The Real Dangers of Electronic Devices and EMFs

Story at-a-glance

- Exposure to microwave radiation from cellphones, routers, cordless phones, smart meters, baby monitors and other wireless devices causes massive mitochondrial dysfunction due to free radical damage
- Excessive free radicals triggered by low-frequency microwave exposure from wireless technologies have been linked to cardiac arrhythmias, anxiety, depression, autism, Alzheimer's, infertility and more
- In addition to remediating obvious EMF exposures, strategies that may help reduce the harmful effects of EMFs include optimizing your magnesium level, eating Nrf2-boosting foods and pulsing molecular hydrogen

By Dr. Mercola

I was recently interviewed by Dave Asprey when I visited his Bulletproof lab on Vancouver Island.[1] In it, I review the real dangers of electromagnetic fields (EMFs) emitted by electronic devices. I will also do a more comprehensive lecture on this topic at Asprey's Bulletproof Conference October 13 through 15 at the Pasadena Convention Center in Pasadena, California.

Avoiding excessive EMF exposure is an important component of optimizing mitochondrial health. In fact, this is going to be the topic of my next book. Like my latest best-seller, "Fat for Fuel," which details my metabolic mitochondrial therapy program, I want the book on EMFs to be peer-reviewed by the leading scientists and researchers in the world who understand the truth and are free of industry corruption.

The key is to translate the science into clear and understandable language, and offer practical recommendations on how to remediate the problem. After all, we are swimming in an invisible ocean of EMFs just about everywhere you go these days. It's near-impossible to avoid microwave exposure completely, but there are ways to reduced it, for sure.

Your Cellphone Is a Major Source of EMF Exposure

As noted by Asprey, his studio is hard-wired, and that's one simple way to reduce exposure from Wi-Fi. You can also shut your Wi-Fi down whenever you're not using it, and certainly at night when you're sleeping. When using your cellphone, use the speaker phone and hold the phone 3 feet away from you, using a selfie stick. I've measured the radiation and you decrease your exposure by about 90 percent this way.

When not in use, make sure your cellphone is in airplane mode and/or keep it in a Faraday bag. These are just a few quick examples of how you can protect your health while still living in modern society. I have carefully measured the radiation coming from my phone and even when it is on and not calling someone the radiation doesn't come down to safe ranges until I am 25 feet away, which is why I keep my phone in airplane mode most of the time and only use it for emergencies or when I am traveling.

It took me awhile to figure this out. I got rid of all the wireless devices and Wi-Fi

in my house, yet the EMFs were still high. Then I finally realized that it was my phone (while on) that caused it. My levels dropped below 0.01 volts/meter once I put it in airplane mode. This is a key point. For nearly everyone reading this, the majority of the radiation you're exposed to is not coming from the outside into your home; it's coming from the items in your home.

Nonthermal Damage

Most of the radiation we're exposed to today is microwave radiation, which does include radiation from your microwave oven. If you still have one, I recommend replacing it with a steam convection oven, which will heat your food just as quickly but far more safely. When you turn that microwave oven on, it will expose you to very dangerous microwave radiation at levels that are far in excess of your cellphone. We're not talking about thermal (heat) damage here. We're talking about nonthermal damage.

I recently interviewed Martin Pall, Ph.D., who has identified and published several papers describing the molecular mechanisms of how EMFs from cellphones and wireless technologies damage plants, animals and humans.[2,3,4,5] Many studies have shown that when you're exposed to EMFs, intracellular calcium increases. 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.

This turns out to be a crucial point, because it's the excess calcium in the cell and the increased calcium signaling that are responsible for a vast majority of the biological effects of EMFs.

Pall has discovered no less than 26 papers showing 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.

Importantly, the cellular membrane is 7 million times more sensitive to EMFs than the charged particles inside and outside of the cells, which are what safety standards are based on. In other words, the safety standards are off by a factor of 7 million!

A Chain Reaction of Harm

The Importance of Mitochondrial Health

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 NO reacts with superoxide, forming peroxynitrite, which is an extremely potent oxidant stressor.

