

Electromagnetic Radiation and Autism: D.Klinghardt, Emerson College, 2018

Electrosmog and it's Destructive Effect on the Brain,
our Genome, Proteome and Microbiome of the Unborn Child

Electrosmog refers to our exposure to the sum total of all man-made electric fields, magnetic fields, radiowaves, TV broadcasting, home lighting and all other sources of radiation

Clinical Study

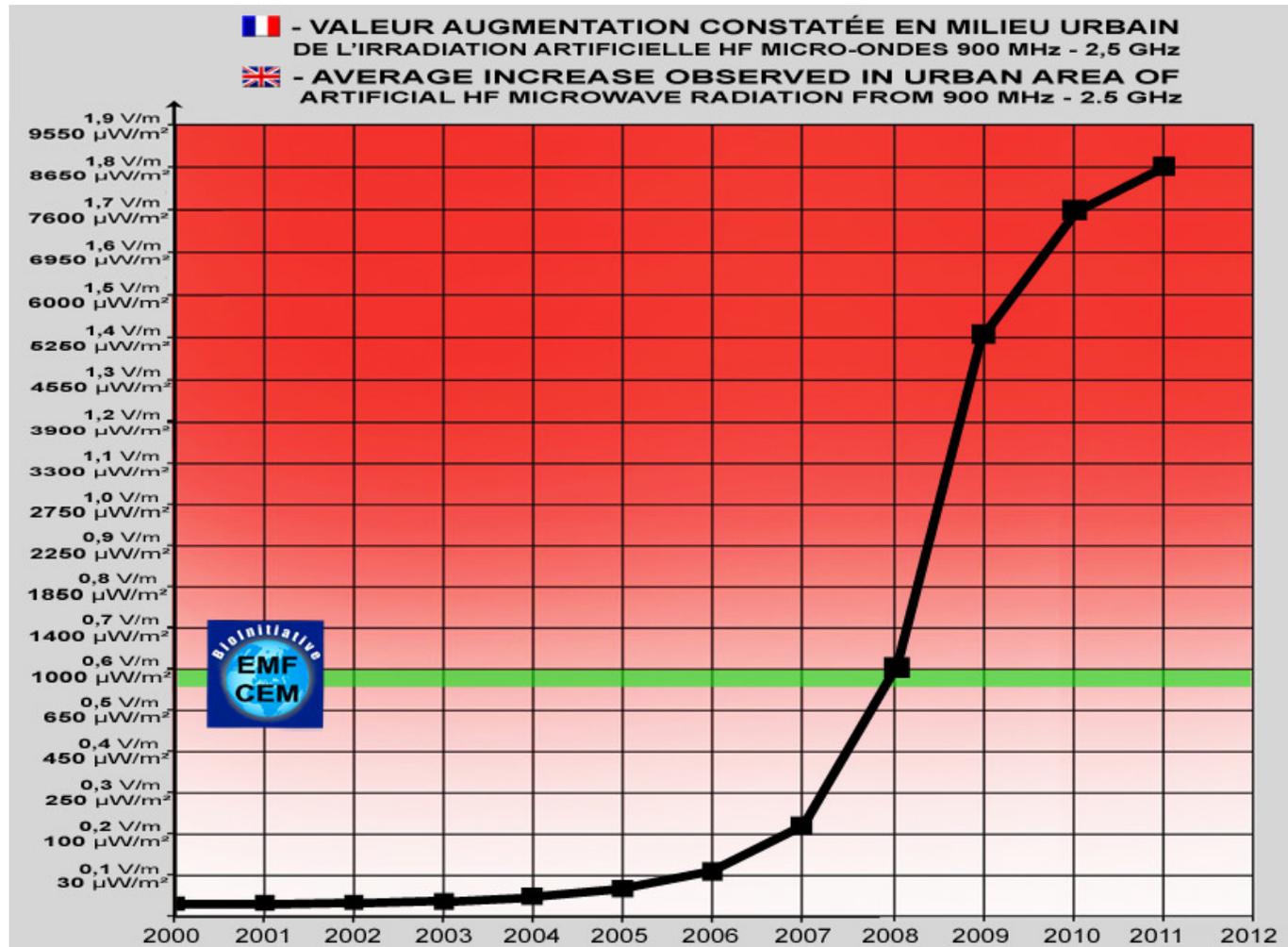
Metabolic and Genetic Screening of Electromagnetic Hypersensitive Subjects as a Feasible Tool for Diagnostics and Intervention

