

## Reduce Your EMF Exposure

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✓ Fact Checked

### STORY AT-A-GLANCE

- › Exposure to microwave radiation from baby monitors, cellphones, cordless phones, Wi-Fi routers, smart meters and other wireless devices causes serious mitochondrial dysfunction due to free radical damage
- › Excessive free radicals triggered by microwave exposure from wireless technologies have been linked to anxiety, Alzheimer's disease, autism, cardiac arrhythmias, depression and infertility
- › The negative effects of EMFs are particularly harmful to pregnant women, putting their child at risk for ADHD and autism, as well as behavioral, emotional and social issues
- › In addition to using wired connections for your phone and computer, strategies that may help reduce the harmful effects of EMFs include optimizing your magnesium level and eating Nrf2-boosting foods

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The negative effects of electromagnetic fields (EMFs) continue to ignite conversations and controversy worldwide. The most dangerous pollution affecting you is the invisible sea of EMFs your body swims in daily. You are exposed to EMFs all day long, not only in public but inside your home, too. Most of the radiation emits from cellphones, cell towers, computers, smart meters and Wi-Fi, to name just a few of the culprits.

While it's nearly impossible to avoid EMF exposure completely, there are practical ways to limit it. Given the number of EMFs that bombard you all day long, getting educated about the negative effects of EMFs is imperative to your well-being. Particularly if you are dealing with a serious illness, it is well worth your time to reduce your EMF exposure as much as possible. If you have been told EMFs are safe and not a danger to humans, you may want to consider:

- The telecommunication industry has manipulated federal regulatory agencies, public health authorities and professionals through powerful and sophisticated lobbying efforts leaving consumers confused and unaware of the health risks associated with EMFs.
- Any negative health effects from EMFs, similar to smoking, may not be immediately noticeable, but will likely develop gradually over time. Cell phones indeed are the cigarette public health threat of the 21st century.

## **What Are EMFs?**

According to the National Institute of Environmental Health Sciences, EMFs are "invisible areas of energy, often referred to as radiation, that are associated with the use of electrical power."<sup>1</sup>

Most agree on the hazards associated with ionizing radiation, which is why the dental hygienist covers you with a lead apron when taking X-rays. Similarly, you would expect to get sunburned if your bare skin is overexposed to the sun's powerful UV rays. Ionizing radiation is generally believed to have enough energy to break the covalent bonds in DNA but actually most of the damage is due to the oxidative stress resulting in excessive free radicals.

The type of EMF your cellphone emits is in the microwave 2 to 5 gigahertz range. Besides your cellphone, electronics such as baby monitors, Bluetooth devices, cordless phones, smart thermostats and Wi-Fi routers consistently emit microwave radiation at levels that may damage your mitochondria.

Interestingly I have reviewed a number of studies that show double and single strand DNA breaks are actually higher when exposed to nonionizing microwave radiation than ionizing radiation. This is believed to be due to the excessive oxidative stress that microwave exposure induces.

## **Intracellular Calcium Increases With Exposure to EMFs**

Martin Pall, Ph.D., Professor Emeritus of biochemistry and basic medical sciences at Washington State University, has identified and published several papers describing the molecular mechanisms of how EMFs from cellphones and wireless technologies damage humans, animals and plants.<sup>2,3,4,5,6</sup> Many studies indicate your intracellular calcium increases with exposure to EMFs.

Pall also discovered a number of studies showing that you can block or greatly reduce the effects of EMFs using calcium channel blockers – medication commonly prescribed to patients with heart disease. Notably, it is the excess calcium in the cell and increased calcium signaling that are responsible for a vast majority of the biological effects of EMFs.

Pall discovered no less than 26 bodies of research asserting that EMFs work by activating voltage-gated calcium channels (VGCCs), which are located in the outer membrane of your cells. Once activated, they allow a tremendous influx of calcium into the cell – about 1 million calcium ions per second per VGCC.

When there's excess calcium in the cell, it increases levels of both nitric oxide (NO) and superoxide. While NO has many beneficial health effects, massively excessive amounts of it react with superoxide, forming peroxynitrite, which is an extremely potent oxidant stressor.

Peroxyntrites, in turn, break down to form reactive free radicals, both reactive nitrogen species and reactive oxygen species, including hydroxyl radicals, carbonate radicals and NO<sub>2</sub> radicals – all three of which do damage. Peroxyntrites also do their own damage.

All this to say EMFs are not having a thermal influence; they are not "cooking" your cells as some suggest. Rather, EMF radiation activates the VGCCs in the outer cell membrane, triggering a chain reaction of devastating events that, ultimately:

- Decimates your mitochondrial function, cell membranes and cellular proteins
- Causes severe cellular damage
- Results in DNA breaks
- Dramatically accelerates your aging process
- Puts you at higher risk for chronic disease

## **Peroxynitrites, Cellphones and Spikes in Chronic Disease**

Once formed, peroxynitrite reacts relatively slowly with biological molecules, making it a selective oxidant. Inside your body, peroxynitrites modify tyrosine molecules in proteins to create a new substance, nitrotyrosine and nitration of a structural protein.<sup>7</sup> These changes from nitration are visible in human biopsy of ALS, atherosclerosis, inflammatory bowel disease, myocardial ischemia and septic lung disease.<sup>8</sup>

Significant oxidative stress from peroxynitrites may also result in single-strand breaks of DNA.<sup>9</sup> This pathway of oxidative destruction triggered by low-frequency radiation emitted from mobile devices may partially explain the unprecedented growth rate of chronic disease since 1990.<sup>10</sup> This, truly, is a far greater concern than brain tumors, when it comes to the hazards of cellphones.

