the values of 50-Hz electromagnetic fields that influence the workers of power enterprises].

Guidance note: risk management of workers with medical electronic devices and metallic implants in electromagnetic fields.

ECG changes in factory workers exposed to 27.2 MHz radiofrequency radiation.

Low-back pain among electric power supply workers and their attitude toward its prevention and the treatment.

Exposure to high-frequency transient electromagnetic fields.

[Exposure to VHF and UHF electromagnetic fields among workers employed in radio and TV broadcast centers. I. Assessment of exposure].

Heart rate variability (HRV) analysis in radio and TV broadcasting stations workers.

[Functional status of workers engaged in connecting high-voltage electric power lines].

[Offshore substation workers' exposure to harmful factors - Actions minimizing risk of hazards].

[Medical and biologic research of electromagnetic fields in radiofrequencies range. Results and prospects].

[Health surveillance guidelines after the European directive on electromagnetic fields].

Monitoring of people and workers exposure to the electric, magnetic and electromagnetic fields in an Italian National Cancer Institute.

[Risk of electromagnetic fields in electric power stations and substations of a petrochemical plant].

An analysis of fatal and non-fatal injuries and injury severity factors among electric power industry workers.

[Hygienic optimization of the use of chemical protective means on railway transport].

[High-frequency electromagnetic field exposure on reproductive and endocrine functions of female workers].

Assessment of levels of occupational exposure to workers in radiofrequency fields of two television stations in Accra, Ghana.

[Evaluation of vital activity of workers with obliterating diseases of lower extremities servicing electric transmission lines].

[Occupational health evaluation of electromagnetic fields in electric trains and subway technologic areas].

[Reports on electromagnetic field strength measurements issued for occupational health and safety needs in the opinion of radio communication station users].

Health problems among operators of plastic welding machines and exposure to radiofrequency electromagnetic fields.

[Various psychological parameters in subjects occupationally exposed to radiofrequencies].

Ocular medical surveillance on microwave and laser workers.

Evaluation of non ionizing radiation around the dielectric heaters and sealers: a case report.

The psychosocial work environment and skin symptoms among visual display terminal workers: a case referent study.

The strategy of targetted health surveillance. II. Genetically determined susceptibility to chemical substances and other issues related to health surveillance.

[Screen dermatitis and visual display units].

[Occupational risks in grocery stores].

Health Effects of Electromagnetic Fields on Reproductive-Age Female Operators of Plastic Welding Machines in Fuzhou, China.

Reproductive hazards among workers at high voltage substations.

[Evaluation of various psychologic parameters in a group of workers occupationally exposed to radiofrequency].

Occupational influences on male fertility and sexuality. I.

[Radiation safety at atomic electric power stations].

[Effect of wide-band modulated electromagnetic fields on the workers of high-frequency telephone exchanges].

[Effect of ultra high frequency electromagnetic waves and lead on the workers' health; phytotherapy of the disorders].

Biosomatic effects of the electromagnetic fields on view of the physiotherapy personnel health.

[On prevention of electromagnetic rays effects in workers exposed to extreme climate conditions].

Microwave sickness: a reappraisal.

Building an index of activity of inhabitants from their activity on the residential electrical power line.

Radiofrequency electromagnetic leakage fields from plastic welding machines. Measurements and reducing measures.

Rate of change of frequency under line contingencies in high voltage electric power networks with uncertainties.

Risk-management and risk-analysis-based decision tools for attacks on electric power.

Exposure from occupational versus other sources.

Occupational exposure of herbicide applicators to herbicides used along electric power transmission line right-of-way.

[Clinical monitoring in areas of exposure to radiofrequency electromagnetic fields].

Electromagnetic noise superimposed on the electric power supply to electronic medical equipment.

Cardiovascular risk in operators under radiofrequency electromagnetic radiation.

Occupational exposure to physical agents: the new Italian database for risk assessment and control.

Erratic electricity supply (Dumsor) and anxiety disorders among university students in Ghana: a cross sectional study.

[A survey on diabetes mellitus in the staff of electric power system in Baotou city].

Correction: The effects of electric power lines on the breeding ecology of greater sage-grouse.

[Risk of electromagnetic fields in control board and switchboard rooms at petrochemical plants].

Biomonitoring of 20 trace elements in blood and urine of occupationally exposed workers by sector field inductively coupled plasma mass spectrometry.

Effects of atmospheric electricity on some substrates of disordered social behavior.

Electricity prices in Italy: Data registered during photovoltaic activity interval.

[Dermatitis in VDT operators: a review of the literature].

Black sky: Exposing electricity as the Achilles' heel of resilience.

[Danger of electricity in the bathtub].

The role of microwave radiometry in carotid artery disease. Diagnostic and clinical prospective.

--Leaf Cluster 36 (84)

Theme - Precautionary measures to reduce potential EMF health risks

Titles

Workgroup report: base stations and wireless networks-radiofrequency (RF) exposures and health consequences.

Recent advances in research on radiofrequency fields and health: 2004-2007.

Recent advances in research on radiofrequency fields and health: 2001-2003.

International and national expert group evaluations: biological/health effects of radiofrequency fields.

Low-level exposure to radiofrequency electromagnetic fields: health effects and research needs.

Public responses to precautionary information from the Department of Health (UK) about possible health risks from mobile phones.

Health risks of electromagnetic fields. Part II: Evaluation and assessment of radio frequency radiation.

The precautionary principle and risk perception: experimental studies in the EMF area.

[Autoimmune processes after long-term low-level exposure to electromagnetic fields (the results of an experiment). Part 1. Mobile communications and changes in electromagnetic conditions for the population. Needs for additional substantiation of the existing hygienic standards].

[In the consumers' interest: precautionary principles for protection against electromagnetic fields].

Exposure Knowledge and Perception of Wireless Communication Technologies.

Epidemiology of health effects of radiofrequency exposure.

World Health Organization, radiofrequency radiation and health - a hard nut to crack (Review).

Public perception of risk concerning celltowers and mobile phones.

Risks perception of electromagnetic fields in Taiwan: the influence of psychopathology and the degree of sensitivity to electromagnetic fields.

The prevalence of symptoms attributed to electromagnetic field exposure: a cross-sectional representative survey in Switzerland.

The development of human exposure standards for radio-frequency fields.

Recent advances in research on radiofrequency fields and health.

Searching for the perfect wave: the effect of radiofrequency electromagnetic fields on cells.

[Mutagenic, carcinogenic and teratogenic effects induced by radiofrequency electromagnetic field of mobile phone].

Cell phones and health concerns: impact of knowledge and voluntary precautionary recommendations.

An international prospective cohort study of mobile phone users and health (Cosmos): design considerations and enrolment.

Risk of brain tumors from wireless phone use.

Does precautionary information about electromagnetic fields trigger placebo responses? An experimental risk communication study.

Vehicle-mounted high-power microwave systems and health risk communication in a deployed environment.

Mobile phone health risk policy in Germany: the role of the federal government and the Federal Office for Radiation Protection.

Electromagnetic fields (EMF): do they play a role in children's environmental health (CEH)?

Improving Precautionary Communication in the EMF Field? Effects of Making Messages Consistent and Explaining the Effectiveness of Precautions.

Discourse and policy making on consumer protection in the areas of mobile telecommunication and tanning.

Source of funding and results of studies of health effects of mobile phone use: systematic review of experimental studies.

Radiofrequency exposure from wireless LANs utilizing Wi-Fi technology.

Near-field radiofrequency electromagnetic exposure assessment.

Wi-Fi and health: review of current status of research.

[Mobile communication and health of population: estimation of danger, social and ethical problems].

Improved classification of evidence for EMF health risks.

German wide cross sectional survey on health impacts of electromagnetic fields in the view of general practitioners.

Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective.

Cell phone radiation: Evidence from ELF and RF studies supporting more inclusive risk identification and assessment.

Assessment of cellular telephone and other radio frequency exposure for epidemiologic research.

Potential health risks due to telecommunications radiofrequency radiation exposures in Lagos State Nigeria.

[Electromagnetic fields: damage to health due to the nocebo effect].

Radiofrequency exposure in the French general population: band, time, location and activity variability.

Public health and the radio frequency radiation emitted by cellphone technology, smart meters and WiFi.

[Fundamentally new electromagnetic pollution and the lack of adequate regulatory framework--on the risk assessment (analysis of modern domestic and foreign data)].

[Application criteria of the precautionary principle].

Health response of two communities to military antennae in Cyprus.