[Chiara De Luca](#)^{1,2}, [Jeffrey Chung Sheun Thai](#)³, [Desanka Raskovic](#)⁴, [Eleonora Cesareo](#)⁴, [Daniela Caccamo](#)⁵,
[Arseny Trukhanov](#)² and [Liudmila Korkina](#)^{1,2}

Abstract

Growing numbers of “electromagnetic hypersensitive” (EHS) people worldwide self-report severely disabling, multiorgan, non-specific symptoms when exposed to low-dose electromagnetic radiations, often associated with symptoms of multiple chemical sensitivity (MCS) and/or other environmental “sensitivity-related illnesses” (SRI). This cluster of chronic inflammatory disorders still lacks validated pathogenetic mechanism, diagnostic biomarkers, and management guidelines. We hypothesized that SRI, not being merely psychogenic, may share organic determinants of impaired detoxification of common physic-chemical stressors. Based on our previous MCS studies, we tested a panel of 12 metabolic blood redox-related parameters and of selected drug-metabolizing-enzyme gene polymorphisms, on 153 EHS, 147 MCS, and 132 control Italians, confirming MCS altered (p less than 0.05 – 0.0001) glutathione-(GSH), GSH-peroxidase/S-transferase, and catalase erythrocyte activities. We first described comparable—though milder—metabolic pro-oxidant/proinflammatory alterations in EHS with distinctively increased plasma coenzyme-Q₁₀ oxidation ratio. Severe depletion of erythrocyte membrane polyunsaturated fatty acids with increased $\omega 6/\omega 3$ ratio was confirmed in MCS, but not in EHS. We also identified significantly ($p=0.003$) altered distribution-versus-control of the CYP2C19*1/*2 SNP variants in EHS, and a 9.7-fold increased risk (OR: 95% C.I.=13–74.5) of developing EHS for the haplotype (null)GSTT1 + (null)GSTM1 variants. Altogether, results on MCS and EHS strengthen our proposal to adopt this blood metabolic/genetic biomarkers’ panel as suitable diagnostic tool for SRI.