Peroxynitrites, in turn, break down to form reactive free radicals, both reactive nitrogen species and reactive oxygen species (ROS), including hydroxyl radicals, carbonate radicals and NO2 radicals — all three of which do damage. Peroxynitrites also do damage all on their own.

So, EMFs are not "cooking" your cells. It's not a thermal influence. Rather, the radiation activates the VGCCs in the outer cell membrane, which triggers a

chain reaction of devastating events that, ultimately, decimates your mitochondrial function and causes severe cellular damage and DNA breaks. It also decimates your cell membranes and cellular proteins. In a nutshell, it dramatically accelerates the aging process.

Common EMF-Related Health Problems

As noted by Asprey, he used to keep his cellphone in a pants pocket on his right leg. He now has 10 percent less bone density in his right femur, which he believes is related to carrying his cellphone there. Needless to say, he no longer carries his phone on his body. Now, since the biological damage is triggered by activation of your VGCCs, it stands to reason that tissues with the highest densities of VGCCs will be more prone to harm.

So, which tissues have the highest concentration of VGCC's? Your brain, the pacemaker of your heart, your nervous system, retina and male testes. Indeed, studies dating back to the 1950s and '60s show the nervous system is the organ that is most sensitive to EMFs. Some of these studies show massive changes in the structure of neurons, including cell death and synaptic dysfunction.

When the VGCCs are activated in the brain they release neurotransmitters and neuroendocrine hormones, and elevated VGCC activity in certain parts of the brain has been shown to produce a variety of neuropsychiatric effects. Among the most common consequences of chronic EMF exposure to the brain are: [6]

- Anxiety
- Depression
- Autism
- Alzheimer's

Common heart problems linked to EMF exposure include:

- Cardiac arrhythmias (associated with sudden cardiac death)
- Atrial fibrillation / atrial flutter
- Premature atrial contractions (PACs) and premature ventricular contractions (PVCs), also known as heart palpitations
- Tachycardia (fast heartbeat) and brachycardia (slow heartbeat)

Many who suffer these conditions are on dangerous drugs. If you have any kind of heart or brain-related condition, you really need to take EMF exposure seriously, and take steps to remediate it. There's simply no question about it — EMF exposure can trigger these and many other conditions. The drug is not treating the cause of the problem, and if you truly want to get well, you need to address the causes. EMFs may not be the sole contributor, but it's a significant one that should not be overlooked.

Reproductive Effects and Cancer

EMF exposure may also increase a man's risk for infertility if he wears his cellphones near his groin and/or uses a laptop on his lap, and a woman's risk for breast cancer is higher if she tucks her cellphone in her bra. Studies have linked low-level electromagnetic radiation (EMR) exposure from cellphones to

an 8 percent reduction in sperm motility and a 9 percent reduction in sperm viability.[7,8]

Wi-Fi equipped laptop computers have also been linked to decreased sperm motility and an increase in sperm DNA fragmentation after just four hours of use.[9] In regard to breast cancer, the most common location for breast cancer is the upper, outer quadrant. When the cancer is located in the upper, inner quadrant, it's more likely to be related to cellphone radiation (if you've been carrying your phone in your bra).

How to Lower Your Exposure

The first step to lower your exposure would be to identify the most significant sources. Your cellphone is a major source of exposure, as are cordless phones, Wi-Fi routers, Bluetooth headsets and other Bluetooth-equipped items, wireless mice, keyboards, smart thermostats, baby monitors, smart meters and the microwave in your kitchen. Ideally, address each source and determine how you can best limit their use. For example, remedial interventions could include:

Swapping a wireless baby monitor for a hardwired one
Carrying your cellphone in a bag instead of on your body, and keeping it in airplane mode and/or in a Faraday (shielded) bag or case when not on a call
Turning off your Wi-Fi at night. Even better, don't use Wi-Fi and switch to wired Ethernet
Using your laptop on a table rather than your lap
Using your cellphone with a headset or on speaker phone, and keeping the phone as far away from your body as possible using a selfie stick. Ideally, use landlines whenever possible
Hardwiring as many devices as possible to avoid Wi-Fi fields. This includes mice, keyboards and printers. Avoid Ethernet over power (EOP), however, as this strategy increases the variability in your power lines, causing dirty electricity. You can partially remediate this with capacitors or filters, but it's not an ideal solution. EOP is better than Wi-Fi, but not as good as running an Ethernet cable

