The impact of waves on health

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If someone had asked me almost 20 years ago, when I began working in autism research and seeing patients with autism, whether household electromagnetic fields (EMFs) or radio frequency (RF) radiation from wireless had anything to do with autism, I would have had no idea what they were talking about. At the time, I was already addicted to computers and email. But the Web was new and we didn't use cell phones, so there were no cell towers. I had a microwave and used it to heat my food with only the vaguest concerns.

So there wasn't that much Wi-Fi and not that much autism either - a coincidence? A lot of other things have changed since then, and there was already a lot of autism education during [1], but in any case, I had hardly seen any patients [2] my training in the early 1990s. At the time, autism and other neurodevelopmental or neuropsychiatric disorders of childhood were taught were caused by early genetic disruptions in brain development. [3]

A lot happened to bring me to the point where I co-authored a 40,000 word article with 560 scientific references supporting the plausibility of a link between autism and EMFs, and a revised version was published in 2013 in the journal *Pathophysiology* . [4]

Over the years, I have learned a lot by carefully observing and listening to my patients. I saw big discrepancies between what I had been taught to monitor in my brain research and what I was actually finding in the data.
I began to discover more and more ways that environment and diet could affect the brain and body. And I saw the number of autistic children skyrocket, even though it was supposed to be purely genetic and hereditary. [5-7]

Listening to my patients helped me a lot to change my way of thinking. My training in pediatric neurology had not really prepared me for the problems my patients presented. My clinical practice began in 1996, in a neuropsychiatry office. As my office filled with children with autism, ADHD [attention deficit hyperactivity disorder], OCD [obsessive compulsive disorder], academic difficulties and meltdowns, epilepsy,

I sometimes subjected them to elaborate searches for genetic and metabolic causes, as I had been trained to do, but I rarely found anything to complain about. Listening to their stories, I was intrigued by the mundane problems shared by so many otherwise different patients. These children were simply not healthy. They suffered from diarrhea, constipation or skin rashes. They had headaches. They couldn't sleep. They were squirming a lot in their chairs. They suffered from food allergies. They ate some foods and refused many others. They hated certain textures or sensations. I had to work very hard, rephrase and repeat often to get them to follow my instructions when I reviewed them. All of these problems occurred to most of my patients, not just those with autism. And my office was filled with these sick and unstable children.

As I straddled the worlds of brain research, environmental neurotoxicology, and field medical care, I realized that I could no longer settle for the questions people were asking in just one field. It was not enough to ask how the brains of people with autism or other neuropsychiatric disorders might differ from those of "normal" people, or what toxins in the environment might be causing the autism. For me, these questions did not directly help me improve the fate of my patients.
In fact, some of my patients and those of my friends were getting better, IMPROVING - but HOW did we change the brain's "autism" if it wasn't supposed to be changeable?

Over time, I have gathered more and more evidence to support the idea that autism is not a “broken brain,” but a brain that has difficulty self-regulating. This led me to research not what causes autism, but HOW autism is caused, and how it can be eliminated. [8-11]

So what are the elements that can disrupt the brain? Well, a lot of things. Like disturbed[12] sleep or insomnia. Such as exposure to pesticides and emissions from automobiles or household products, glues and other chemicals. A diet low in zinc, magnesium or other vital nutrients, or too high in sugar, additives or other junk. Like having a gut that is so irritated or inflamed that you don't absorb nutrients well. Like having allergies.

A dysregulated brain may or may not have changes in its anatomy - based on what is seen on a magnetic resonance image of the brain. He may not have brain waves abnormal enough to constitute epileptic seizures if an electroencephalogram brain wave study is performed. But taking a more subtle look, researchers studying brain FUNCTION in autism spectrum disorder are finding that different parts of the brain are not as well coordinated with each other as they are in more developing children . 15 typical.

This is where electromagnetic fields and radio frequencies came into play for me. The brain waves that the brain uses to communicate within itself are electrical or electromagnetic. The same goes for EMF/RF. Given the proliferation of devices that emit radio frequencies (cell towers, telephones

cell phones, digital or DECT cordless phones, Wi-Fi routers, etc.), we walk around in an invisible soup of electromagnetic signals without really knowing if we are not complicating or confusing the communication processes in our brain.

This may seem a bit far-fetched, but that's not all. First of all, the brain is not the only one that uses electromagnetic signals. The more sensitive our scientific measuring instruments become, the more we learn that every cell in our body uses electromagnetic signals—many cellular processes, and even DNA, involve electromagnetic properties that change significantly. The main difference with the brain is that it takes this electromagnetic activity to a dazzling and complex level of organization. [16]

In school we study biology, chemistry, and physics (including electromagnetism) as separate subjects, but in reality our biological bodies and brains operate through processes that are both chemical and electrical. .
Chemical ions create electrical voltage differences across cell membranes, for example, that keep us alive. It has recently been discovered that people with a small difference in voltage between the inside and outside of a membrane are more vulnerable to cancer. However, if we increase the voltage difference between the inside and outside of the cell, vulnerability decreases and the cancer can improve. [17]

Our vital biological functions arise from countless chemical and electrical interactions, and for us to perform at our best, they must be optimized. I believe there is sufficient scientific evidence to support that EMF/RF are important factors that contribute to degrading the optimal chemical-electrical function of our body, thereby disrupting our brain and nervous system. [18]

How can EMF/RF do this? The issues I list below parallel those that have been documented in people with autism spectrum disorders.