Growth in Exposure to Microwave Radiation 2000-2010



Next-Up Organisation

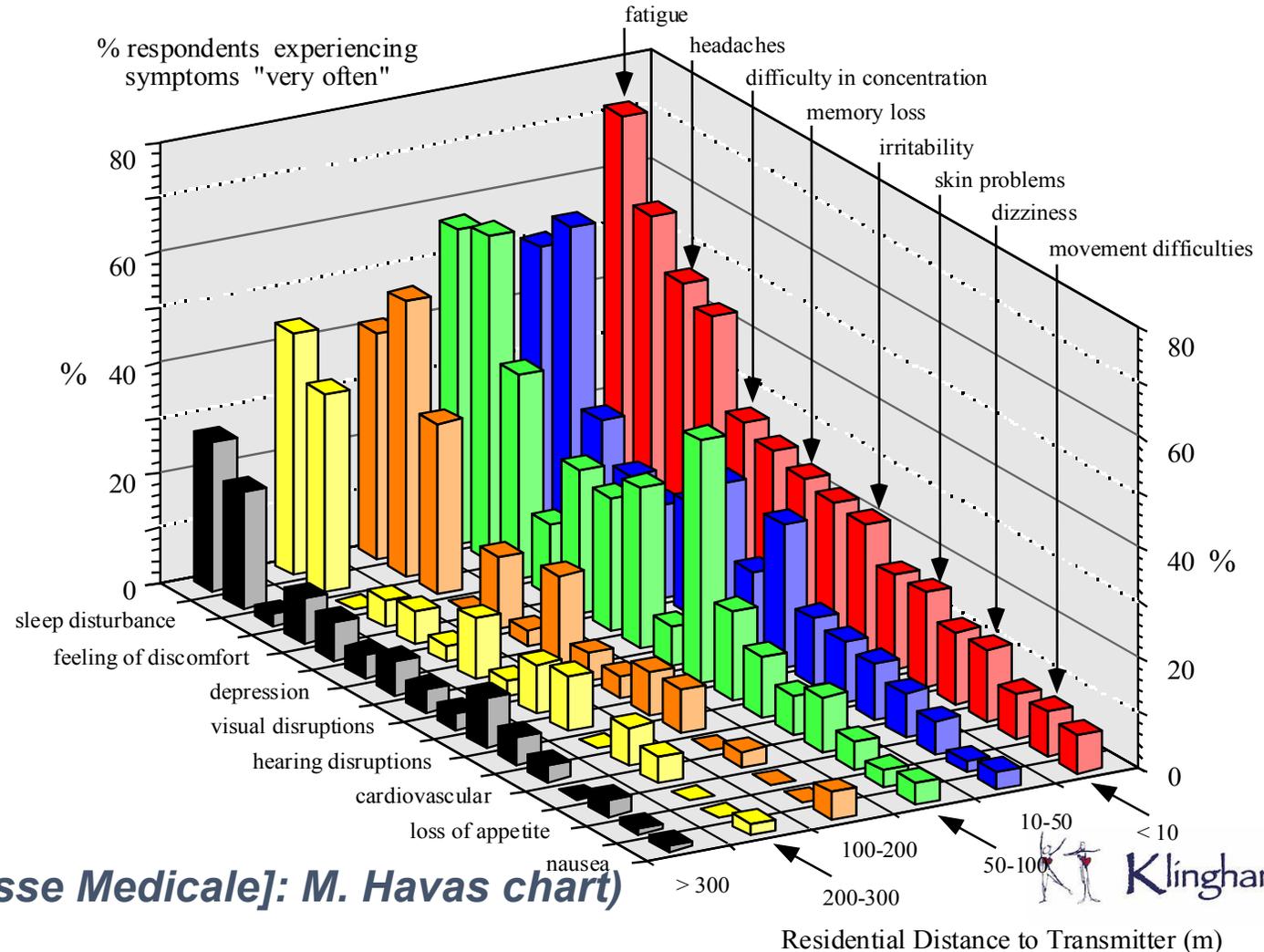
2001 Spain

Frequency of Electromagnetic Hypersensitivity Symptoms Based on Distance to Cell Phone Base Station

Electro-Hyper-Sensitivity (EHS)

1. Fatigue *
2. Sleep disturbance *
3. Headaches
4. Feeling of discomfort
5. Difficulty concentrating *
6. Depression *
7. Memory loss *
8. Visual disruptions *
9. Irritability *
10. Hearing disruptions *
11. Skin problems *
12. Cardiovascular *
13. Dizziness *
14. Loss of appetite *
15. Movement difficulties *
16. Nausea

* Associated with Aging:
"Rapid Aging Syndrome"



[Santini 2001, La Presse Medicale]: M. Havas chart)

“Brain proteome response following whole body exposure of mice to mobile phone or wireless DECT base radiation”

Electromagnetic Biology and Medicine; Posted online on January 20, 2012.

(doi:10.3109/15368378.2011.631068 (1–25) Adamantia F. Fragopoulou, Athina Samara, Marianna H. Antonelou, Anta Xanthopoulou, Aggeliki Papadopoulou, Konstantinos Vougas, Eugenia Koutsogiannopoulou, Ema Anastasiadou, Dimitrios J. Stravopodis, George Th. Tsangaris, Lukas H. Margaritis Department of Cell Biology and Biophysics, Athens University

Abstract:

