

## **Connection Between EMF Radiation and Autism**

The **mobile electronic devices** we use daily, such as cell phones, tablets, and laptops emit a form of energy called **Electromagnetic Fields**, or **EMF radiation**.

Current research shows EMF radiation can **cause a wide range of health issues**. These include minimal concerns like headaches and skin rashes to bigger health concerns like DNA fragmentation, cell damage, and fertility problems.

EMF radiation can actually change and damage cells biologically, as well as affect DNA synthesis and replication. You can learn more about which areas of the body are most affected by EMF radiation in this [blog article](#).

Now, **emerging research** is beginning to establish a more **concrete link between EMF radiation** exposure and **Autism**.

In 2011, a [study](#) was conducted by Stanford University on identical twins. It was previously thought that genetics accounted for 90% of Autism risk, but from this study, researchers concluded that genetics account for less than half of the risk with environmental factors accounting for the remaining portion. In an effort to pinpoint which environmental triggers might be causing the disorder, **researchers have focused on EMF radiation emissions**.

A [study](#) conducted by Richard Lathe at the University of Edinburgh hypothesized that neonatal exposure to

microwaves and EMF radiation may **cause a child to be predisposed to Autism**. Lathe studied the timing of the first rise in Autism compared to the spread of domestic microwave devices. **Autism diagnoses** began to noticeably **rise in the early 1980s**, around the same time that microwaves were first introduced into households. By the mid-1980s, it was common for most households to have a microwave. While **correlation does not equate to causation**, Lathe initiated a theory that has opened the door to more research.

As a neurodevelopmental condition, Autism stems from differences in the way the brain was formed as compared to a normal brain.

In 2013, Dr. Marth Herbert and EMF expert Cindy Sage released a [paper](#) that showed symptoms of **Autism matched symptoms of overexposure to EMFs**. These symptoms include immune aberrations, low total and reduced glutathione levels, lower activity of the anti-oxidative stress system, and mitochondrial dysfunction. A common attribute among individuals with Autism is **oxidative stress**, which aligns with well-established research showing low-intensity **EMF radiation exposure** is associated with **oxidative damage**.

Previously, it was believed that extremely low levels of microwave frequency only caused thermal effects, meaning EMF radiation would damage cells through heating them up. Because these levels of frequency were so low, it wasn't thought to be strong enough to have biological effects. However, more and more

research has proven this is *not the case*. EMFs can cause a *range of non-thermal effects*.

Dr. Martin L. Pall, Professor Emeritus of Biochemistry and Basic Medical Sciences at Washington St. University, has extensively studied the non-thermal effects of EMFs. He has found that **voltage-gated calcium channels (VGCCs) are impacted by EMF radiation**.

One of his [articles](#) discusses the downstream effects of the **VGCC activation**. In a presentation given at the AutismOne conference, he focused on the connection between VGCCs and Autism. **EMFs activate VGCCs**, increasing the amount of intercellular calcium. Excess intercellular calcium is **connected to Autism**.

For all of us who don't have a PhD in biochemistry and genetics like Dr. Pall, what this means is that each cell has an opening that allows calcium to enter the cell. EMFs cause these channels to open *more frequently*, thus **increasing the amount of calcium within the cell**.

When there is too much calcium within a cell, it *disrupts the formation of synapses*. Synapses connect neurons in the brain, which allow the brain to perform all of its functions. With *too much intercellular calcium*, the development of brain functioning is impaired due to the lack of proper synaptic connections. VGCCs can be activated even by *very low levels of EMF radiation*.

These levels of EMF radiation are common (and legal!) environment levels that everyone—including the **most**

**vulnerable members of the population** such as pregnant women, babies and growing children—are *exposed to on a daily basis*.

## **Ways to Minimize EMF Radiation Exposure for Your Child In and Out of the Womb**

Though the research connecting EMF radiation exposure and Autism is still developing, there is **clear evidence that EMF radiation exposure can be harmful**, especially to [developing babies and children](#).

EMF radiation exposure reduction while pregnant is just as—if not more—**important to keeping your developing child safe** from electronic device emissions and their associated health effects.

**Children are the most vulnerable to the harmful effects of EMF radiation** because their bodies and tissues are still developing. Their brains are especially susceptible to the adverse effects of EMF radiation because their skulls are thinner than those of adults.