Physicians appeals on the dangers of mobile communication--what is the evidence? Assessment of public health data.

[Ionizing and non-ionizing radiation (comparative risk estimations)].

Radiofrequency exposure in young and old: different sensitivities in light of age-relevant natural differences.

Drosophila oogenesis as a bio-marker responding to EMF sources.

Radiofrequency electromagnetic radiation exposure inside the metro tube infrastructure in Warszawa.

Electromagnetic Fields, Pulsed Radiofrequency Radiation, and Epigenetics: How Wireless Technologies May Affect Childhood Development.

Radiofrequency (RF) sickness in the Lilienfeld Study: an effect of modulated microwaves?

Neurological effects of radiofrequency radiation.

[French general practitioners and electromagnetic fields].

The (co-)production of public uncertainty: UK scientific advice on mobile phone health risks.

Procedure for assessment of general public exposure from WLAN in offices and in wireless sensor network testbed.

Exposure caused by wireless technologies used for short-range indoor communication in homes and offices.

Scientific basis for the Soviet and Russian radiofrequency standards for the general public.

[Effects of electromagnetic radiation from cellular telephone handsets on symptoms of neurasthenia].

Genetic, carcinogenic and teratogenic effects of radiofrequency fields.

Assessment of guidelines for limiting exposures to emf using methods of probabilistic risk analysis.

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## **Appendix 5 – Potential Impact of Wireless Radiation Exposure on the Opioid Crisis and Coronavirus Pandemic**

### **A5-A. Potential Impact on Opioid Crisis**

The previous findings of wireless radiation adverse effects reported in Chapter 2 of this monograph are based on *hard evidence* and have been *validated* in numerous studies. The present section on the link of wireless radiation to the opioid crisis is based on *hard evidence* as well, but the link of wireless radiation to the opioid crisis is *not as far along in the validation process*. It should be viewed as a hypothesis at this point, and serve as a basis for discussion and further research.

The opioid crisis (drug dependence and overdosing) has become of increasing concern since the 1990s (coincidentally, when mobile networking technology was being introduced on a larger scale). This appendix addresses potential relationships between wireless radiation and increasing dependence on drugs.

“Over the past two decades, the United States has experienced a growing crisis of substance abuse and addiction that is illustrated most starkly by the rise in deaths from drug overdoses. Since 2000, the annual number of drug overdose deaths has quadrupled from 17,500 to 70,000 in 2017.....Most of these deaths involved opioids, including heroin, prescription painkillers, and synthetic opioids such as fentanyl.” [Planalp, Hest, Lahr, 2019].

According to the US Department of Health and Human Services [HHS, 2019], 47,600 people died from overdosing on opioids in 2018, 10.3 million people misused prescription opioids in 2018, and 2 million people had an opioid misuse disorder in 2018. While there can be myriad contributing factors to such a widespread disorder, wireless radiation exposure (which increased dramatically over the same period that drug overdose deaths increased dramatically) may be a significant contributing factor. The reasons follow.

An analogy to climate change would be helpful in framing the perspective. The contribution of fossil fuel combustion to anthropogenic (man-made) climate change is *conceptually* similar to the contribution of wireless radiation to opioid overuse. The climate change analogy will be presented initially, since it crystallizes the nature of the causative effect. It will then be followed by the analogous details of the wireless radiation link.

The main contributing factor to anthropogenic climate change is the combustion of fossil fuels. The combustion process produces two major products relevant to climate change: carbon dioxide (CO<sub>2</sub>) and fossil sulphates/nitrates [Dutton, 2019].

CO<sub>2</sub> from fossil fuel combustion percolates to the upper atmosphere and remains there for decades. It is transparent to the high frequency solar radiation and is partially absorbent of the lower frequency radiation returning from the Earth, thereby trapping some of the incoming solar energy in the atmosphere (and especially the ocean). Decades are required for the Earth's



global mean surface temperature to come into equilibrium with the levels of CO<sub>2</sub> in the atmosphere.

The fossil sulphates and nitrates rise in the atmosphere, form small particles called aerosols, remain there for very short periods of time (days or weeks), then precipitate to Earth. They increase the effective albedo of the atmosphere (the albedo is a measure of the reflectiveness of the Earth's atmosphere to the incoming solar radiation), and this partial mirroring effect reduces the level of solar flux reaching the Earth's surface.

Thus, from the perspective of climate change, there is 1) an apparent *positive short-term* effect from the aerosol shielding of the solar radiation, and 2) a *negative long-term* effect from the energy trapping of the CO<sub>2</sub>. **The positive short-term effect is masking the harmful effects of the negative long-term effect!**

What is the analogy of the climate change phenomena described above to the impact of wireless radiation on the opioid crisis? Consider the endogenous opioid system. This innate pain-relieving system “consists of widely scattered neurons that produce three opioids: beta-endorphin, the met- and leu-enkephalins, and the dynorphins. These opioids act as neurotransmitters and neuromodulators at three major classes of receptors, termed mu, delta, and kappa, and produce analgesia” and other effects [Holden et al, 2005].

It has been shown many times that one impact of wireless radiation (at myriad frequencies) is release of endogenous opioids [e.g., Radzievsky et al, 2008; Lai et al, 1983]. This release of endogenous opioids can enable analgesic effects by itself [Wu et al, 2012], or can enhance the analgesic effects of exogenous analgesics [Emilie et al, 2012; Thomas et al, 1979]. This has been demonstrated at pulsed millimeter-wave frequencies [Miryutova et al, 2001; Radzievsky et al, 2008; Hura et al, 2011], WiFi frequencies [Maillefer and Quock, 1992], mobile phone frequencies [Bodera et al, 2019], radiofrequencies [Foley-Nolan, 1992], and extremely low frequencies [Ozdemir et al, 2017; Demirkazik et al, 2019]. Additionally, as has been demonstrated by the results of the current monograph, wireless radiation at all the above frequencies has resulted in serious mid-term and especially long-term adverse health effects.

Therefore, analogous to the climate change example, wireless radiation exposure, especially at cell phone, WiFi, and millimeter-wave pulsed and modulated frequencies, generates **1) analgesic and pleasurable short-term effects and 2) serious adverse mid- and long-term effects**. There would be some exceptions for the short-term, such as electrohypersensitivity (EHS) sufferers, who are immediately affected adversely by wireless radiation exposure.

*For most people, the enhanced analgesic short-term effects of the wireless radiation would in effect mask the long-term damage from this radiation, analogous to the short-term positive effects from the aerosols masking the long-term negative effects from the CO2 in the climate change example.*

Consider the following cases. In the first case, a person with ordinary pains and aches starts using a cell phone or WiFi system. There will be an almost immediate feeling of less pain and pleasurable sensations, similar to that experienced after a modest period of exercise (another stimulant of endogenous opioids) [Boecker et al, 2008]. This feeling can last for a short to intermediate length of time, after which another bout of stimulation is required to release further endogenous opioids. The cell phone/WiFi user will get conditioned to associating the immediate positive feelings with the wireless radiation-emitting devices. As time proceeds, the latent longer-term adverse effects of the wireless radiation will result in various levels of increasing discomfort and unpleasant symptoms, if not outright diseases. The immediate analgesic effects from the wireless devices will become even more important, but may be insufficient to overcome the increased levels of discomfort due to prolonged wireless radiation exposure. The individual will then be forced to use 1) exogenous opioids and narcotics and 2) wireless radiation devices to help attenuate the increasing feelings of discomfort, leading to possible addiction.

In the second case, a person with serious pain-producing disease or injury starts using a cell phone or WiFi system. This person has already been prescribed pain-killers of various types. Research has shown that wireless radiation of selected frequency characteristics in the parameter ranges discussed above not only exhibits an enhanced analgesic effect in its own right, but can enhance further the analgesic effects of exogenous analgesics [Emilie et al, 2012; Thomas et al, 1979]. Again, this person will become conditioned to the short-term analgesic and analgesic-enhancing effects of the wireless radiation devices. And, again, the increasing levels of discomfort eventually produced by prolonged wireless radiation exposure (augmented in many cases by adverse long-term effects of prolonged analgesics (<https://www.painedu.org/pain-medications-long-term/>)) will increase the need for 1) further wireless radiation exposure and 2) additional exogenous analgesics. This positive feedback mechanism will lead to **two forms of addiction**: exogenous pain-killers and wireless radiation.