The objective of this study was to investigate the effects of two sources of electromagnetic fields (EMFs) on the proteome of cerebellum, hippocampus, and frontal lobe in Balb/c mice following long-term whole body irradiation. Three equally divided groups of animals (6 animals/group) were used; the **first** group was exposed to a **typical mobile phone**, at a SAR level range of 0.17–0.37 W/kg for 3 h daily for 8 months, the **second** group was exposed to a **wireless DECT base** (Digital Enhanced Cordless Telecommunications/Telephone) at a SAR level range of 0.012–0.028 W/kg for 8 h/day also for 8 months and the **third** group comprised the **sham**-exposed animals. Comparative proteomics analysis revealed that long-term irradiation from **both EMF sources** altered significantly ($p < 0.05$) the **expression of 143 proteins** in total (as low as 0.003 fold downregulation **up to 114 fold overexpression**). Several neural function related proteins (i.e., Glial Fibrillary Acidic Protein (GFAP), Alpha synuclein, Glia Maturation Factor beta (GMF), and apolipoprotein E (apoE)), heat shock proteins, and cytoskeletal proteins (i.e., Neurofilaments and tropomodulin) are included in this list as well as proteins of the brain metabolism (i.e., Aspartate aminotransferase, Glutamate dehydrogenase) to nearly all brain regions studied. Western blot analysis on selected proteins confirmed the proteomics data. The observed **protein expression changes may be related to brain plasticity** alterations, indicative of **oxidative stress in the nervous system** or involved in **apoptosis** and might potentially explain human health hazards reported so far, such as **headaches, sleep disturbance, fatigue, memory deficits, and brain tumor long-term induction** under similar exposure conditions.

Wireless Radiation in the Etiology and Treatment of Autism: Clinical Observations and Mechanisms

J. Aust. Coll. Nutr. & Env. Med. Vol. 26 No.2 (August 2007) pages 3-7

Tamara J Mariea and George L Carlo

• Results

The sentinel subject's history suggested that the **efficiency of heavy metal detoxification was dramatically increased when EMR was eliminated**. For the larger groups, data indicated that heavy metals were cleared in a time and molecular weight-dependent manner after EMR was eliminated from the treatment environment.

• Conclusions

The findings suggest a significant **role of EMR in both the etiology of Autism and the efficacy of therapeutic interventions**. The mechanism of EMR impact could be direct by facilitating early clinical onset of symptoms or indirect, including **trapping heavy metals in cells** and both accelerating the onset of symptoms caused by heavy metal toxicity as well as impeding therapeutic clearance. These data also suggest that wireless device EMR is a synergen in the etiology of Autism, acting in conjunction with environmental and genetic factors, and offer a mechanistic explanation for the correlation between concurrent increases in the incidence of Autism and the use of wireless technology.

A Possible Association Between Fetal/Neonatal Exposure to Radiofrequency Electromagnetic Radiation and the Increased Incidence of Autism Spectrum Disorders (ASD).

Medical Hypotheses, Eden Press, New York. USA (2004); R.C. Kane

<http://linkinghub.elsevier.com.proxy.healwa.org/retrieve/pii/S0306987703003098?showall=true>

Abstract

Recently disclosed epidemiological data indicate a dramatic increase in the incidence of autism spectrum disorders. Previously, the incidence of autism has been reported as 4-5 per 10000 children. The most recent evidence indicates an increased incidence of about 1 per 500 children. However, the etiology of autism is yet to be determined. The recently disclosed data suggest a possible correlation between autism incidence and a previously unconsidered environmental toxin. It is generally accepted in the scientific community that radiofrequency (RF) radiation is a biologically active substance. It is also readily acknowledged that human exposures to RF radiation have become pervasive during the past 20 years, whereas such exposures were uncommon prior to that time.

It is suggested that fetal or neo-natal exposures to RF radiation may be associated with an increased incidence of autism

“Out of Time: A Possible Link Between Mirror Neurons, Autism and Electromagnetic Radiation”

Medical Hypotheses; I.M. Thornton, Eden Press, New York. USA (2006)

<http://linkinghub.elsevier.com.proxy.heal-wa.org/retrieve/pii/S0306987706000934?showall=true>

Abstract

Recent evidence suggests a link between autism and the human mirror neuron system. In this paper, I argue that **temporal disruption from the environment** may **play an important role in the observed mirror neuron dysfunction**, leading in turn to the pattern of deficits associated with autism. I suggest that the developing nervous system of an infant may be particularly prone to temporal noise that can interfere with the initial calibration of brain networks such as the mirror neuron system. **The most likely source of temporal noise in the environment is artificially generated electromagnetic radiation.** To date, there has been little evidence that electromagnetic radiation poses a direct biological hazard. It is clear, however, that time-varying electromagnetic waves have the potential to temporally modulate the nervous system, particularly when populations of neurons are required to act together. This modulation may be completely harmless for the fully developed nervous system of an adult. For an infant, this same temporal disruption might act to severely delay or disrupt vital calibration processes.