Once you understand cellphones can contribute to these chronic diseases – not just brain tumors – you may be more motivated to limit your exposure. Although the top health threats continue to be cardiovascular disease, cancer and infections, the rates of increase noted for the following diseases and disorders is astounding. Some of them were not even public knowledge prior to 1980.<sup>11</sup>

**Disease or disorder**

**Increase since 1990**

<b>Disease or disorder</b>	<b>Increase since 1990</b>
ADHD	819%
Alzheimer's disease	299%
Autism	2,094%
Bipolar disease in youth	10,833%
Celiac disease	1,111%
Chronic fatigue syndrome	11,027%
Depression	280%
Diabetes	305%
Fibromyalgia	7,727%
Hypothyroidism	702%
Lupus	787%
Osteoarthritis	449%
Sleep apnea	430%

## **Are You Affected by One of These EMF-Related Health Problems?**

Since biological damage from EMFs is triggered by activation of your VGCCs, it stands to reason that tissues with the highest densities of VGCCs are at greater risk of harm.

Your body tissues with the highest concentration of VGCCs (and most susceptible to damage from EMFs) include your:

- Brain
- Testes (for men)
- Nervous system
- Pacemaker of your heart resulting in arrhythmias
- Retina

When VGCCs are activated in your brain, they release neurotransmitters and neuroendocrine hormones. Elevated VGCC activity in certain parts of your brain has been shown to produce a variety of neuropsychiatric effects. Among the most common consequences of chronic EMF exposure to your brain are:<sup>12</sup>

- Alzheimer's
- Anxiety
- Autism – One of my longtime mentors, Dr. Dietrich Klinghardt, has linked autism in children to excessive EMF exposure during pregnancy
- Depression

While EMFs may not be the sole cause of heart problems, it is very likely a significant factor and one worthy of further investigation, especially if you are taking a heart medication. The most common heart issues that have been tied to EMF exposure include:

- Atrial fibrillation / atrial flutter
- Bradycardia (slow heartbeat)
- Cardiac arrhythmias (associated with sudden cardiac death)
- Heart palpitations
- Tachycardia (fast heartbeat)

## **EMFs Negatively Affect Reproduction**

If you are a man, EMF exposure can increase your risk of infertility, especially if you routinely carry your cellphone in a pants pocket near your groin and/or use your laptop on your lap. Studies have linked low-level electromagnetic radiation exposure from cellphones to an 8% reduction in sperm motility and a 9% reduction in sperm viability.<sup>13,14</sup>

Besides those associated with reproduction, you have a number of other sensitive organs in that general area, including your bladder, colon, kidneys and liver, all of which are susceptible to damage from radiation.

If you are a woman, your risk of breast cancer is higher if you regularly carry your cellphone in your bra. Generally, the most common location for breast cancer is the upper, outer quadrant. When the cancer is located in the upper, inner quadrant, however, it's more likely to be related to cellphone radiation (if you've been carrying your phone in your bra).

## **Ways to Reduce Your EMF Exposure**

Below are some tips to reduce your EMF exposure:

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Connect your desktop computer to the internet via a wired connection and be sure to put your desktop in airplane mode. Also avoid wireless keyboards, trackballs, mice, game systems, printers and house phones. Opt for the wired versions.

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If you must use Wi-Fi, shut it off when not in use, especially at night when you are sleeping. Ideally it is best to work toward hardwiring your house so you can turn off the Wi-Fi at all times. If you have a notebook without any Ethernet ports it is easy to purchase a USB Ethernet adapter that will allow you to connect to the internet without a wireless connection.

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Shut off the electricity to your bedroom at night. This typically works to reduce electrical fields from the wires in your wall unless there is an adjoining room next to

your bedroom. If that is the case you will need to use a meter to determine if you also need to turn off power in the adjacent room.

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Use a battery-powered clock, ideally one without any light. I use a talking clock that I merely press a button to determine the time and never see any light at night.

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If you still use a microwave oven, consider replacing it with a steam convection oven, which will heat your food as quickly and far more safely. Next to induction stovetop burners, microwave ovens are likely the largest EMF polluters in your home.

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Avoid using “smart” appliances and thermostats that depend on wireless signaling. This would include all new “smart” TVs. They are called smart because they emit a Wi-Fi signal and, unlike your computer, you are unable to shut the Wi-Fi signal off. Consider using a large computer monitor as your TV, as they don’t emit Wi-Fi.