- EMF/RF stress cells. They cause cellular stress, such as the production of heat shock proteins, even when EMF/RF is not intense enough to cause a measurable increase in heat. [19-21]

- EMF/RF damages cell membranes and makes them permeable, preventing them from maintaining significant chemical and electrical differences between the inside and outside of the membrane. This degrades the metabolism in many ways and makes it inefficient. [22-30]

- EMF/RF damages the mitochondria which are the energy production factories of cells. They carry out their chemical reactions on their membranes. When these membranes are damaged, the mitochondria struggle to do their job and don't do it effectively. Mitochondria can also be damaged by direct shocks in their chemical assembly line. When our mitochondria become inefficient, so do we. This can hit our brains with particular intensity, since electrical communications and synapses in the brain require an enormous amount of energy.

- EMF/RF creates oxidative stress, a phenomenon that occurs when a system cannot adapt to stress caused by oxygen use, because the price to pay is that oxygen consumption generates free radicals. These are generated in the normal course of things and are usually neutralized by antioxidants such as those present in fruits and vegetables; but when the antioxidants don't keep pace or the damage is too great, then free radicals start to do damage.

- EMF/RF are genotoxic and damage proteins, the most important mechanism being the free radicals they generate which damage cell membranes, DNA, proteins and everything they touch. When free radicals damage DNA, they cause mutations. This is one of the main ways that waves are genotoxic – toxic to genes. When they damage proteins they can cause them to fold in particular ways. We are learning that diseases like Alzheimer's are linked to the accumulation of misfolded proteins and the brain's inability to remove these biological wastes from its tissues and fluids.

- EMF/RF depletes glutathione, the body's primary antioxidant and detoxification substance. So, on the one hand, EMF/RF creates damage that increases the need for antioxidants and, on the other hand, it depletes these same 4,18 antioxidants.

- EMF/RF damages the body's vital barriers, particularly the blood-brain barrier which protects the brain from substances in the blood that could harm it. When the blood-brain barrier leaks, cells inside the brain deteriorate, are damaged and killed. 4,18,31

- EMF/RF can impair the function of calcium channels, which are openings in cell membranes that play many vital roles in the brain and body. 32-41

- EMF/RF degrades the rich and complex integration of brain waves and increases the entropy, or disorganization, of signals in the brain, meaning they can no longer be synchronized or coordinated, which has been measured in 13-15,42-51 autism.

- EMF/RF can disrupt sleep and the brain's production of melatonin. 52-54

- EMF/RF can contribute to immune problems. 55-61

- EMF/RF contributes to increased stress at the chemical, immune and electrical levels, which we experience 31, psychologically. 62-79

Notes:

1. There are many other things that create similar degradation effects, such as thousands of substances "xenobiotics" which we call toxic.

Notably, toxic chemicals (including those that contain naturally occurring toxic elements like lead and mercury) cause harm through several of the mechanisms noted above.

2. In many experimental EMF studies, damage could be reduced by improving nutrient status, particularly by adding antioxidants and melatonin.[80-83]

We live in a world full of new substances and combinations and intensities of electromagnetic frequencies not found in nature, many of which damage our cells, tissues and living processes in similar ways. So it's hard for me to believe that EMF/RF are the ONLY contributors to autism and other neuropsychiatric and health problems.

We've only just begun to explore the impact of waves on fetuses and babies, but it's not looking good. Fetal or young child development is engaged in an incredible set of highly vulnerable dynamic processes, where even small changes can have lifelong consequences. And yet, how many people put wireless monitors right next to their baby's head, without realizing the potential damage they can inflict on their child's brain? How many pregnant women plug in their laptops and put them on their[85] thighs and thus expose their fetus to EMF/RF radiation? How many men put their cell phone in their pants pocket when it has been shown to lower sperm counts and lead to mutations?[86] [87-92]

The more I know about the underlying biology of autism and many other chronic neuropsychiatric and medical illnesses, the less importance I place on the labels we place on specific illnesses. From the standpoint of protecting people and helping them heal, I don't care so much whether it's autism, ADHD, OCD, or whatever other label you might choose , because beneath the surface I see more overlap than differences between these conditions. I believe we can make a difference by addressing the FUNCTION of our bodies and our brains, in:

- reducing harmful exposures as much as possible, in order to avoid the degradation of our bodily functions and to prevent the desynchronization of our nervous system, and in

- maximizing the quality of our diet through a high nutrient density diet so that our body has everything it needs to protect itself and function at its best.

In the meantime, given everything we have already learned about the subtle biological, cellular, and electrical impacts of EMF/RF, we must update our outdated regulations to account for the extreme vulnerability we experience today. And we need to look for safer ways to meet our device needs.

communication and other EMF/RF generating devices. Just because these waves are invisible does not mean they are safe.
We need to admit we have a problem and do something about it.

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https://health.maryland.gov/phpa/OEHFP/EH/Shared%20Documents/CEHPAC/Dr.%20Herbert%20Autism%20and %20EMF%20The%20Autism%20NoteBook%20April-May%202015.pdf

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