Extremely-Low Frequency (ELF) and Radiofrequency (RF) Electromagnetic Fields Have Very Similar Biological Effects

- **Genetic Effects**
- **Cancer**
- **Cellular/Molecular Effects**
- **Electrophysiology**
- **Behavior**
- **Nervous System**
- **Blood-brain barrier**
- **Calcium**
- **Cardiovascular**
- **Warm sensation**
- **Hormones**
- **Immunology**
- **Metabolic rate/ effects**
- **Reproduction/ growth**
- **Subjective symptoms**
- **Stress**

Source: Dr. Henry Lai, Research Professor, Department of Bioengineering, University of Washington. Presentation March 21, 2008 at Council on Wireless Technology Impacts EMF Panel, San Francisco, CA.

Mom's Cell phone use leads to decreased melatonin production and decreased protection of the fetus

Melatonin metabolite excretion among cellular telephone users

Int J Radiat Biol. 2002 Nov;78(11):1029-36 [Burch JB](#), [Reif JS](#), [Noonan CW](#), [Ichinose T](#), [Bachand AM](#), [Koleber TL](#), [Yost MG](#).

Department of Environmental and Radiological Health Sciences, Colorado State University, Fort Collins, CO

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PURPOSE: The relationship between cellular telephone use and excretion of the melatonin metabolite 6-hydroxymelatonin sulfate (6-OHMS) was evaluated in two populations of male electric utility workers (Study 1, n=149; Study 2, n=77).

MATERIALS AND METHODS: Participants collected urine samples and recorded cellular telephone use over 3 consecutive workdays. Personal 60-Hz magnetic field (MF) and ambient light exposures were characterized on the same days using EMDEX II meters. A repeated measures analysis was used to assess the effects of cellular telephone use, alone and combined with MF exposures, after adjustment for age, participation month and light exposure. **RESULTS:** No change in 6-OHMS excretion was observed among those with daily cellular telephone use >25 min in Study 1 (5 worker-days). Study 2 workers with >25 min cellular telephone use per day (13 worker-days) had lower creatinine-adjusted mean nocturnal 6-OHMS concentrations (p=0.05) and overnight 6-OHMS excretion (p=0.03) compared with those without cellular telephone use. There was also a linear trend of decreasing mean nocturnal 6-OHMS/creatinine concentrations (p=0.02) and overnight 6-OHMS excretion (p=0.08) across categories of increasing cellular telephone use. A combined effect of cellular telephone use and occupational 60-Hz MF exposure in reducing 6-OHMS excretion was also observed in Study 2.

CONCLUSIONS: Exposure-related reductions in 6-OHMS excretion were observed in Study 2, where daily cellular telephone use of >25 min was more prevalent. **Prolonged use of cellular telephones may lead to reduced melatonin production, and elevated 60-Hz MF exposures may potentiate the effect.**

[Acta Trop.](#) 2014 Sep;137:31-8. doi: 10.1016/j.actatropica.2014.04.021. Epub 2014 May 6.

Effects of melatonin on oxidative stress, and resistance to bacterial, parasitic, and viral infections: a review.

[Vielma JR](#), [Bonilla E](#), [Chacín-Bonilla L](#), [Mora M](#), [Medina-Leendertz S](#), [Bravo Y](#)

Abstract

Melatonin, a hormone secreted by the pineal gland, works directly and indirectly as a free radical scavenger. Its other physiological or pharmacological activities could be dependent or independent of receptors located in different cells, organs, and tissues. In addition to its role in promoting sleep and circadian rhythms regulation, it has important immunomodulatory, antioxidant, and neuroprotective effects suggesting that this indole **must be considered as a therapeutic alternative against infections**. The aim of this review is to describe the effects of melatonin on oxidative stress and the resistance to bacterial (*Klebsiella pneumoniae*, *Helicobacter pylori*, *Mycobacterium tuberculosis*, and *Clostridium perfringens*), viral (Venezuelan equine encephalomyelitis virus and respiratory syncytial virus), and parasitic (*Plasmodium* spp., *Entamoeba histolytica*, *Trypanosoma cruzi*, *Toxoplasma gondii*, and *Opisthorchis viverrini*) infections.