Parents can take **preventative steps to reduce exposure** and increase the overall health of themselves and their children, before and after they are born. Luckily, many of the **steps to reduce EMF radiation exposure are easy** to do!

- **Limit screen time** for both you and your children, and keep electronic devices like cell phones, tablets, and laptops **away from your bodies**, especially when you're not using them

(keep devices at least 4 feet away while sleeping).

- When you are using your phone or other device, **do not place it on your belly, [in your bra](#), or in your pocket.**
- When WiFi or a Cellular signal is not needed, **enable [Airplane Mode](#)** on your device. This action eliminates the wireless emissions from the device, *significantly decreasing total EMF radiation exposure.*
- If you need your mobile devices on hand (or lap!) with WiFi and Cellular signals, make sure to **use an EMF radiation protection shield** for your [cell phone](#), [tablet](#), or [laptop](#), which blocks up to 100% of EMF radiation in the direction of the shield. An [EMF radiation shielding blanket](#) can also help protect your body and unborn child from wireless signals in the environment.
- If possible, **connect to the Internet via an Ethernet cable** instead of using WiFi. If you do need WiFi, **place your WiFi router away** from areas of the house you spend a lot of time in (bedroom, family room, etc.). At night—or even during the day—when you are not using the wireless connection, make sure to **turn it off**. Even when no one is home, WiFi signals can travel to residences within a couple hundred feet. A timer plug-in (like you would use for Christmas lights) can make this a no-brainer!
- Toril Jelter and Cindy Sage created a [protocol](#) to limit the amount of exposure to

children. This includes turning off baby monitors, cordless phone base stations, and WiFi routers at night during sleep hours. They found that 80% of Autistic children they studied on this protocol had a noticeable improvement as little as two weeks.

It is clear that we still have much to learn about the causes of Autism Spectrum Disorder. If there is a possibility that EMF radiation exposure to unborn babies, newborns, and children could be linked to the disorder, then **precautions should be taken to reduce this risk.**

Luckily, there are simple things a current mother or future mother-to-be can do to **limit EMF radiation exposure.**

Let's take a deeper dive into the EMF-Autism connections

**Seven findings that EMF/RFR exposure is associated with autistic behavior:**

- **EMFs alter brain functioning** in some children. EEG readings show abnormal patterns and reduced attention span. (Which happens to EVERYONE not just folks with autism)
- **EMF affects pineal gland function and melatonin production**, a hormone that is essential in regulating sleep/wake cycles and immune system functioning. This may explain why so **many people with autism struggle with insomnia**
- **EMF has an effect on motor control cells** thus affecting coordination skills. Some studies have found EMF effects to be associated with motor dysfunctions.
- **EMF may enhance glutamate toxicity and cause autistic symptoms such as aggressiveness, self-stimulating behavior, seizures, insomnia, anxiety, and depression.**
- EMFs affect the blood-brain barrier (BBB), which allows toxins to enter the brain that would normally be kept out by a healthy BBB. **EMFs have been shown to**

**damage the protective cells** known as microglia, which are **responsible for removing toxins from the brain.**

- **EMFs can affect neurotransmitters** in the brain that control behavior, including serotonin which has been shown to be **low in children with autism.**

It is widely understood that those on the autism spectrum typically experience abnormalities in sensory integration and how they process visual experiences. How visual stimuli is experienced in an autistic individual may vary greatly from a person without autism and lead to uncomfortable symptoms including light sensitivity. We take a comprehensive look at the research and recommendations for sensitivity to light that stems from autism spectrum disorder.

## How Light Sensitivity Affects Those with Autism

With as many as 90-95% of people with autism spectrum disorder having external sensitivities, it is not surprising that exposure to bright light can affect their symptoms. Studies have shown that it may not be as prominent as other sensory problems—notably hearing and touch—but one small study has pegged that more than half of autistic adolescents have visual processing deficits, including sensitivity to light.<sup>2</sup> Other analyses have noted that hypersensitivity to light and photophobia increases with autistic traits as well.<sup>3</sup>

## Why Light Negatively Impacts Autism

With so little direct research on light sensitivity and autism, experts have had a difficult time explaining exactly what causes painful responses to light reported by many with the disorder. However, some hypotheses have emerged.

