



# WAKING



## GROUNDBREAKING STUDY SHOWS SHIELDING EMF IMPROVES AUTOIMMUNE DISEASE

January 24, 2018



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**Waking Times**

*Novel research reveals that blocking exposure to electromagnetic fields (EMF) produces significant symptom changes in 90% of patients with autoimmune disease. No longer can it be ignored that man-made electromagnetic radiation poses innumerable risks to human health*

## The Ubiquity of Electrosmog

Concerns about **electromagnetic fields** (EMF) are branded pseudoscientific conspiracy theories and relegated to the realm of tin-hat wearing quackery. However, a recent publication in the peer-reviewed journal *Immunologic Research* entitled “Electrosmog and Autoimmune Disease,” sheds new light on the validity of concerns about this so-called electrosmog with which we are constantly inundated.

Although we encounter natural microwave electromagnetic radiation in the form of cosmic radiation from outer space, the aurora borealis, and thunderstorms, the vast majority of electrosmog that we encounter is largely manmade (1). These atmospheric phenomena, however, emit electromagnetic radiation at low frequencies and are negligibly weak in comparison to manmade sources, which have increased exponentially due to the emergence of television, cellular phone technologies, and WiFi, all of which utilize **microwave frequency bands** (1).

According to researchers Marshall and Heil (2017), for instance, “The recent release of WiGig and anti-collision vehicle radars in the 60 GHz region embody a 1000-fold increase in frequency, and photon energy over the exposures mankind experienced up until the 1950s” (1).

## How Electrosmog Interfaces with the Bioelectromagnetic Body

It is intuitive that electrosmog would interact with human biology, since human physiology operates in part via electromagnetic fields. Apart from physical information superhighways such as the blood, nervous, and lymphatic systems, the body uses electromagnetic forms of energy transmission and communication that are several orders of magnitude faster than chemical diffusion (2).

Called biophotonic emission (BPE), these quanta of electromagnetic energy have a visibility one thou-

times lower than the sensitivity of our naked eye and are quintessential to cellular metabolism and to powering of our energy-intensive nervous and immune systems (3). Harbored within our genetic material, **biophotons** serve as a mode of instantaneous communication from one body part to another in the extraneous world (4) and their emission is influenced by our global state of health (5). Research even suggests that mental intention and the **fabric of our consciousness** is mediated by these quantum of light which operate as highly coherent frequencies and generate an ordered flux of photons (4).

Thus, both the stuff of consciousness and the functioning of our cellular energetics is premised upon electromagnetism, which may be susceptible to distortion by electrosmog. Curtis and Hurtak describe the electromagnetic body as both “an entire body distinct from the chemical body that interpenetrates it” and a light circulatory system operating on an energetic level in a markedly different manner from that of its molecular counterparts” (2). That there is “an incredible amount of activity at levels of magnification that span more than two-thirds of the 73 known octaves of the electromagnetic spectrum” (6) in the human body is emblematic of our vulnerability to electromagnetic disturbances.

## **Potential Immune Disturbances due to Electrosmog Exposure**

Although current public health laws are predicated on effects of short-term exposure, research suggests that dosage and repetitive exposures likely influence health risk of electrosmog (7). Two thirds of studies examined report ecological effects of electromagnetic radiation, and researchers state that, “current evidence indicates that chronic exposure to electromagnetic radiation, at levels that are found in the environment may particularly affect the immune, nervous, cardiovascular and reproductive systems” (7).

Although the conventional mantra is that no harm is incurred from low-energy radio waves, low-level exposures to ionizing radiation are known to manifest profound effects upon human physiology (1). **Ionizing radiation exposure**, which occurs secondary to nuclear energy accidents, for example, produces immunosuppression, so much so that some scientists have even suggested radon exposure as a therapeutic treatment for rheumatoid arthritis due to its inhibition of inflammatory immune messengers such as adipokine visfatin (8).