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Refuse smart meters as long as you can or add a shield to an existing smart meter, some of which have been shown to reduce radiation by 98 to 99%<sup>15</sup>

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Considering moving your baby's bed into your room instead of using a baby monitor, or use a hard-wired monitor. In any case avoid any baby monitor that is wireless. There are some wired options available.

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Replace CFL bulbs with incandescent bulbs. Ideally remove all fluorescent lights from your house. Not only do they emit unhealthy light, but more importantly they will actually transfer current to your body just being close to the bulbs.

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Avoid carrying your cellphone on your body unless it is in airplane mode and never sleep with it in your bedroom unless it is in airplane mode (and especially not under your pillow). Even in airplane mode it can emit signals, which is why I put my phone in a Faraday bag.

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When using your cellphone, use the speaker phone and hold the phone at least 3 feet away from you. Seek to radically decrease your time on the cellphone. I probably am



down to below 30 minutes a month on my cell, mostly when traveling. Instead use VoIP software phones that you can use while connected to the internet via a wired connection.

While you may think the majority of your radiation exposure comes from outside your home, most of it is very likely coming from the items inside your home and the homes of your closest neighbors. Due to their proximity, particularly if you live in an apartment or condo, it may be worth your time to educate your neighbors about the dangers of wireless technology, including cordless phones, smart meters and Wi-Fi.

## **Certain Nutrients May Help Protect Your Body From EMF Damage**

While making changes to your physical environment is of the utmost importance, there are a few nutritional interventions you can consider to help protect your body from EMFs. My recommendations include:

- **Magnesium** — As a natural calcium channel blocker, magnesium can help reduce the effects of EMF on your VGCCs. Since many are deficient in magnesium, I believe you could benefit from as much as 1 to 2 grams of magnesium per day.
- **Molecular hydrogen** — Studies have shown molecular hydrogen can mitigate about 80% of the damage caused by EMFs because it targets the free radicals produced in response to radiation, such as peroxy nitrates. You can take molecular hydrogen tablets when flying to protect you from gamma rays. It is one of several tips I shared on how to minimize jet lag.
- **Nrf2** — Increasing Nrf2, which is a biological hormetic that upregulates superoxide dismutase, catalase and all the other beneficial intercellular antioxidants, is also helpful mainly because it lowers inflammation, improves your mitochondrial function and stimulates mitochondrial biogenesis, among other benefits.

You can activate Nrf2 by consuming Nrf2-boosting food compounds such as sulforaphane from cruciferous vegetables, foods high in phenolic antioxidants, the

long-chained omega-3 fats DHA and EPA, carotenoids (especially lycopene), sulfur compounds from allium vegetables, isothiocyanates from the cabbage group and terpenoid-rich foods.

Performing high-intensity exercises that activate the NO signaling pathway, such as the NO dump exercise, activates Nrf2, and so does intermittent fasting.

- **Spices** — Certain spices may help prevent or repair damage from peroxynitrites. Spices rich in phenolics, specifically cinnamon, cloves, ginger root, rosemary and turmeric, have exhibited some protective effects against peroxynitrite-induced damage.<sup>16</sup>

## **Children at Greater Risk Than Adults From EMFs**

Sadly, most of our youth have widely adopted the wireless revolution and it is your responsibility to teach your children these dangers. Many kids have cellphones and wireless tablets before the age of 5 and many children sleep with their phones on or under their pillows. This is exposing them to a far more serious health threat than their grandparents had when they were smoking as adolescents.

The opportunity to experience greater mitochondrial damage over time is exponentially greater for children than it is for adults. Many kids today are growing up completely enveloped in technology. They carry cellphones at younger and younger ages, use computers and tablets beginning in the early school years and play internet-based video games, to name just a few of their EMF-related activities.

Depending on the habits of their parents, especially their mothers, many children were exposed to EMFs even before they were born. Particularly as it relates to cellphone use, EMF radiation penetration is deeper in kids than adults since their skulls are thinner.

Regarding the use of cellphones within the pediatric population, Ronald L. Melnick, scientific adviser for the Environmental Health Trust, said, "The penetration of the cellphone radiation into the brain of a child is deeper and greater. Also, the developing nervous system of a child is potentially more susceptible to a damaging agent."<sup>17</sup>

California's Environmental Health Investigations guidelines concur, saying: "EMFs can pass deeper into a child's brain than an adult's. The brain is still developing through the teen years, which may make children and teens more sensitive to EMF exposure."<sup>18</sup> It's important to take precautions now to protect your children, especially because the damage done by EMF radiation can take years, and sometimes decades, to develop.

While there is no reliable way to predict the long-term effects on children, one study, involving more than 13,000 mothers, revealed some sobering potential effects. Upon viewing these statistics, I hope you will take steps today to reduce your EMF exposure, both for the health of your child and your own well-being. As compared to children born of mothers who did not use cellphones during pregnancy, children born of mothers who did experienced a:<sup>19</sup>

- 49% increase in behavioral problems
- 35% increase in hyperactivity
- 34% increase in peer-related problems
- 25% increase in emotional issues

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