Finally, consider the following. Alcohol has been shown to have analgesic effects [Thompson et al, 2017]. In Lai's experiments involving microwave irradiation and consumption of a mixture containing ethanol, microwave irradiation enhanced consumption of ethanol by about 25% [Lai et al, 1984]. As Lai pointed out, microwave irradiation may stress the rats, and consumption of ethanol may serve to reduce stress. So, the microwave irradiation triggers the release of endogenous opioids, producing a calming/analgesic effect, and at the same time increases stress or other adverse symptoms, driving the rodents to seek analgesia from an external source.

The above examples focus on positive short-term analgesic effects from wireless radiation followed by negative long-term addictive effects. There is no reason to believe this short-term long-term dichotomy is limited to analgesic effects. Wireless radiation ***short-term performance enhancements*** of many types accompanied by ***long-term detrimental effects*** cannot be ruled out (witness such effects for anabolic steroids on the performance of athletes in myriad sports [Vorona and Niesshlag, 2018], where short-term athletic performance is enhanced, with long-term adverse health consequences).

While the non-wireless radiation determinants of the opioid crisis should not be downplayed, a credible component of the opioid crisis may be the downward spiral of the self-reinforcing positive feedback mechanisms generated by the wireless radiation. While there are obviously cultural influences, peer-pressure influences, over-prescribing of medications, etc, the pain and discomfort induced by the wireless radiation exposure may directly impact increased use of wireless radiation devices.

There is some overlap between the opioid crisis and the increased suicide crisis in the USA relative to wireless radiation exposure [Cheatle, 2011, 2016; Racine et al, 2017]. There are the same reasons existing for an increase in discomfort due to wireless radiation exposure, and the increase in suicide-related opioid abuse from wireless radiation, but the suicide crisis will not be addressed further in the current monograph.

#### A5-B. Potential Impact on Coronavirus Pandemic

The previous findings of wireless radiation adverse effects reported in Chapter 2 of this monograph are based on ***hard evidence*** and have been ***validated*** in numerous studies. The present section linking wireless radiation to exacerbation of the coronavirus pandemic is based on ***hard evidence*** as well, but the link of wireless radiation to exacerbation of the coronavirus pandemic is ***not as far along in the validation process***. It should be viewed as a hypothesis at this point, and serve as a basis for discussion and further research.

***The fundamental hypothesis in this section is that wireless radiation weakens the immune system, and a weakened immune system increases the chances that exposure to the coronavirus (or any virus) will translate into symptoms/disease.***

Almost a decade ago, I published a paper on potential treatments for SARS [Kostoff, 2011], the China-based pandemic of 2002-2003 that was associated with another coronavirus. As in the present China-based coronavirus pandemic, the SARS zoonotic virus/disease was thought to originate with infected bats. These bats then infected other species, which were then sold in open-air markets, and eventually infected their buyers.

Approximately 8,000 people globally presented with SARS symptoms, and approximately 10% of those who presented died. However, those who succumbed were not a random ten percent. Most had many co-morbidities, and it appeared their immune systems could not handle yet another insult.

The SARS pandemic was not ended with drugs or vaccines. None of these measures worked. Instead, quarantine and good hygiene contributed most to ending the pandemic.

After the pandemic ended, a number of physicians (especially in Asia) reviewed the records of all patients they had examined for various health issues (or standard annual physical examinations) during the pandemic, and concentrated especially on the blood test results. There were many cases where the coronavirus antibodies had shown up in the blood tests, *but the patient had exhibited none of the SARS symptoms.*

**In other words, the patient's adaptive immune system was sufficiently strong to operate properly and neutralize the coronavirus to which the patient had been exposed!**

To me, that was the key finding, and contributed to the approach I have taken for developing protocols to reverse chronic diseases [e.g., Kostoff, Porter, and Buchtel, 2018].

There are on the order of 300,000 viruses, many/most of which have zoonotic potential. To develop vaccines for all of these viruses (before an epidemic or pandemic strikes) is unreasonable (based on present technology) because of the sheer numbers involved. To develop vaccines for any specific virus *during* an epidemic or pandemic (which was the mainstream approach taken for the coronavirus during the SARS pandemic of 2002-2003) is completely unrealistic, because of the lead times required for vaccine development, efficacy testing, *credible* mid-and long-term safety testing, and implementation.

Those who succumbed during the SARS pandemic had 1) myriad co-morbidities and 2) weakened immune systems unable to neutralize the SARS coronavirus. Having a strong immune system that allowed a smooth transition from innate immune system operation to adaptive immune system operation *was the one intrinsic defense that worked!* The SARS experience showed that the best and most realistic approach for defense against any potential viral attack is reversing immune-degrading lifestyles well before any pandemic or epidemic outbreaks. In that case, the immune system would be sufficiently strong to be able to handle viral exposure on its own without the emergence of serious symptoms, as was the case with those exposed to the SARS coronavirus (with coronavirus antibodies in their serum) who exhibited no (or minimal) symptoms.

This gets to the link between wireless radiation exposure and the latest coronavirus pandemic. Wireless radiation adversely affects the immune system (see boxed references at end of this section). To the degree that non-ionizing radiation exposure (superimposed on the myriad toxic stimuli to which many people are exposed by choice or imposition) degrades the operation of the innate and adaptive immune systems, it would increase the likelihood that the immune system could not counteract the exposure to the coronavirus (or any other virus) as nature intended. Thus, *wireless radiation would contribute to the exacerbation of adverse effects from coronavirus exposure.* The bottom line is that exposures to essentially ALL the exogenous immune-damaging toxic stimuli (including, but not limited to, wireless radiation) need to be removed before resistance to viruses of any type can be improved substantially.

## **ADVERSE IMPACT OF WIRELESS RADIATION ON IMMUNE SYSTEM- REFERENCES**

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## **Appendix 6 – Funding Source Bias on Research Outcomes**

Upton Sinclair, noted muckracker and one-time candidate for Governor of California, once stated: “It is difficult to get a man to understand something, when his salary depends upon his not understanding it!” ([https://www.brainyquote.com/quotes/upton\\_sinclair\\_138285](https://www.brainyquote.com/quotes/upton_sinclair_138285)). In a nutshell, this crystallizes the central problem of integrity and credibility of the biomedical literature, especially for topics of commercial, military, and political sensitivity.

There have been many studies addressing how researcher and institutional conflicts-of-interest relate to their published findings. The following article titles reflect only the tip of the iceberg of biased outcomes related to funding sources. Since research manipulations to achieve a predetermined agenda tend not to be advertised (e.g., see section 3.2.2 of Kostoff [2016]), what eventually sees the light of day is truly the very small tip of a very large iceberg. In these sensitive topical areas, *bias may in fact be closer to the norm than to the exception!*

### **Titles of Sample Records**

(to obtain Abstracts, insert titles into Pubmed, or similar search engines, if available)

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## **Appendix 7 – Adverse Effects of Wireless Radiation Related to Implants and Appendages**

### **A7-A. Overview**

Adverse impacts of wireless radiation on myriad medical implants and appendages don't get much discussion in the literature, especially passive medical implants (A7-B2), non-medical implant analogues (A7-B3), and metallic appendages (defined below), and especially with regard to radiofrequency radiation. The FCC has raised concerns about the interactions of RF radiation with passive implants. Paragraph 230 of [FCC, 2013] states: "Electrically conductive objects in or on the body may interact with sources of RF energy in ways that are not easily predicted. Examples of conductive objects in the body include implanted metallic objects. Examples of conductive objects on the body include eyeglasses, jewelry, metallic accessories, etc."

A number of articles in the database addressed non-organic implants, which are foreign bodies inserted into humans and animals for medical purposes. Non-organic implants addressed in the present database are typically not rejected by the immune system like organic foreign substances (although some adjuvants such as metal could induce autoimmune responses [Loyo et al, 2013]). Non-rejection does not imply safety, especially from exposure to wireless radiation.

There were two major types of implants covered by the database articles showing adverse effects: active implants that produced electrical signals mainly for controlling heart irregularities (e.g., pacemakers, defibrillators) and hearing deficiencies (e.g., cochlear implants), and passive metallic implants for structural support (e.g., dental implants, bone pins, plates, etc). The active implants also have a passive component, since their structural components are imbedded in, and interactive with, the incoming RF. Additionally, there are articles addressing adverse effects from wireless radiation in the vicinity of **metallic** appendages (e.g., eyeglasses, jewelry, etc).