Installing a Faraday cage (copper- and/or silver-threaded fabric) around your bed. If you live in a high-rise and have neighbors beneath you, place the Faraday fabric on the floor beneath your bed as well. This may significantly improve your sleep quality, as EMFs are known to disrupt sleep

If you have a smart meter, take steps to have it removed and replaced with an old analog meter. If your area is planning on installing them, be proactive in preventing its installation. For more information about this and guidance on how to go about preventing smart meter installation or getting it reversed, see "InPower: A Mass Action of Liability"

To identify EMF sources you might not have considered, it would be a worthwhile investment to buy a microwave meter. The Cornet ED88T[10] is likely the best low cost meter out there, but their manual is terrible so you need to watch this video by Lloyd Burrell to learn how to use it.

When I travel, I'll check the room in which I'm staying to determine the best side of the bed to sleep on. I've found there can be a tenfold difference between one side of the bed and the other. The Trifield meter is quite popular, but it's important to realize that Trifield meters only measure magnetic fields, not microwave radiation.

EMF Meter Review - Cornet ED88T

Nutritional Intervention

Nutritional intervention can also help reduce the harmful effects of EMFs. It's not a permanent solution you can use in lieu of remediation, but it can be helpful while you're implementing more permanent solutions. The first is magnesium, as magnesium is a natural calcium channel blocker. Many are deficient in magnesium to start with, and I believe many may benefit from as much as 1 to 2 grams of magnesium per day.

Increasing Nrf2 is also helpful. NRf2 is a biological hormetic that upregulates superoxide dismutase, catalase and all the other beneficial intercellular antioxidants. It also:

- Lowers inflammation
- Improves mitochondrial function
- Stimulates mitochondrial biogenesis
- Helps detoxify the body from xenobiotics, carbon-containing toxicants and toxic metals
- Activates the transcription of over 500 genes in the human genome, most of which have cytoprotective functions. This includes the three genes that encode enzymes required for synthesis of reduced glutathione, which is one of the most important antioxidants produced in your body

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 allum vegetables, isothiocyanates from the cabbage group and terpenoid-rich foods
- High-intensity exercises that activate the NO signaling pathway, such as the NO dump exercise
- Calorie restriction (such as intermittent fasting)

The Benefits of Molecular Hydrogen

Another helpful supplement is molecular hydrogen. Tyler LeBaron's website, molecularhydrogenfoundation.org,[11] lists several hundred studies relating to hydrogen. You can also find a number of his lectures on YouTube. In summary, molecular hydrogen consists of two atoms of hydrogen, the smallest molecule in the universe, which:

- Is a neutral molecule that can defuse across any cell membrane, instantly
- Has no polarity
- Is a potent, selective antioxidant

Free radicals are actually important; they do serve health functions. The problem is excess free radicals, or the wrong ones. Molecular hydrogen has been shown to target free radicals produced in response to radiation, such as peroxynitrites. Studies have shown molecular hydrogen can mitigate about 80 percent of this damage. The take home message is it can be quite valuable when flying, for example, to counteract the damage caused by gamma rays encountered at 35,000 feet.

Your body actually makes hydrogen gas, about 10 liters a day, which benefits your body. However, when you have a steady state of exposure, you don't get the other benefits, so you want to pulse it. That's where you get the benefit. I've taken molecular hydrogen tablets on my last few flights, and it worked great. There are a number of different ways to get it, but the most practical way is to take molecular hydrogen tablets.

Once you're at about 5,000 to 10,000 feet, put the tablet in a small bottle of lukewarm water. Put the cap back on and leave it on while the tablet dissolves to prevent the gas from escaping. Once dissolved, drink it as quickly as possible. The hydrogen gas will continue working for about two hours, so if you're on a longer flight, you may want to do a second dose halfway through.

More Information

To learn more, I highly recommend listening to my interview with Pall, if you missed it. Also consider joining me at the Bulletproof Conference October 13 through 15 in Pasadena, California, where I will deliver a keynote lecture that will go into this topic at greater depth. During one of the breakout sessions I'll also share some of my favorite biohacks.