Researchers have linked autistic individuals with abnormal pupillary light reflex, which refers to how the pupil reacts and adapts to the brightness of various light sources. Photosensitive retinal ganglion cells—which have been implicated in migraine-related light sensitivity—are central in this process, thus suggesting that impairment may similarly affect how autistic persons perceive light.<sup>3</sup>

Interestingly, those with autism have also been found to have physical differences in the structures of their central nervous systems. Furthermore, there is evidence that they also have a lower neurological threshold for environmental stimuli, including light. These physical changes contribute to the many visual and behavioral changes experienced by those on the autism spectrum.<sup>1,3</sup>

Another explanation deals with an overload of the senses. Bright lighting added to an already visually-disorienting environment may provoke strong or painful responses to light. This is further compounded by the intensity of the light, the specific wavelengths and any harsh glare. As a result, the brain becomes confused, hindering one's ability to process light stimuli.<sup>4</sup> Other findings similarly suggest that is not light which is the direct trigger, but instead an added complication that is enhanced by other environmental and emotional stressors.<sup>2</sup>

## *Fluorescent Lighting and Autism*

Certain types of lighting, specifically fluorescent lighting, has been shown to have a particularly negative affect on individuals with autism. Approximately half of autistic individuals experience what is classified as a severe sensitivity to fluorescent lighting. In fact, one small study found that the use of fluorescent lighting increased the repetitive behaviors of children with autism, which may be attributed to a hypersensitivity to fluorescent light flicker.<sup>17</sup> Another small study reported similar results noting that fluorescent lighting increased the frequency of stereotypical repetitive behaviors in autistic children.<sup>8</sup>

## Signs and Symptoms of Autism Light Sensitivity

Sensitivity to light can manifest in different ways for people with autism. For instance, physical symptoms may include:<sup>3</sup>

- *Lower tolerance for light*
- *Discomfort from fluorescents and other artificial light*
- *Light avoidance behaviors (e.g. shielding eyes)*
- *Afterimages*
- *Visual snow*
- *Headaches or migraines triggered by light*<sup>5,6</sup>

Other signs may include repetitive behaviors (stereotypical of autism) as well as poor eye contact or eye movement. Increased anxiety is also reported autism-related sensory deficits; this is reinforced by broader clinical studies showing that light exposure can be a prominent source of anxiety in sensitive individuals—you can read more about this connection [here](#). What is worse is that these types of sensory disruptions can lead to social problems and worsening educational outcomes, at least for school-aged autistics.<sup>2</sup>

## How to Reduce Light Sensitivity from Autism

Broad recommendations for [reducing light sensitivity](#) may include things like:

- **Minimizing exposure to fluorescent lighting and replacing it with indirect natural or incandescent lighting**
- **Maintaining rooms with dim lights**
- **Wearing a hat with a visor when fluorescent lights cannot be avoided**
- **Reducing other visual clutter and environmental stressors**

Some people may find relief with the use of tinted glasses like TheraSpecs, which uses a precision tint that is associated with lower incidences of light sensitivity in people with migraine or sensory dysfunction. This includes some anecdotal support among people specifically with autism-related light issues. In addition, TheraSpecs have been shown to reduce sensitivities due to fluorescent lighting by filtering out blue wavelengths as well as the invisible pulsing that is part of its core functioning—this can reduce the likelihood of it triggering pain and other symptoms.

## EMF Dangers and Autism

### Autism and the MMR Vaccine Study: An integrative point of view

<http://www.drsinatra.com/autism-and-mmr-vaccines-from-dr-stephen-sinatra>

Autism is a growing problem in the US. Forty years, ago, about 1 in 10,000 children was diagnosed with autism. Now the incidence is up to 1 in 63 among boys.

Some parents believe their children developed autism after receiving a dose of the MMR (measles-mumps-rubella [German measles]) vaccine. The vaccine controversy began after a 1998 article that appeared in the British journal *Lancet*. That journal published a retraction of the original article last year. Now, on January 5, 2011, the *British Medical Journal* published a report saying that the original 1998 article was “an elaborate hoax.”



I believe there is a real connection between vaccines and autism. But saying that vaccines are the sole cause of autism is like saying cholesterol is the sole cause of heart disease. It simply isn't true. So what's been causing the shocking increase in autism over the past 40 years?