The external EMF from microwaves (and other sources) could 1) impact the electrical operation of the active implants adversely, 2) increase the Specific Absorption Rate (SAR) values of tissue in the vicinity of the passive implants substantially, and 3) increase the flow rate and acidity of saliva. While the EMF effects on the cochlear implants could adversely affect auditory capability, EMF effects on the heart-related implants could potentially be life-threatening. The increased SAR values around the passive metal implants could result in increased tissue temperatures, and could adversely impact integration and longevity of the passive metallic implants. In the mouth, the combination of 1) increased tissue temperatures in proximity to the implant, and 2) increased saliva flow rate and acidity, could lead to 3) increased leaching of heavy metals from metallic orthodontic structures. This also raises the question: what other adverse health effects from the exposure of both the active and passive implants to increasing levels of wireless radiation have not been identified or addressed or reported?

While [Table A7-1](#) shows that substantial research has been done on exogenous electrical interference with cardiac pacemakers and defibrillators, the impacts of automotive-based electrical sources on these active implants have not been promulgated widely. [Appendix 8](#) addresses the larger issue of automotive-based wireless radiation at myriad frequencies, including adverse impacts on these active implants.

## A7-B. Specific Impacts from Passive Implants

### A7-B1. Overview

This sub-section of Appendix 7 examines two types of passive implants: passive metallic medical implants (dental implants, orthodontic structures, nails, plates, etc) and passive micro/nano implant analogues. The former types of implants are well-known, and the latter are much less well-known, especially in their interactions with radiofrequency radiation. The latter include exogenous nanoparticles that could also enhance absorption of RF radiation. Section A7-B2 focuses on the passive metallic medical implants, and section A7-B3 focuses on passive micro/nano implant analogues.

### A7-B2. Impacts from Passive Metallic Medical Implants

The potential interference from external electromagnetic fields on implanted devices that emit electromagnetic signals is somewhat obvious, and has been the subject of extensive study. Some relevant documentation will be presented later. Less studied is the impact from external electromagnetic fields on passive metallic medical implants and appendages. What are the technical issues surrounding these EMF-implant interactions?

A good summary of these interactions is contained in Virtanen et al [2006]. The following excerpts are most relevant, and critical issues are highlighted.

“When a conductive object like an implant lies close to the source of the EM field, it affects the shape of the radiated field and thus the SAR distribution. Within a perfectly conducting object, the E field disappears; and outside the implant E field, *lines bend perpendicular to the surface of the implant*. If the surface area is small, a *dense EM flux may arise near the implant*. In lossy tissues, this leads to *higher power absorption near the implant* compared to the same tissue volume with no implant present. Correspondingly, tissue volumes with lower power absorption also occur as the implant redistributes the SAR pattern. This phenomenon may especially occur with implants that are thin.....or have sharp edges or tips.....Furthermore, the *conductive implant may couple with a radiating source*, for example, an antenna. The coupling can be either conductive, magnetic, or both.....As a consequence, a *current oscillating on an antenna induces a current on the implant*, too. Furthermore, the *induced surface current produces a secondary EM field, which contributes to the power absorption, that is, SAR, in tissues around the implant.....Hence the implant acts as a weak radiating antenna.....or a re-radiator.....*in tissues. At high frequencies, the induced current flows in a thin surface layer of the implant, that is, at the implant–tissue interface, which may even slightly warm up due to ohmic losses.....However, this warming is marginal compared to warming of surrounding tissues.

The size of an implant is essential when evaluating its effect on the SAR distribution.....If the implant is very small compared to the wavelength, it does not have a strong effect on the SAR distribution.....Generally intermediate size implants, with dimensions close to the wave length, and *especially those with resonance dimensions*, may cause strong EM fields around themselves, and thus *enhanced SAR may occur around such an implant*. Large implants

again may cause a ***major change in the SAR distribution***, since they may ***scatter or reflect the field***.....

In addition to other size-related effects, the size affects the magnitude of induced currents.....A special case of this is the ***implant with a resonance dimension***.....The length, which apparently causes the highest SAR enhancement is about  $lT/3$ , where  $lT$  is the wavelength in the media.....or  $lT/2$ .....An implant with such a dimension may even ***cause enhancement of SAR1g or SAR10g by a factor of 2–3***..... The shape of an implant is an important factor.....Pin- or rod-shaped implants ***may act as antennas and re-radiate the external field***.....Rings and other loop structures may act as induction loops and thus ***carry high induced currents***.....A gap in the loop or rod would ***induce high SAR in the gap***.....Sharp corners and tips in the implant may cause ***concentration of the EM flux around them***.

One essential factor in the interaction is the orientation of an implant with respect to the external source, that is, polarization of the field in the far field.....Especially for pin- or rod-like structures, the orientation parallel to the electric field or antenna is the worst case.....In this orientation, the ***implant may act like an antenna*** as described earlier. For arbitrary-shaped implants, the mutual inductance of an antenna and an implant depends on their orientation with respect to each other and other geometrical factors. The higher the mutual inductance, the stronger is the interaction.....

Since dielectric properties of tissues vary, the ***tissues that surround an implant have a great impact on the SAR distribution***.....If tissues have high conductivity and relative permittivity, they are very lossy and ***SAR around the implant can be high***.....

However, in bone, the ***SAR enhancement due to an implant is assumingly higher because of lower base level***. In general, the larger the relative difference between the dielectric properties, especially conductivity, of the two media, the ***greater is the bending of the EM field when it enters the more lossy media***. Hence ***larger averaged SAR values can be expected in small volumes on the boundary***. Furthermore, the dielectric properties affect the wavelength of EM field. In certain (plane wave) cases, the distance between the implant and the skin surface may match the wavelength in tissue so that constructive interference occurs in the surface layers.....This may ***cause elevated SAR in the surface***.....Similar phenomena may also occur in other layered structures.....

As a consequence of the described effects, the maximum SAR may occur at a different location with and without the implant in the EM field.....Usually the SAR will be at maximum either on the surface of the body, that is, in the skin, or in the tissue with the highest water content. However, due to the interaction of implant and RF field, the ***location of the highest SAR may be shifted to the proximity of the implant***. This is an important fact for RF exposure evaluation.”

Key takeaways from this summary are that resonance between the incoming EMF waves and the implants can contribute to increased SAR levels, and these increased SAR levels can occur in the bone or soft tissue adjacent to the implant(s).

Implants, both active and passive, are cornerstones of modern medical treatment, and are big business. Many of the implant-related articles read for this monograph attempted to downplay the significance of the EMF effects on passive implants. While some acknowledged that substantial increases in SAR are possible, especially near the implant(s), some/many concluded that while SAR was indeed increased, the values averaged over the appropriate volume (as allowed by the FCC) were small, and well under the FCC exposure limits.

This is misleading. Stating that exposure levels well below those allowed by the FCC (which bear no relation to safety) are somehow ‘safe’ is disingenuous! There can be very high SAR levels in volumes smaller than those allowed by the FCC, and this could have a dual impact. The bonding between the implant and surrounding media could be impacted adversely, and the myriad other adverse effects associated with SAR levels of that magnitude could be operable. Many of the articles identified the presence of ‘hot spots’, where the SARs were very high, but the effect was numerically attenuated by averaging over a somewhat larger area.

Additionally, most of these measurements/computations were for single stressors only (the incoming EMF radiation). Adding the real-life combinations of other toxic stimuli would tend to exacerbate the effect, perhaps substantially. Finally, the measurements and computations tended to end with a demonstration of the increase in SAR level. That’s equivalent to performing a chest x-ray on someone who smoked his first cigarette, and then writing a paper that smoking had little effect on the lungs and other structures! What are the long-term effects of the incoming wireless radiation on the passive implants and their supportive tissue/bone, both in terms of structural integrity and increased incidence of non-communicable disease impacts? The question about long-term effects and combined toxic stimuli applies to the operation of the active implants as well.

A recent paper addressing adverse effects of RF impacts on osseointegration (dental implant integration with underlying bone) illustrates the issues raised above [Kavyashree et al, 2019]. “Forty-eight implants were placed in tibia and femur bone of rabbits, and after 90 days the rabbits were sacrificed and bone surrounding the implant was retrieved.....Significantly less bone-to-implant contact and bone area surrounding implant threads were found in the test groups compared to the control group. There was a significant difference in regular bone formation.....among the three groups.....Implants exposed to cell phone radiation showed more inflammatory reaction when compared to the nonexposed implants, thus indicating that *cellular phone overuse could affect the maturation of bone and thus delay osseointegration.*”

If other toxic stimuli were co-exposed along with EMF radiation, and if longer-term data were taken, more severe impacts could be expected. Similar effects could be expected for other types of implants!