There is, however, often a substantial lag time between exposure and the materialization of symptoms (1). The detriment to immune defense “often does not become apparent until the body is catastrophically challenged to overcome an acute challenge” (1). In addition, new science is overturning the previous assumption that immunosuppressive effects are exclusive to ionizing radiation exposure.

A research group headed by Lushinov, for example, found that repeated exposures to low-level non-ionizing electromagnetic **radiation impaired the immune response** in mice, negatively influencing immunocompetence or the ability of the immune response to respond to an immune-provoking antigenic substance (9). Exposure to low-intensity electromagnetic radiation negatively influenced thymic and splenic cellularity, causing a statistically significant decrease in the immune cells generated by these lymphoid organs (9). Immunocompetence of the Aegean wall lizard was also significantly reduced upon daily exposure to radiofrequency resembling the amount of electrosmog emitted from cordless phones (10).

Moreover, Gapeev and colleagues (2006) elucidated that exposure to low-intensity non-ionizing electromagnetic waves exerted equivalent immunosuppressive effects to a single dose of the **nonsteroidal anti-inflammatory drug (NSAID)** diclofenac (11). In another experiment, exposure to low-intensity electromagnetic radiation reduced the footpad edema and local hyperthermia, also known as swelling and heat, that accompanied injection of zymosan, an agent that induces acute **inflammation** (12). This constitutes evidence that electrosmog exposure may impair the normal immune response to potential threats.

## **Human Proteins are Responsive to Electromagnetic Waves**

Biomolecules, which are constantly undergoing molecular collisions and interacting on the scale of picoseconds, are subject to forces exerted by incident electromagnetic fields (1). According to research by Marshall and Heil, “It seems likely that signals a million times lower than those currently being used in research may be sufficient to elicit a tangible change in human biology” (1).

## **Induction of Stress Proteins**

Electrosmog at both an extremely low-frequency (ELF) or in the radio frequency (RF) range has been found to stimulate a cellular stress response, leading to expression of stress response genes including heat shock protein 70 (HSP70) (13). As a consequence, there is increased production of highly conserved stress proteins which serve as chaperones by refolding and repairing damaged proteins (13). Heat shock proteins have likewise been observed to up-regulate an immune response, “transferring antigenic peptides to the class I and class II molecules of the major histocompatibility complexes” as well as increasing activity of a number of immune cells which perpetuate an immune reaction, such as macrophages and dendritic cells (14).

## **Aberrant Anti-Microbial Response**

In addition, the function of another human protein, lysozyme, has been shown to be disrupted by electromagnetic radiation (15). Also called muramidase, lysozyme is an antimicrobial enzyme liberate cytoplasmic granules of immune cells such as granulocytes and macrophages (16). Contained in human secretions such as mucus, tears, saliva, and breast milk, this bacteriolytic element degrades glycosidic in peptidoglycan, a molecule prominent in the cell walls of gram-positive bacteria (17).

Lysozyme is a major contributor to bactericidal activity, facilitating elimination of inhaled airborne microorganisms to prevent their colonization in the respiratory passages, which would interfere with gas exchange (17). Studies have indicated that depletion of lysozyme reduces bacteria-killing ability of human airway sections by approximately fifty percent (18). Animal studies also highlight how lysozyme is especially important in host pulmonary defense, since, “Increased concentration of lysozyme in the air of transgenic mice enhanced bacterial killing whereas lysozyme deficiency resulted in increased bacterial burden and morbidity” (17).

Turton and colleagues (2014) published a study in *Nature Communications* showing that non-ionizing terahertz electromagnetic radiation altered the binding of lysozyme to its ligand, triacetylchitotriose, in turn would affect the biological function of lysozyme (15). Although this represents a much higher frequency than normal background electrosmog, the implications are that human immune defenses against pathogen invasion and virulence may be adversely affected due to repeated and cumulative exposures to electrosmog (15).