**Autism is a form of brain damage.** And the list of things that can damage delicate brain tissue is long and broad. Mothers-to-be are already warned about the **toxic dangers of alcohol** and **tobacco**. But **heavy metals, pesticides, and plastics also disrupt the growing brain**.

The real cause of the increase though, is that all these chemicals now have an easier time getting into a **baby's brain where they can cause damage**. Our brains are protected by what's called the "**blood-brain barrier**." This barrier allows nutrients to pass into the brain, and wastes to pass out, while keeping toxic elements out (pathogens, etc.). But **exposure to wireless radiation makes the blood-brain barrier more permeable**, so more toxins can get in.

Whether in the **womb or after birth**, an infant is especially susceptible to the effects of **electromagnetic radiation: from cell phones and microwaves, from wi-fi and computer screens**. Here are some [images of a brain scan](#), showing the difference with age.

So here's my take on vaccines and autism:

Modern children are exposed to more toxins than their growing bodies can handle. Any of those toxins could be the one that sends them over their personal limit, and causes changes such as autism. So it's no wonder that, yes, some children do begin to show signs of autism after receiving a vaccination. It's also no wonder that large-scale studies don't show an association between vaccines and the condition: There are so many triggers that the vaccines sort of get lost in the crowd.

## My Advice to Parents

If you have a young child, and you're wondering whether to have them receive the standard childhood vaccines, I'd say to examine your child's whole environment. Do you have wi-fi or cordless phones in your home? Do you live near a cell phone tower? Did the mother eat lots of canned tuna during her pregnancy? If your child is being subjected to an overall toxic lifestyle (I know no parent wants to believe that's the case, but it may be happening unwittingly), then you should be concerned about the effects of a vaccine.

You can start by detoxifying your home and your family's diet. Here are some places to start.

- Switch from wi-fi to an Ethernet home computer setup.
- Limit your use of cleaning chemicals and pesticides/herbicides in and around your home.
- Switch from disposable plastic water bottles to a glass or stainless steel reusable water bottle.
- Reduce the amount of large fish in your child's diet (tuna salad, for example).

Once you clean up your child's life (and yours, too as a side benefit) you can be much less concerned about the effects of childhood vaccinations.

And what about that bogus study? It doesn't concern me one bit. As I said, vaccines aren't the sole cause of autism. The increase in autism is very real, and vaccines are just one piece of the puzzle.

### **Abstract**

**There is increasing evidence that wireless transmissions have biological effects, some of which are harmful, at levels that may be orders of magnitude below present safety guidelines. These guidelines were drawn up on the assumption that the radiation could only damage living tissues if it generated significant heat. It has since been shown that radiation at much lower levels has direct electrical effects. These are mainly on electrically charged cell membranes, where the low frequency pulses from the modulated microwaves make them vibrate and leak. This can give rise to many "modern illnesses" ranging from electromagnetic hypersensitivity to cancer and disorders of the immune system. [The most dramatic increase in the incidence of autism due to damage to the developing brains of the fetus and young children.](#) Modulated microwaves, such as those from cell phones, portable phones, WiFi, baby monitors and wireless smart meters are sources of potentially damaging radiation. The strength of the radiation appears to be less important than the duration and pattern of the exposure, with intermittent and repeated exposure being the most damaging. The strong regular transmissions from wireless smart meters are particularly harmful and more likely to lead to DNA damage, cancer and autism.**

### **Sub-thermal effects of electromagnetic radiation.**

There are thousands of scientific papers showing biological effects of non-ionizing electromagnetic radiation occurring well below the levels at which they can generate significant heat. Many of these have been reviewed at by expert scientist at [www.bioinitiative.org](http://www.bioinitiative.org) and <http://www.neilcherry.com/documents.php> . They include harmful effects such as damage to DNA in living cells that can lead to cancer, loss of fertility, brain damage due to the disruption of the blood-brain barrier and neuronal hyperactivity leading to autism in children. Many of these effects can be attributed to the loss of structurally important calcium from cell membranes, which makes them leak. This can disrupt normal metabolism and also release DNase (which destroys DNA) from the internal structures (lysosomes) that normally recycle waste into the rest of the cell [http://www.hese-project.org/hese-uk/en/papers/cell\\_phone\\_and\\_cell.pdf](http://www.hese-project.org/hese-uk/en/papers/cell_phone_and_cell.pdf) .