[Table A7-1](#) contains an implant taxonomy. The format is category heading followed by a few selected references. The active implant categories cover cardiac, cochlear, and other devices, and the passive implant categories cover imbedded implants and appendages.

A sub-category of passive implants called Metal Release was created. This category reflects adverse effects of wireless radiation that are almost unknown to the general public. The

focus is on increased corrosive abilities of saliva due to wireless radiation exposure, and the subsequent release/leaching of metal from myriad orthodontic structures in the mouth. Many of these metals are heavy metals, such as nickel and chromium, which can be extremely dangerous when released into the body. Most of the references in [Table A7-1](#) in this Metal Release category deal with nickel release from orthodontic appliances.

In these circumstances, the mobile phone radiation stimulates the parotid glands, causing them to produce more saliva. Not only is the flow of saliva increased, but its properties are altered, including reduction of pH. Additionally, as the larger passive implant category has shown, there will be some preferential heating at the saliva-orthodontic appliance interface. The net effect will be to increase corrosion of the metal appliance, resulting in release of nickel. ***Given that children are major customers for many of these dental appliances as well as increasingly major users of cell phones, WiFi, etc, these children will be adversely impacted by the wireless radiation through myriad pathways!***

**Table A7-1 – Implant Taxonomy**

<b>CATEGORY/SAMPLE REFERENCES</b>
<b>ACTIVE IMPLANT - CARDIAC</b>
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### A7-B3. Impacts from Passive Macro/Nano Implant Analogues

The FCC regulations for RF exposure limits are based on an average exposure over a six-minute period for occupational applications, and thirty-minute period for the general public. For near-field exposures, the guidelines can be summarized as follows: “Whole-Body SAR is averaged over the entire body; Partial-body SAR is averaged over any 1 g of tissue in the shape of a cube; SAR for hands, wrists, feet and ankles is averaged over any 10 g of tissue in the shape of a cube.

SAR limits are not applicable above 6.0 GHz; MPE limits for field strength and power density should be applied. Categorical exclusion of routine MPE evaluation for mobile transmitters does not apply to portable devices operating above 6.0 GHz” ([https://transition.fcc.gov/oet/ea/presentations/files/oct05/RF\\_Exposure\\_Concepts\\_Support\\_KC.pdf](https://transition.fcc.gov/oet/ea/presentations/files/oct05/RF_Exposure_Concepts_Support_KC.pdf)).

Averaging processes attenuate the extremes. In particular, within the thirty-minute averaging window used for general population exposure averaging (above), there could be many examples of RF power fluxes exceeding the FCC guidelines, perhaps substantially. Given that the FCC Guidelines are based on thermal limits not being exceeded, this means that (within the thirty-minute averaging window) temperatures (and related thermal stresses) could reach peak values capable of inflicting serious damage. Neufeld and Kuster [2018] examined RF heating of skin in the >10 GHz region, and concluded: “Transient exposure with high PAR [peak-to-average ratio] can lead to large temperature oscillations, with peak temperature increases in the skin reaching tens of degrees, thus exceeding tissue damage thresholds after short exposure durations.” The computations were made “at an intensity resulting in a temperature increase of 1 K at *continuous exposure*”.

Would implant analogues, such as imbedded nanoparticles in the heated tissue, change the characteristics of tissue heating from the pulsed RF described above? Section 2E contains the statement “At the millimeter carrier wavelengths characteristic of high performance 5G, one can expect resonance phenomena with small-scale human structures [Betzalet, 2018], as well as resonances with insects/insect components [Thielens et al, 2018, 2020].” Can this enhanced heating of tissue due to high-frequency pulsed RF be extended to nanoparticle-imbedded tissue?

These implant analogues could include e.g. tattoos using nanoparticle materials, nanoparticles from cosmetics and air pollution, possibly nanoparticles from forced-air occupational situations, etc. These analogues could be metallic or non-metallic. Whether they would be heated by RF, and how that would vary by particle characteristics, RF characteristics, and surrounding tissue properties, is an open question. Collins et al [2014] conclude, for gold nanoparticles: “The chief conclusion is that in some cases gold nanoparticles immersed in RF fields heat, and in other cases they do not.”

There is a substantial literature on RF heating of nanoparticles within tissue, motivated by applications to hyperthermia treatment of diseased tissue, especially cancer [e.g., Huang et al, 2008; Gupta et al, 2010; Hanson et al, 2011; Cardinal et al, 2008; Xu et al, 2008; Tamarov et al, 2016; Ocampo-Garcia et al, 2015; San et al, 2013; Pantano et al, 2017; Nordebo et al, 2017; Nguyen et al, 2016; Mironava et al, 2017; Mackeyev et al, 2017; Liu et al, 2015; Letfullin et al,

2015; Kim et al, 2013; Corr et al, 2012; Collins et al, 2014; Chaurasia et al, 2016; Amini et al, 2018; Glazer et al, 2010; Dennis and Ivkov, 2013; Sassaroli et al, 2012; Moran et al, 2009; Gannon et al, 2008]. The references/bibliography at the end of this section contain more examples of RF (and other pulsed) heating of nanoparticles, including some non-tissue-related heating.

There is not uniform consensus on heating mechanisms. While myriad specific approaches are used for RF heating of nanoparticle-imbedded tissue for cancer therapy, Glazer and Curley [2011] provide a reasonable summary of the technical issues involved. They state: “RF field therapy is a non-invasive method to expose cancers to nonionizing radiation that is relatively nontoxic in and of itself..... nanoparticle-mediated RF field hyperthermia induces heating on the scale of approximately 100  $\mu\text{m}$ . Fortunately, noninvasive RF fields easily penetrate human tissues and pass through the entire body with minimal perturbations until the RF fields interact with metal..... The size of the field can be scaled from small, animal-sized devices..... up to very large volumes that could theoretically treat small (local tumor) or large regions of the human body. Samples (cells, animals or, theoretically, patients) are placed in an RF field created by a parallel plate capacitor ..... This establishes a directional electromagnetic field that passes through tissues and organs without significant absorbance. Metal, however, absorbs RF energy and quickly releases heat to the surrounding region. Nanoparticles in general, and metal nanoparticles specifically, are utilized because of this general principle, as well as their unique qualities that absorb even more energy (and release even more heat), due to their very small size and quantum characteristics.

Recent advancements in nanotechnology have resulted in multiple types of nanoparticles that can be targeted with antibodies, peptides/proteins and sugar residues to cancer cells..... Thermal therapy is induced with either focused laser irradiation, manipulation of magnetic fields or RF field exposure..... While these nanoparticles may be more selective than specific, animal studies have demonstrated promising results without major toxicity..... nanoparticles induce intracellular hyper-thermia. Unique physicochemical properties of metallic and non-metallic nanoparticles result in different heating rates for various types of non-ionizing radiation exposure..... We have found that solid gold nanoparticles less than 50 nm in diameter are safely taken up by macrophages in the liver and spleen without major toxicity..... large nanoparticles with a large aspect ratio (i.e., rods or tubes) have been associated with fibrosis and cellular injury..... Nanoparticle heating in RF fields is a very complex phenomenon. The end result is that RF fields induce nanoparticle heating rates of 1–3°C/s in various solutions and at various power levels..... Most RF field devices are based on shortwave RF fields (13.56 MHz) as licensing agencies permit this frequency for ‘medical use’..... The power of these devices is typically from 100–800 W. The energy transfer efficiency from the field generator to actual field strength varies amongst the devices; determining the exact field strength is problematic..... The RF electrical field strength in general, however, is approximately 5–15 kV/m.....

In a nanoparticle concentration and field strength-dependent manner, nanoparticles in aqueous solutions can reach boiling temperatures in 2–3 min. Interestingly, deionized water negligibly heats in RF fields, while antibody solutions (e.g., with ions or proteins) typically heat around

five- to ten-times less than nanoparticle solutions..... In the RF field, SWNTs heat in the range of 2–6°C/s, slightly faster than gold.....

There remains some controversy regarding the mechanism in which nanoparticles heat in an RF field. Our group has demonstrated that gold nanoparticles heat primarily via Joule heating..... This work has demonstrated that gold nanoparticles behave as ‘mini-resistors’, where free electrons on the surface have limitations to their movement. In this way, friction is created at the individual nanoparticle level, which release heat into the surrounding aqueous solution. Furthermore, based on these findings, one would predict less heating for larger nanoparticles as well as much less for aggregates where there are far fewer limitations placed on the movement of electrons.”