[Int J Exp Pathol](#). 2015 Apr 19. doi: 10.1111/iep.12122. [Epub ahead of print]

The protective properties of melatonin against aluminium-induced neuronal injury.

[Al-Olayan EM1](#), [El-Khadragy MF](#), [Abdel Moneim AE](#)

Abstract

Aluminium (Al) toxicity is closely linked to the pathogenesis of Alzheimer's disease (AD). This experimental study investigated the neuroprotective effect of melatonin (Mel; 10 mg/kg bwt) on aluminium chloride (AlCl₃; 34 mg/kg bwt) induced neurotoxicity and oxidative stress in rats. Adult male albino Wistar rats were injected with AlCl₃ for 7 days. The effect on brain structure, lipid peroxidation (LPO), nitric oxide (NO) levels, glutathione (GSH) content, antioxidant enzymes (SOD, CAT, GPx and GR), apoptotic proteins (Bax and Bcl-2) and an apoptotic enzyme (caspase-3) was investigated. No apparent changes occurred following the injection of melatonin. **Melatonin** pre-treatment of the AlCl₃ -administered rats **reduced brain damage**, and the tissues appeared like those of the control rats. Compared to treatment with AlCl₃, pre-treatment with melatonin **decreased LPO and NO levels** and **increased the GSH content and antioxidant enzyme activity**. Moreover, melatonin increased the levels of the anti-apoptotic protein, Bcl-2, decreased the levels of the pro-apoptotic protein, Bax, and inhibited caspase-3 activity.

Therefore, our results indicate that melatonin may provide therapeutic value against aluminium-induced oxidative stress and histopathological alternations in the rat brain and that these effects may be related to anti-apoptotic and antioxidant activities.

[Int J Immunopharmacol.](#) 2000 Oct;22(10):821-32.

Influence of melatonin on immunotoxicity of lead.

[Kim YO](#)¹, [Pyo MY](#), [Kim JH](#)

Abstract

The results suggested that immunotoxicity induced by lead [Pb, as Pb(NO₃)₂] was significantly restored or prevented by melatonin (MLT). MLT (10 or 50 mg/kg) was orally administered to ICR mice daily for 28 days, and Pb was also administered at 35 mg/kg in the same way 2 h after the administration of MLT, and the normal mice were given vehicle. Within the Pb plus MLT-treated group, the body weight gains and the relative thymus weights were significantly increased when compared with the treatment of Pb alone. The relative spleen and liver weights were increased by the treatment of Pb alone, and then restored to normal value by MLT treatment. Hemagglutination (HA) titer, plaque-forming cell response to sheep red blood cell (SRBC), and secondary IgG antibody response to BSA were significantly enhanced in the Pb plus MLT-treated mice, as opposed to when compared with the treatment of Pb alone. The mitogenic response of splenic T cell to concanavalin A and that of B cells to lipopolysaccharide was remarkably increased by MLT treatment when compared with treatment of Pb alone. Splenic CD4(+) cells were significantly increased by MLT treatment when compared with treatment of Pb alone. In case of CD8(+) cells, the slight enhancement was observed in MLT treatment. Splenic T and B cells were significantly increased by MLT treatment when compared with the treatment of Pb alone. The **natural killer cell, phagocytic activity** and the number of peripheral **leukocytes were significantly enhanced in Pb plus MLT-treated mice** when compared with the treatment of Pb alone.

[Int J Immunopharmacol.](#) 2000 Apr;22(4):275-84.

Influence of melatonin on immunotoxicity of cadmium.

[Kim YO](#), [Ahn YK](#), [Kim JH](#).