## Derangements in Vitamin D Pathways

Research shows that Vitamin D Receptor (VDR) pathways are susceptible to interference by electrosmog. Functionality of the vitamin D receptor, a transcription factor that translocates to the nucleus and influences gene expression when bound to **vitamin D**, is fundamental for immunomodulation. The cascade of effects that occur upon vitamin D binding to its receptor reinforce gut barrier integrity, establish oral tolerance, and suppress autoimmune responses by enabling the immune system to differentiate self from non-self.

According to researchers, the shape of the VDR molecule transforms with electrosmog exposure within the frequency range of WiFi routers: “Groups of hundreds of atoms which form the helical “backbone” of VDR...shift together at the lower frequencies present in electrosmog” (1). Sophisticated molecular dynamics software, which illustrates the lock-and-key interaction between the vitamin D receptor and its native 1,25-dihydroxyvitamin-D (1,25-D), have shown that so-called Lorentz forces act upon charged oxygen

in carboxyl groups of the vitamin D receptor (1). These Lorentz forces may either promote or hinder activation of the vitamin D receptor, depending on both the frequency of the “molecular interactions, that of the impinging electromagnetic waves” (1).

## **Electrosmog Affects Human Brain Activity and Behavior**

As far back as 1987, Bise published a pilot study wherein electrosmog exposure at levels dramatically higher than that observed in urban areas elicited transient changes in human brain waves and behavior (19). Bise reports, “Constructive and destructive interference patterns from standing waves within the skull possibly interact with the bioelectric generators in the brain, since electroencephalogram wave amplitudes and frequencies increased or decreased respectively at different radio wavelengths” (19).

What’s more, the literature reveals that neuroimaging and electroencephalography studies demonstrate enhanced cortical excitability with EMF exposure, particularly in the front-temporal regions, which is paradoxically correlated with faster reaction times, but may also **interfere with sleep** (20).

Alarming, the patterns observed in human electroencephalograms (EEG) was altered by wave amplitudes as low as -100 dBm (19). Bise was able to induce an immediate frontal headache at a level of -60 dBm (19). Unfortunately, barring use of a Faraday cage, these experiments are impossible to replicate since electrosmog background levels in cities are now 100,000 times stronger at -50 dBm (19).

## **Silver-Threaded EMF-Blocking Caps Improve Autoimmune Disease**

In a recent case series, patients wore shielding clothing and tenting consisting of silver-coated polyethylene threads interspersed with bamboo fibers that were partially capable of blocking penetration of microwave electrosmog (1). Due to anecdotal testimonies of improvement, researchers decided to distribute standardized garments that would shield the brain and brain stem in order to systematically analyze the results (1).

In this study, 64 patients with assorted autoimmune diagnoses such as **systemic lupus erythematosus (SLE)**, **rheumatoid arthritis (RA)**, **multiple sclerosis (MS)**, **Sjogren’s syndrome**, and **celiac disease** of whom were disabled and house-bound, were recruited (1). Subjects wore the silver-threaded cap for 8 hours at night and for four hours during the day, and patient-reported outcomes were collected (1). Impressively, 90% of patients indicated a “definite” or “strong” change in their symptomatology, which is a significant variance with the 3% of the population that is estimated to be sensitive to electrosmog (1).



Some researchers have attributed this so-called electro-hypersensitivity (EHS) or idiopathic environmental intolerance (IEI) to the nocebo effect. However, Dieudonné explores the possibility of a psychosomatic mechanism in the journal *Bioelectromagnetics*, and concludes, “Overall, symptoms appear before subjects start questioning effects of EMF on their health, which is not consistent with the hypothesis that IEI originates from **nocebo** responses to perceived EMF” (21).

In this groundbreaking study, it is also telling that the researchers found the therapeutic efficacy of the silver-coated caps to be so theoretically plausible that they decided the idea of using a control group was unethical. These authors concluded that autoimmune patients exhibit a pronounced susceptibility to electrosmog at levels normally encountered in home and occupational environments, and hypothesize the exposure may be contributing to their disease etiology (1).