Extrapolation from the cancer (and similar) therapy use of nanoparticles for hyperthermia destruction of diseased tissue to heating of nanoparticles imbedded in near-surface tissue by communications-level RF powers is not straight-forward. The therapeutic situation involves high-power RF targeting nanoparticles with desired pre-selected properties at specific locations to achieve high temperatures, whereas the communications situation involves low-power RF interacting with nanoparticles of unknown properties at unknown locations constrained to low temperature increases. Additionally, the RF therapy situation has typically involved RF frequencies in the MHz range, whereas the RF communications scenario (especially for 5G) would involve frequencies in the GHz range (high-band 5G would be in the 10s of GHz).

It is unclear how the effects on tissue surrounding these micro/nanoscale implant analogues would relate to those of the macro-implants of the previous section. More detailed computations are required to identify specific temperature excursions and related thermal stresses for specific nanoscale implant analogues.

As mentioned previously, there may also be electromagnetic and thermal resonances with insects and other small living creatures and substances. For insects, there could be resonances based on overall body dimensions [e.g., Thielens, 2018, 2020], and/or resonances based on specific appendage dimensions. Insects are a critical part of the ecological chain, and severe functional damage may occur even if only critical organs or appendages are damaged. If antennae are heated, or experience even moderate cyclic thermal stresses, that may be sufficient to disable the insect, and eliminate their functional contribution to the ecological chain.

Additionally, for insects, heating at different spatial macroscales may be sufficient to cause damage, as well as microscale heating. More detailed insect heating computations at the microscale, and at the macroscale (covering the spectrum of full body resonance to critical appendage resonance) are required before declarations of safety become credible.



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## **Appendix 8 – Adverse Effects of Automotive-Based Wireless Radiation**

### **A8-A. Overview**

The modern automobile is a powerful source of wireless radiation at myriad frequencies, and is subject to external wireless radiation at myriad frequencies as well. The trend has not been to reduce these sources, but rather to add equipment both to the vehicle and to the external environment that will increase the wireless radiation flux associated with the vehicle substantially. The numbers and types of sources are not well-known, even among those experts and laymen concerned about adverse effects from wireless radiation. This appendix will address only a few of those sources.

Some/much of the appendix is based on recent personal experience. Over a year ago, I began looking for a new car. My previous vehicle had almost none of the wireless add-ons that are promoted extensively by the automotive industry, and I had hoped to replace it with a similar wireless-free vehicle.

I spent perhaps six months part-time test-driving vehicles, taking some EMF measurements in selected vehicles, and researching myriad vehicles on the Web. This appendix uses some of my findings as a starting point to identify the full scope of the radiation flux exiting and entering the vehicle.

### **A8-B. Specific Automotive Wireless Radiation Sources**

During this automotive evaluation process, I received a very informative response from Dr. Theodore Metsis. It is summarized at the following link (<http://www.radiation dangers.com/automotive-radiation/automotive-radiation/>). Of particular interest is the diagram at the beginning of the article, showing radars and wireless sensors in modern cars. I would recommend the reader study that diagram in detail, to better appreciate how ubiquitous are these sources of wireless radiation. Not all the wireless radiation enters the cabin, since some/much is outward-directed, but some/much of it will enter the cabins of other cars on the road.

However, that diagram tells only part of the story. Assume there is a car pool commuting to work from the suburbs of a major city. It is not uncommon (in today's world) for a one-way trip to take from one-two hours, or more. Even in a regular car, or mid-size SUV, there might be four or so passengers. They may be using cell phones, WiFi, or both, thereby adding to the radiation from the automotive-based sensors/transmitters. For example, in an experiment comparing cell phone-Bluetooth use inside and outside a car, Dhimi [2015] concluded "The increase in radiation power density with the use of Bluetooth was observed to be 313% higher as compared to phone alone when measured outside the car....The power density was observed to have increased by 393% when cell-phone and Bluetooth were used inside the car with windows rolled up as compared to using no phone/Bluetooth."

There will be cell towers lining the sides of a major highway, thereby increasing the radiation to the occupants substantially. Depending on conditions, there may be substantial air pollution to which the occupants are exposed. Additionally, the prolonged sitting is very dangerous, and is a contributing factor to many serious diseases [Kostoff, 2015]. If the vehicle is new, there may be substantial out-gassing of toxic chemicals from the interior materials (<https://www.ecocenter.org/newsletter/2012-02/dangers-lurk-behind-new-car-smell>). Combined exposure to the wireless radiation, air pollution and other toxic substances, coupled with prolonged sitting and continual impacts from the car's motions, produces a synergistic effect that exacerbates adverse impacts from any of the constituent components substantially.

#### A8-B1. Automotive ELF

About a decade ago, the Israeli Ministry of Environmental Protection undertook an evaluation of the safety of hybrid vehicles with respect to emissions of non-ionizing radiation. The following excerpt summarizes their findings, and the context (<https://www.thetruthaboutcars.com/2010/03/israel-preps-worlds-first-hybrid-car-radiation-scale/>):

“Not exactly flower power, the radiation in question is cast by the electromagnetic field made by alternating current (AC) flowing from the batteries in the back to the engine up front. The medical implications of this non ionizing radiation, similar to radiation from cellphone antennas, are not yet clear.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) recommends a limit of 1,000 mG (milligauss) for a 24-hour exposure period. While other guidelines pose similar limits, the International Agency for Research on Cancer (IARC) deemed extended exposure to electromagnetic fields stronger than 2 mG to be a “possible cause” for cancer. **Israel’s Ministry of Health recommends a maximum of 4 mG.**

The ministry’s foray into this topic is a culmination of a public outcry resulting from publications in the media regarding possible dangers from radiation in hybrid cars. Last year, Israeli automotive website Walla! Cars conducted a series of tests on the previous generation Toyota Prius, Honda Insight and Honda Civic Hybrid, and recorded radiation figures of **up to 100 mG during acceleration**. Measurements also peaked when the batteries were either full (and in use) or empty (and being charged from the engine), while **normal driving at constant speeds yielded 14 to 30 mG** on the Prius, depending on the area of the cabin.”

Over the past couple of decades (bracketing the Israeli study), a number of researchers have conducted studies measuring EMF emissions in conventional gasoline/diesel-powered cars, hybrids, and electric vehicles. Some of these studies are listed in the first part of [Table A8-1](#). The results are all over the map. One reason is that “there are alternating magnetic fields produced by its engine, control systems, air conditioning, sound, video, communications, etc. In vehicles with tyres, one has to add the magnetic field produced by the magnetized metal of the wheels” [Paniagua et al, 2017]. Additionally, the results vary by location, vehicle speed, and braking/acceleration.

The findings of [Paniagua et al, 2017] are instructive, and provide a good summary of magnetic fields found in fossil-fuel powered cars. “Other works, however, detect magnetic fields inside cars with values that are comparable to ours. Thus, for example, Milham et al.....found a range of 0.2 to 2.0 $\mu$ T, Stankowski et al.....0.1 to 9.5 $\mu$ T, and Halgamuge et al.....0.3 to 3.5 $\mu$ T. These studies used instrumentation that measures magnetic fields with frequencies above 5 Hz.

As in our study, Stankowski et al.....found magnetic fields that were higher in the rear seats than in the front seats, and higher at floor level than at the seat and head levels. The reason for the differences between the two sets of studies lies in the frequency ranges used. The rotating wheels produce spectral peaks that coincide with the rotation frequency, typically 6–12 Hz.....and are not detectable when using instrumentation whose lowest frequency threshold is 30–40 Hz. This instrumentation detects the magnetic fields generated by the motor and the electrical systems of the vehicle, but not those generated by the effect of wheel rotation. One can therefore conclude that the magnetic fields from the rotating wheels represent a very important part of the total magnetic field inside the vehicles.” The maximum exposures reported in the study by [Panigua et al, 2017] were about twenty milligauss (1  $\mu$ T=10 milligauss).

In a 2014 article on hybrids [Karabetsos et al, 2014], Figure 8 (cruising at 80-120 kilometers/hour) shows exposures in the right-rear seat reaching over 20% of 1998 ICNIRP limits for the general public. The article does not provide actual magnetic field numbers for these exposures, nor does it provide the frequencies at which these magnetic fields were measured. The 1998 ICNIRP limits are a function of frequency.