Abstract

- The results suggested that immunotoxicity induced by Cd was significantly restored or prevented by MLT. MLT (10 or 50 mg/kg) was orally administered to ICR mice daily for 28 consecutive days, and cadmium (Cd, as [Cd(AC)(2)]) was also administered at 25 mg/kg by the same route 2 h after the administration of MLT, and the normal mice were given vehicle. Within the Cd plus MLT-treated group, the body weight gains and relative thymus weights were significantly increased when compared with the treatment of Cd alone. The relative spleen and liver weights were increased by treatment of Cd alone, then restored to normal value by MLT treatment. Hemagglutination (HA) titer, primary IgM antibody response to SRBC, and secondary IgG antibody response to BSA was significantly increased with the Cd plus MLT-treated mice, as opposed to when compared with treatment of Cd alone. **The NK cell and phagocytic activity** used for evaluation of non-specific immunocompetence was **significantly increased** in Cd plus MLT-treated mice when compared with the treatment of Cd alone. The **number of peripheral leukocytes was significantly increased** in Cd plus MLT-treated mice when compared with treatment of Cd alone.

“Extremely Low-Frequency Magnetic Field Decreased Calcium, Zinc and Magnesium Levels in Costa of Rat”

Abstract

Electromagnetic field (EMF) can affect cells due to biochemical change followed by a change in level of ions trafficking through membrane. We aimed to investigate possible changes in some elements in costa of rats exposed to long-term extremely low-frequency magnetic field (ELF-MF). Rats were exposed to 100 and 500 μ T ELF-MF, which are the safety standards of public and occupational exposure for 2 h/day during 10 months. At the end of the exposure period, the samples of costa were taken from the rats exposed to ELF-MF and sham. The levels of elements were measured by using atomic absorption spectrophotometry (AAS) and ultraviolet (UV) spectrophotometry. Ca levels decreased in the ELF-500 exposure group in comparison to sham group ($p < 0.05$). Statistically significant decrease was found in Mg levels in the ELF-500 exposure group in comparison to sham and ELF-100 exposure groups ($p < 0.05$). Zn levels were found to be lower in the ELF-500 exposure group than those in the sham and ELF-100 exposure groups ($p < 0.05$). No significant differences were determined between groups in terms of the levels of P, Cu and Fe.

In conclusion, it can be maintained that **long-term ELF-MF exposure can affect the chemical structure and metabolism of bone by changing the levels of some important elements such as Ca, Zn and Mg in rats.**

“Mobile phone-induced myocardial oxidative stress: protection by a novel antioxidant agent caffeic acid phenethyl ester”

Toxicol Ind Health. 2005 Oct;21(9):223-30

[Ozguner F](#), [Altinbas A](#), [Ozaydin M](#), [Dogan A](#), [Vural H](#), [Kisioglu AN](#), [Cesur G](#), [Yildirim NG](#)

Electromagnetic radiation (EMR) or radiofrequency fields of cellular mobile phones may affect biological systems by increasing free radicals, which appear mainly to enhance lipid peroxidation, and by changing the antioxidant defense systems of human tissues, thus leading to oxidative stress. Mobile phones are used in close proximity to the heart, therefore 900 MHz EMR emitting mobile phones may be absorbed by the heart. Caffeic acid phenethyl ester (CAPE), one of the major components of honeybee propolis, was recently found to be a potent free radical scavenger and antioxidant, and is used in folk medicine. The aim of this study was to examine 900 MHz mobile phone-induced oxidative stress that promotes production of reactive oxygen species (ROS) and the role of CAPE on myocardial tissue against possible oxidative damage in rats. Thirty rats were used in the study. Animals were randomly grouped as follows: sham-operated control group (N: 10) and experimental groups: (a) group II: 900 MHz EMR exposed group (N: 10); and (b) group III: 900 MHz EMR exposed+CAPE-treated group (N: 10). A 900 MHz EMR radiation was applied to groups II and III 30 min/day, for 10 days using an experimental exposure device. Malondialdehyde (MDA, an index of lipid peroxidation), and nitric oxide (NO, a marker of oxidative stress) were used as markers of oxidative stress-induced heart impairment. Superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GSH-Px) activities were studied to evaluate the changes of antioxidant status. In the EMR exposed group, while tissue MDA and NO levels increased, SOD, CAT and GSH-Px activities were reduced. CAPE treatment in group III reversed these effects. In this study, the increased levels of MDA and NO and the decreased levels of myocardial SOD, CAT and GSH-Px activities demonstrate the role of oxidative mechanisms in 900 MHz mobile phone-induced heart tissue damage, and CAPE, via its free radical scavenging and antioxidant properties, ameliorates oxidative heart injury.