## Electrosmog and Mitochondrial Dysfunction

Because electric fields result from voltage differences, whereas magnetic fields from the flow of electric current, EMFs may be capable of disrupting the finely orchestrated proton gradient and flow of electrons within the inner mitochondrial membrane upon which the process of oxidative phosphorylation is carried out (13). Oxygen-dependent aerobic respiration, which relies upon oxidative phosphorylation, is the process that drives production of the cellular energy currency adenosine triphosphate (ATP) in our cellular energy factories, the mitochondria.



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These organelles are fundamental to every energy-dependent process in the body but especially quintessential for the energy-demanding nervous system. Thus, EMF-mediated changes in mitochondrial function may affect cognition and even perpetuate development of neurodegenerative diseases such as **Alzheimer's** and **Parkinson's** in which mitochondrial dysfunction has been demonstrated. In fact, induced disruption of mitochondria may play a role in many diseases in which mitochondrial collapse implicated, including **psychiatric disorders, autoimmune diseases, migraine headaches, ataxia, stroke, diabetes**, heart disease, neuropathic pain, chronic fatigue syndrome, **fibromyalgia**, and **liver disease** (22, 23).

It has also been proposed that EMFs can interact directly with electrons in DNA, so it is not a stretch that EMFs could interact with the electron transport chain (ETC) in mitochondria (24). This concept is supported by a study where pulsed electromagnetic radiation (EMR) resulted in alterations in the ETC, leading to adverse metabolic changes, cellular hypoxia, and increased generation of **oxidative stress** inducing free radicals such as the superoxide anion (25).

## Electrosmog and Cancer

Although the undoubtedly industry-influenced mainstream consensus is that EMFs do not play a role in the development of **childhood cancers**, “Kheifets and Shimkhada [2005] stated that epidemiologic studies on ELF-EMFs and childhood leukemia are difficult to design, conduct, and interpret due to the fact that ELF-EMFs are imperceptible, ubiquitous, have multiple sources, and can vary greatly over time and short distances” (26). Also, in an animal study, a correlation between ELF-EMF radiation and development of malignant tumors specifically gliomas and schwannomas of the heart, was discovered (26).

These findings led the American Academy of Pediatrics (AAP) to revise their criteria for EMF exposure for children, and include recommendations such as using hands-free and wired headsets, holding the phone away from the head, limiting television watching, and texting when possible (13). Currently, a 14-country study called MOBI-Kids is being conducted to examine the **carcinogenic** effects of RF-EMFs from mobile telephones on the central nervous system in children and adolescents (27).

Further upstream, electrosmog has also been shown to induce DNA strand breakages, such that “Any extensive damage or changes to DNA that need repair may increase the risk of developing cancerous cells” (13). Studies also suggest that electrosmog causes genome-wide alterations in methylation (28), or the attachment of one-carbon tags to DNA sequences which modulate gene expression, affecting everything



neurotransmitter production to detoxification.

## Mitigating Electromog Exposure

Although more data is needed, the science warrants exercising the precautionary principle and taking steps to minimize EMF exposure. To remediate electromog, renowned doctor Dietrich Klinghardt recommends removing cordless phones from the house, turning off WiFi, switching off fuses at night, considering an EMF-reducing sleep sanctuary or canopy, and grounding.

Moreover, fundamental to neutralizing the toxic effects of electromog is spending time in nature and **grounding** in order to scavenge free radicals and engender antioxidant effects. Direct contact with surface of the earth precipitates an influx of electrons, which are absorbed and distributed throughout ground substance of extracellular tissue as well as intracellular biopolymers, neutralizing oxidative stress in the body (29).

Studies have elucidated that grounding decreases the voltage imposed on the body by a factor of seven upon exposure to alternating current (AC) electric potential (30). This transfer of electrons that occurs as a result of grounding, therefore, can minimize electromog-induced derangements in the electrical activity of our bodies, which is meaningful since researchers state that, “There is no question that the body reacts to the presence of environmental electric fields” (30).

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