The article states: “it was observed that the major components of the magnetic flux density appeared at frequencies lower than 100 Hz.” In this frequency spectrum, the ICNIRP limits range from 400,000 milligauss at 1 Hz to 500 milligauss at 100 Hz. So, the actual measurement of ~20% of ICNIRP limit could range from 80,000 milligauss to 100 milligauss, depending on the frequency(s) at which the measurements were made. For reference, the ICNIRP limits for power frequency (60 Hz) are 830 milligauss (for the general public), far above the levels shown as dangerous in the Israeli reference above, and other references in the biomedical literature.

In Vasilev et al, [2015], magnetic field measurements were made in myriad electric vehicles and hybrids. The two major sources of magnetic fields were traction currents and wheels. The findings for each were as follows: “Therefore, if the traction current has variations up to  $\pm 300$  A, the magnetic field could also have variations of up to  $\pm 300$   $\mu$ T.” The upper limit translates to 3,000 milligauss! “The permanent magnetization of steel belted tires is a well known source of in-vehicle magnetic fields.....Our measurements show that this phenomenon is responsible for a magnetic field inside the car of up to 2  $\mu$ T at the wheel frequency fw (which ranges from 0 to 20 Hz for speeds ranging from 0 to 130 km/h).” This upper limit translates to twenty milligauss, and is similar to the upper limit above reported by Panigua et al, [2017].

References to other studies are shown in the first section of [Table A8-1](#). The hybrids and EVs are associated with larger magnetic fields (especially at acceleration and braking), due mainly to large electrical power transfers for all operations. My own measurements in hybrids



showed magnetic fields around the driver could range up to 15-30 milligauss, depending on the vehicle. However, the meter I used had a lower limit of 40 Hz, so I could not measure the powerful magnetic fields shown by the above studies to occur at the extremely low frequencies. However, in my view, chronic exposure even to the 15-30 milligauss I measured is something to be avoided at all costs, much less the larger fields at the lower frequencies!

In many of the references shown in [Table A8-1](#) (and beyond), the authors don't present actual magnetic field numbers, but rather magnetic fields ***normalized to ICNIRP*** recommended exposure limits. They usually conclude that, because the ratios are less than one, therefore, the vehicles are safe. This is fallacious and disingenuous, since the ICNIRP recommended limits have nothing to do with safety (based on exposures shown to cause harm in the biomedical literature) and everything to do with providing cover for the wireless radiation promoters.

Additionally, many of the guidelines tend to be based on single stressor experiments. Vehicle cabins expose their occupants to many types of toxic stimuli (described initially in this appendix), and the synergies will reduce the levels of EMF exposure at which damage occurs, sometimes dramatically.

**Table A8-1 – Appendix 8 References**

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### A8-B2. Automotive Radar

Radar has become ubiquitous on modern automotive vehicles. Many of the new ‘safety’ systems use radar in their operation, and in-cabin radars have been proposed to further enhance ‘safety’. How safe are these radar add-ons, and what are their potential radiation levels?

The FCC used to have a requirement that when cars were stopped, such as in a traffic jam or at a traffic light, any onboard radars would have to reduce power to minimize longer-term exposure to humans. In 2009, Toyota applied to relax these rules, for reasons described in the linked document below. Naturally, the FCC complied with the request, as per the following 2012 directive addressing vehicle radar systems:

<https://www.federalregister.gov/documents/2012/08/13/2012-19732/operation-of-radar-systems-in-the-76-77-ghz-band>.

The FCC promulgated the following emission limits:

"In lieu of separate emission limits for in-motion and not-in-motion, the Commission proposed to increase the average power density limit to 88  $\mu\text{W}/\text{cm}^2$  at 3 meters (average EIRP of 50 dBm) and to decrease the peak power density limit to 279  $\mu\text{W}/\text{cm}^2$  at 3 meters (peak EIRP of 55 dBm) for vehicular radar systems regardless of the direction of illumination."

Converting units, the average power density limit would be  $88 \times 10^4$  microwatts/square meter, or 880,000 microwatts/square meter, *at three meters*. So, in slow moving traffic on a superhighway, if there was six meters separation between the bumper of the car behind and the driver of the car ahead (a conservative estimate in bumper-to-bumper traffic), there could be as much as **220,000 microwatts/square meter radiating the front vehicle**, if the radars were operating at the allowable limit. Some bands would be absorbed by the glass at these frequencies, and other bands would penetrate the glass. There could also be side radar coming from cars other than the rear car.



However, pedestrians or highway workers would not have whatever protections from wireless radiation are afforded by vehicle structures. For example, a person walking on a crosswalk in front of stopped traffic could even be closer to the bumper than three meters, and could be exposed directly full body to a *million microwatts/square meter*, or more, if the radars were operating at the allowable limit! Children walking close to a vehicle would be even more vulnerable, since they are closer to the horizontal plane of bumper antennas. And, these numbers carry the assumption of being radiated from one car only. If there are multiple cars, with some emissions spreading to the side, then the cumulative exposures could be well above the FCC exposure limits at selected points. Walking on streets in high traffic areas may become a dangerous pastime, and few people realize it!

Are there sources of radar potentially entering the vehicle cabin other than those from the 'safety' sensors? The answer is yes (at least in the future and maybe in the present), as shown in the following article: [https://www.eetimes.com/document.asp?doc\\_id=1333330](https://www.eetimes.com/document.asp?doc_id=1333330).

The author of the above article states:

"For example, the digital processing capability inside the mmWave sensor can filter out noise, said Wasson, allowing TI's radar chips to detect very small movements, even the breathing that indicates the presence of a person or animal inside a vehicle.

Wasson noted that "child occupancy detection" is likely to become a feature in the Euro NCAP roadmap. This, he believes, will open the door for TI's radars in body, chassis, and in-cabin applications. As tier ones and OEMs look for the right sensing technology to enable such detection possibilities, Wasson noted that radars are much better-positioned.

Radar, for example can "see" through a blanket to determine whether a child is underneath. TI's radar chips can even distinguish between a person and a static object like a duffel bag, explained Wasson, because their on-chip digital signal processing can detect a heartbeat."

The aim seems to be to deliberately flood the cabin with radar RFR, for various detection purposes. The article makes no mention about potential power levels.

Another potential in-cabin source would be radar aimed at the driver continuously, to insure alertness and awareness. For example, consider the following statement:

"Sudipto Bose, director of marketing for automotive radar at Texas Instruments, points out that in-cabin radar offers a number of benefits. It can alert parents if they've left children in a car, and it can be used for gesture controls, which let drivers control navigation, phone and stereo with hand motions. This proximity radar could also identify if a driver's attention is not focused out the windshield.....If automakers take Texas Instruments up on its new radar sensors, a production vehicle with radar-based gesture control would still be two to five years away (<https://www.cnet.com/show/news/volkswagen-invests-100-million-to-develop-solid-state-battery-tech/>)."

There appears to be a developing market focused on occupancy sensing using radar. For example, “So radar is no longer the preserve of complex and costly, high-end markets, it's ready for 100% reliable infant presence detection in cars. Whether our children's movements are major, minor or finer, they'll be detected and the driver can be automatically reminded: ‘Don't forget, you have someone very precious in the back seat of your car.’

(<https://www.xethru.com/blog/posts/hot-car-deaths-radar-tech-can-help-save-lives>)”.

As another example: “Startup Caaresys imagines its radar-based system monitoring the respiration and heart rates of everyone in the car, with a particular focus on sensing a child that might be hidden from view in the back and potentially left behind in the car

(<https://www.cnet.com/roadshow/news/in-car-monitoring-surveillance-technology-privacy/>).”

Novelic (<https://www.novellic.com/applications-and-system-solutions/>) offers radar-based sensors for car interiors, including: Seat Occupancy Sensor; Vital Signs Detection Sensor; Passenger Detection Sensor; “Baby left in a car” Sensor; Driver and Passengers Fatigue Sensor; Driver and Passengers Emotion Sensor. Other non-car applications include: Baby crib monitoring; Assistive Living for Elderly People; Visual Impairments Sensor; Emotion Sensor.

Azcom (<http://www.services.azcomtech.com/index.php/services/mmwave-sensors/automobile-in-cabin-monitoring/>) promotes continuous in-cabin monitoring as follows: “In case of autonomous vehicles, it will also be critical to continuously monitor vehicle occupancy without creating privacy concerns. Radar sensors, combined with special ad hoc algorithms, are well-suited for such applications.”