These results show that CAPE from Propolis exhibits a protective effect on mobile phone-induced and free radical mediated oxidative heart impairment in rats.

Radioprotection for ASD kids

1. Daytime:

- No wireless in home, no cordless phones
- Child should wear radio protective clothing (BioPure.eu)
- **Rosemary tincture:** *“highly significant protective anti-mutagenic activity”. “Even the most powerful water-soluble antioxidants lack the capacity to protect against gamma ray induced damage”. (British Journal of Radiology, February 2 edition, 2015)*
- Using the **Stetzer filters** throughout home or school to decrease “dirty electricity”

2. Evening:

- **Liposomal Melatonin** (+ 50-100 mg DMSA for a few weeks)
- Trial with 5 HTP (adult dose: 200 mg)
- **Propolis tincture** 4-6 pipettes after dinner. A propolis compound (CAPE) protects lymphocytes against radiation (2008 Journal of Biochemical and Molecular Toxicology). **Best: use KiScience “RayWave” – 2 pipettes 3 times/day**
- TD-Magnesium, **Epsom salt baths** twice daily, oral Mag.glycinate. Magnesium act as calcium channel blocker. Voltage gate calcium channels are upregulated by EMR (M.Pall, 2013)

3. Nights:

- Sleep sanctuary, fuses off
- Consider Samina bed

Autism may be Linked to Electromagnetic Radiation Levels In Mother's Bedroom During Pregnancy

Pilot Study Finds Over 20x Higher Microwave Power Density Levels in Mothers' Sleeping Locations During Pregnancy

Dr. Dietrich Klinghardt, MD, PhD of the Sophia Health Institute in Woodinville, WA recently conducted a pilot study to assess the potential role of electromagnetic frequencies in the dramatic rise in autism and other neurological impairments over the past decade. Various measurements of electromagnetic radiation exposure were assessed in the case of 10 children with neurological impairment, 8 categorized with Autism Spectrum Disorder. Data was obtained for:

- 1) Mothers' Body Voltage in the mothers' sleeping location during pregnancy;**
 - 2) Child's Body Voltage in current sleeping location;**
 - 3) Microwave Power Density in mothers' sleeping location during pregnancy (microwatt/square meter); and**
 - 4) Child's Microwave Exposure in current sleeping location.**
- Data for mothers with neurologically impaired children were contrasted with similar data for 5 healthy children and their mothers.

The results were as follows:

Body Voltage Levels:

Median Body Voltage Level in Mom's Bed During Pregnancy*

	Value	Range
Neurologically Impaired Children	1,872 millivolts	(380-6,040)
Healthy Group	224 millivolts	(12-480)

8.4x Higher body voltage levels in moms with neurologically impaired children

**Note research shows whatever the Body Voltage of the Mom, it is even higher in the fetus.*

Body Voltage of child in current bed location

	Value	Range
Neurologically Impaired Children	1,028 millivolts	(420-4,900)
Healthy Group	120 millivolts	(0-230)

Conclusion: 8.5x Higher Body Voltage in Neurologically Impaired Child's Sleeping Location

Microwave Exposure:

Microwave Power Density in Sleeping Location

Neurologically Impaired Children-Mom's Bed Exposure In Pregnancy	mw/sq. meter	Range
Healthy Group	290	(110-1,710)
	14	(0-67)

Conclusion: 20.7x higher microwave power density in moms sleeping location in cases where children were neurologically impaired

This pilot data strongly suggests that electromagnetic radiation in the sleeping environment of mothers during pregnancy, as well as electromagnetic radiation in the sleeping environment of children, may be the undiscovered key contributing - if not causative - factor in neurological impairments in children, including autism. Given increasing levels of ambient electromagnetic radiation in modern environments from society's use of electronic equipment, wireless technologies, such as cell phones and wireless networks, high frequency transients on electric lines, and broadband over power lines (BPL), this association needs immediate further exploration