### **Prolonged and intermittent radiation causes more damage**

The duration of the radiation seems to be more important than its strength, with the effects being cumulative as more and more cells are damaged. Interestingly, DNA damage from [cell phone radiation](#) is greater when the exposure is intermittent (5 minutes on, 10 minutes off) than when continuous (Diem et al 2005). This may be because the cells are constantly adapting and using energy to defend themselves; they drop their guard during the off period and are caught unawares when it goes on again. This constant switching uses more energy, which eventually leaves the cells less able to counteract the effects of the radiation.

Diem et al. (2005) also found that the effect on DNA damage was still greater if the microwaves were pulsed or modulated to carry information (modulation involves sudden stops and starts of the signal, which are even more damaging).

Smart meters, which operate 24/7 and radiate modulated microwaves intermittently, can therefore be expected to be particularly harmful to DNA.

## **Microwave radiation causes cancer**

There is already evidence that heavy cell phone users are more prone to brain cancers. This has resulted in cell phones now being rated by the World Health Organisation as class 2B carcinogens. This rating may later be increased, since brain tumours normally take decades to develop and few people have been regularly using a cell phone for more than a single decade. Particularly worrying is the finding by Hardell and Carlberg (2009 ) that young people were about 5-times more likely to get brain cancer both from cordless and cell phones if they began using them before the age of 20. The regular transmissions from wireless smart meters can be expected to have much the same effect, with younger people being more at risk. This is possibly because their brain structure is still growing and developing and therefore more susceptible to damage leading to cancer.

## **The effect of microwaves on autism is far worse**

The greatest damage from microwaves is when the brain is first developing in the fetus and the very young child, when [it can lead to autism](#). Dr Dietrich Klinghardt has recently shown the relationship between microwaves and autism; a summary of his work can be found at <http://electromagnetichealth.org/media-stories/#Autism> .

## **What is autism?**

Autism is in fact a group of life-long disorders (autistic spectrum disorders or ASD) caused by brain malfunctions and is associated with subtle changes in brain anatomy (see Amaral *et al.* 2008 for a review). The core symptoms are an inability to communicate adequately with others and include abnormal social behaviour, poor verbal and non-verbal communication, unusual and restricted interests, and persistent repetitive behaviour. There are also non-core symptoms, such as an increased risk of epileptic seizures, anxiety and mood disorders. ASD has a strong genetic component, occurs predominantly in males and tends to run in families.

## **Genetic ASD may be caused by calcium entering neurons**

It has been hypothesised that some genetic forms of ASD can be accounted for by known mutations in the genes for ion channels that result in an increased background concentration of calcium in neurons. This would be expected to lead to neuronal hyperactivity, the formation of sometimes unnecessary and inappropriate synapses, which in turn can lead to ASD (Krey and Dolmetsch 2007).

## **Electromagnetic fields let calcium into neurons too**

There has been a 60-fold increase in ASD in recent years, which cannot be accounted for by improvements in diagnostic methods and can only be explained by changes in the environment. This increase corresponds in time to the proliferation of mobile telecommunications, WiFi, and microwave ovens as well as extremely low frequency fields (ELF) from mains wiring and domestic appliances. We can now explain this in terms of electromagnetically-induced membrane leakage leading to brain hyperactivity and abnormal brain development.

## **Non-ionising radiation makes cell membranes leak**

The first effect of non-ionising electromagnetic radiation is to generate small alternating voltages across the cell membranes, which destabilize them and make them leak. This can have all sorts of consequences as unwanted substances diffuse into and out of cells unhindered, and materials in different parts of the cell that are normally kept separate, become mixed.

## Why weak fields are more damaging than strong ones

We have known since the work of Suzanne Bawin and her co-workers (Bawin *et al.* 1975) that modulated radio-frequency [electromagnetic radiation](#) that is far too weak to cause significant heating can nevertheless remove calcium ions (positively charged calcium atoms) from cell membranes in the brain. Later, Carl Blackman showed that this also occurs with extremely low frequency electromagnetic radiation (ELF) but only within one or more “*amplitude windows*”, above and below which there is little or no effect (Blackman *et al.* 1982; Blackman 1990). A proposed molecular mechanism for this can be found in Goldsworthy (2010). In particular, it explains why weak electromagnetic fields can have a greater effect than strong ones and why prolonged exposure to weak fields (where cells are maintained in the unstable condition for longer) is potentially more damaging than relatively brief exposure to much stronger ones.