There are even nascent efforts to make some of these systems mandatory. For example, “U.S. lawmakers and European safety regulators are considering rules that could mandate “child presence detection” systems aimed at avoiding hot-car deaths of unattended children. That has suppliers scrambling to develop new systems for automakers, according to interviews with several high-tech suppliers at a recent industry conference here.....”The moment you have regulation, things are going to move fast,” Melamed told Automotive News. “The timelines are very, very close.”” (<https://www.autonews.com/regulation-safety/safety-idea-gets-mandate>)

Also, it's not clear how the FCC exposure limits (which are already six orders of magnitude higher than exposures shown in the biomedical literature to cause damage) would apply to limit in-cabin radiation levels. Would they apply to each source, or to the total radiation? The former seems more likely, since it is unclear how they would enforce the latter. If that is the case, cabin occupants could be exposed theoretically to radiation levels in excess of the FCC present limits.

In sum, the occupants of a hybrid vehicle with a full load of passengers will be subject to:

- \*ELF-EMF from the tires and other sources unique to hybrids
- \*RFR from the passengers' cell phones
- \*RFR from Bluetooth
- \*RFR from the WiFi 'hot spot' and the devices communicating with the hot spot

\*RFR from the myriad cell towers that dot the sides of most highways

\*RFR from the radar sensors of other cars

\*RFR from on-board radar sensors to detect motions and driver alertness within the cabin

Almost all these radiation sources will also be operable in a gasoline-powered car, and there will be some radiation reflections within the cabin because of the surrounding metal.

Our studies on combinations of toxic stimuli including non-ionizing radiation [Kostoff et al, 2018; Kostoff and Lau, 2013, 2017] showed that adverse health effects are exacerbated when non-ionizing radiations of different characteristics are combined. What would be the effects of the above complex combination that goes well beyond EMF constituents?

The middle part of [Table A8-1](#) contains references to other studies showing deliberate radar impingement on vehicle occupants.

### A8-B3. Automotive Wireless Networks

The past decade has seen an increasing number of wireless networks that are fully or partially intra-vehicular. The final segment of [Table A8-1](#) presents only a small part of the studies that have been done to expand these intra-vehicular wireless networks. The remainder of this appendix addresses two of these many intra-vehicular networks, and it is based on my personal experience with these two networks.

#### A8-B3a. Keyless Access Network

As mentioned at the beginning of this appendix, about six months ago I bought a new car. One of the features in the particular model trim is the ability to open the doors and allow engine ignition with a key fob in proximity. This capability is not unique to the model I bought. Far from it! My search process showed that the push-button start capability is rapidly becoming ubiquitous in new cars. The strenuous process of turning a key in a lock is thereby bypassed.

According to the Owner's Manual, my new car has a 130+ KHz continuously operating wireless network that allows 1) the doors to be opened and closed, and 2) the ignition to be started by push-button, when the key fob is within proximity of the car. The Owner's Manual also states that the radio waves from the network could potentially interfere with an implanted pacemaker or defibrillator, and accompanies this statement with a Warning icon.

Luckily, according to the Owner's Manual, this wireless system/function can be disabled. The disabling is allowed not because of any manufacturer-stated concern for the adverse effects of wireless radiation on normal humans. It is allowed because it could potentially interfere with the operation of pacemakers and other similar devices.

The Owner's Manual provides two approaches to disabling the keyless access capability, thereby converting the key fob to effectively a key with some remote-control functions (like the TV remote-control). Disabling this capability is not a simple process, as I discovered. I was not able to do it myself, even though two alternative methods were provided in the Owner's Manual.

The dealer from whom I bought the vehicle said the disabling was not possible, and the second dealer I visited required two technicians to experiment before they could finally disable it.

Here's the critical point of this narrative. The technicians (and other service personnel) of the second dealer told me ***no one had ever requested this disabling before!*** From the first dealer's feedback, I'm sure they had never received such a request either.

This means that the customers with implanted electrical devices who purchase these vehicles are (for the most part) not disabling the 130+ KHz wireless network. My guess is they don't even know about this network. None of the salespeople I had at any of the dealerships who offered test drives in cars with keyless access function (and in my case there were probably half a dozen different brands I drove that had this capability) asked whether I had an implantable electrical device (I don't) nor mentioned the presence of the 130+ KHz network, or any other frequency applicable to their model/brand. I doubt whether any of them knew!

Here's the bottom line. If people with implantable devices are not motivated to eliminate these wireless networks, where there exists a rather obvious potential danger to health, how will healthy (or relatively healthy) people become motivated to avoid wireless systems/radiation?

Whatever dangers the 130+ KHz network (or different frequency networks of other brands performing the same function) would pose in isolation, I suspect the adverse effects would be amplified substantially in combination with the other toxic stimuli sources I mentioned in previous sections. While one could make arguments about some applications of wireless radiation being useful/justified in extreme emergencies, installing a potentially harmful wireless network to eliminate inserting a key into a lock is technology gone mad!

#### A8-B3b. Tire Pressure Monitoring System

Another intra-vehicular source of wireless radiation entering the automobile cabin is the tire pressure monitoring system (TPMS). TPMS has been mandated in the USA by the TREAD Act, and has been installed on all cars for the past decade. ([https://en.wikipedia.org/wiki/Tire-pressure\\_monitoring\\_system](https://en.wikipedia.org/wiki/Tire-pressure_monitoring_system)). It is mandated and used in many other countries as well.

There are myriad types of these sensors. Most Direct TPMS deploy tire pressure sensors on each wheel of a vehicle. As tire pressure data is collected for each tire, it is sent to one or more TPMS receivers, using RF (radio frequency) technology. The majority of Direct TPMS installations transmit their data via UHF (Ultra High Frequency) radio. TPMS data is typically transmitted in one of two frequency ranges, which depends on the geographical location of the TPMS: about 433MHz in Europe, and at 315MHz in most other parts of the world. <https://tpms247.com/blogs/tpms-faq/73376901-tpms-frequencies-315-mhz-433mhz>.

I didn't find any articles addressing adverse health effects from the TPMS. That doesn't mean they don't exist. There may be myriad reasons why I didn't find adverse health effects.

A8-B4. Other

The latter part of Table A8-1 alludes to many other types of networks being studied, as well as optimizing some already implemented. Most of these are not mentioned in my new car Owner's Manual, since I assume they don't affect pacemakers and defibrillators (at least according to whomever has responsibility for monitoring such systems). The only way to fully understand the levels of wireless radiation to which vehicle occupants are being subjected is through detailed measurements of the wireless radiation environment.

This would include full spectrum monitoring (from 1 Hz for ELF to >100 GHz for millimeter-wave communications and detection). Testing would be done under at least four conditions:

- no passengers and in an EMF quiet zone, with all on-board electronics operating;
- with passengers using myriad wireless devices, in EMF quiet zone, and with all on-board electronics operating;
- no passengers and in a typical urban business high EMF antenna concentration zone, and with all on-board electronics operating;
- with passengers using myriad wireless devices, in high EMF high antenna concentration zone, and with all on-board electronics operating.

Those results should begin to provide some idea of the complex and potentially dangerous wireless radiation environment that many commuters face.

## ABOUT THE AUTHOR

Ronald Neil Kostoff received a Ph. D. in Aerospace and Mechanical Sciences from Princeton University in 1967. He has worked for Bell Laboratories, Department of Energy, Office of Naval Research, and MITRE Corp. He invented the Wake Shield for producing high vacuum in low orbit, and used in manned space missions for research and development. He has published over 200 peer-reviewed articles, served as Guest Editor of four journal Special Issues since 1994, obtained two text mining system patents, and presently is a Research Affiliate at Georgia Institute of Technology.

He has published on numerous medical topics in the peer-reviewed literature, including:

- potential treatments for
  - Multiple Sclerosis,
  - Parkinson's Disease,
  - Raynaud's Phenomenon,
  - Cataracts,
  - SARS,
  - Vitreous Restoration,
  - Peripheral Neuropathy/Peripheral Arterial Disease
  - Alzheimer's Disease, and
  - Chronic Kidney Disease;
- potential causes of Chronic Kidney Disease;
- potential causes of Alzheimer's Disease;
- potential causes of Peripheral Neuropathy/Peripheral Arterial Disease
- potential impacts of Electromagnetic Fields on health; and
- synergistic effects of toxic stimuli combinations.

His recent publications in toxicology have shown that regulatory exposure limits to toxic stimuli are, on average, orders of magnitude too high compared to exposures shown to cause damage in the biomedical literature, and are not protecting the public from harmful substances.

He is listed in:

- Who's Who in America, 60th Edition (2006),
- Who's Who in Science and Engineering, 9th Edition (2006), and
- 2000 Outstanding Intellectuals of the 21st Century, 4th Edition, (2006).