## How calcium ions stabilize cell membranes

This loss of calcium is important because calcium ions bind to and stabilize the negatively charged membranes of living cells. They sit between the negatively charged components of the cell membrane and bind them together rather like mortar binds together the bricks in a wall. Loss of just some of these calcium ions destabilize the membrane and make it more inclined to leak, which can have serious metabolic consequences. Among these are the effects of membrane leakage on the neurons of the brain.

## How membrane leakage affects neurons

Neurons transmit information between one another in the form of chemical neurotransmitters that pass across the synapses where they make contact. However, the release of these is normally triggered by a brief pulse of calcium entering the cell. If the membrane is leaky due to electromagnetic exposure, it will already have a high internal calcium concentration as calcium leaks in from the much higher concentration outside. The effect of this is to put the cells into hair-trigger mode so that they are more likely to release neurotransmitters and the brain as a whole may become hyperactive (Beason and Semm 2002; Krey and Dolmetsch 2007, Volkow *et al.* 2011). This may not be a good thing since the brain may become overloaded leading to a loss of concentration and what we now call attention deficit hyperactive disorder (ADHD).

## How does this impact on autism?

Before and just after its birth, a child’s brain is essentially a blank canvas, and it goes through an intense period of learning to become aware of the significance of all of its new sensory inputs, e.g. to recognise its mother’s face, her expressions and eventually other people and their relationship to him/her (Hawley & Gunner 2000). During this process, the neurons in the brain make countless new connections, the patterns of which store what the child has learnt. However, after a matter of months, connections that are rarely used are pruned automatically (Huttenlocher & Dabholkar 1997) so that those that remain are hard-wired into the child’s psyche. The production of too many and often spurious signals due to electromagnetic exposure during this period will generate frequent random connections, which will also not be pruned, even though they may not make sense. It may be significant that autistic children tend to have slightly larger heads, possibly to accommodate unpruned neurons (Hill & Frith 2003).

Because the pruning process in [electromagnetically-exposed children](#) may be more random, it could leave the child with a defective hard-wired mind-set for social interactions, which may then contribute to the various autistic spectrum disorders. These children are not

necessarily unintelligent; they may even have more brain cells than the rest of us and some may actually be savants. They may just be held back from having a normal life by a deficiency in the dedicated hard-wired neural networks needed for efficient communication.

### **Autism and the economy**

The incidence of autism has increased 60-fold, in parallel with the increase in electromagnetic pollution over the last thirty years. The chance of having an autistic child may now be as high as one in fifty. Apart from the personal tragedies for the affected children and their families, autism is of enormous economic importance. In the UK alone, the annual cost to the Nation in care and lost production exceeds the annual tax revenue from the entire mobile phone industry, which is about 20billion UK pounds. <http://www2.lse.ac.uk/newsAndMedia/news/archives/2009/05/MartinKnappAutism.aspx> In theory the Government could close down the entire mobile phone industry and actually show a profit!

There are ways in which the modulation of the signal can be changed to avoid this, but in the meantime, the compulsory introduction of smart meters can only contribute further to autism on a grand scale. This will be a further burden on the economy and increase the National deficit. This will far outweigh any possible advantages from the use of these meters.

There is also a risk of legal complications for the utility companies. If it can be shown that the consumer has taken reasonable precautions to minimise their microwave exposure by eliminating WiFi, cordless phones and wireless baby monitors from their house, the utility company could be held legally responsible for any autistic children that they may have.

In the UK, the lifetime cost of caring for an autistic child is in the region of one million pounds. It would be reasonable to claim compensation for this amount. In the United States, it may also be possible to claim punitive damages if it can be shown that the utility company knew of this risk when they installed or refused to remove a smart meter when requested.

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[BrainAdvance.org](http://BrainAdvance.org) - [How Smart Meters, EMF Cause Autism, Cancer, Disorders](#)