

CHE EMF Working Group Call 10 December 2013
Links Between EMFs and Autism: A Conversation with Cindy Sage and Dr. Martha Herbert

INTRODUCTION

The Collaborative on Health and the Environment EMF Working Group hosted a special call featuring Cindy Sage and Dr. Martha Herbert, co-authors of the recently published two-part paper entitled: Autism and EMF? Plausibility of a Pathophysiological Link – Part I and Part 2; which originally appeared in the Bioinitiative Report 2012, Section 20: Findings in Autism (ASD) Consistent with Electromagnetic Fields (EMF) and Radiofrequency Radiation (RFR).

To access the recording and other resources related to this call visit: http://www.healthandenvironment.org/wg_calls/13091

The Bioinitiative Report, originally published in 2007 is an extensive document authored by 29 experts from 10 countries. The report calls for the reform of outdated safety standards due to the mounting evidence of health effects from electromagnetic fields (EMF) and radiofrequency radio waves (RFR). The report was updated in 2012 with new chapters including blood-brain-barrier effects, fertility and reproduction, fetal and neonatal effects, and finally a chapter on autism. The Bioinitiative 2012 website experiences an impressive ½ million to 1 million website hits every month. <http://www.bioinitiative.org/>

FEATURED SPEAKERS (excerpt from CHE website)

Cindy Sage is the co-founder of the EMF Working Group and she co-owns and operates SAGE Associates Environmental Consultancy in Santa Barbara, CA where she has been an environmental consultant and public policy researcher in EMF issues since 1972. She is the co-editor and principle author of the Bioinitiative Report.

Dr. Martha Herbert, MD, PhD is an Assistant Professor of Neurology at Harvard Medical School, a Pediatric Neurologist at the Massachusetts General Hospital in Boston, and an affiliate of the Harvard – MIT – MGH – Martinos Center for Biomedical Imaging, where she is the Director of the TRANSCEND Research Program (Treatment Research and Neuroscience Evaluation of Neurodevelopmental Disorders).

HIGHLIGHTS FROM CINDY SAGE

Cindy Sage explains how their research project began; how she asked Dr. Herbert to review the extensive EMF/RFR literature and although she was very busy, Cindy was able to convince Dr. Herbert this was extremely important. As a result, Dr. Herbert agreed to collaborate on a new chapter for the Bioinitiative Report 2012, Section 20: Findings in Autism (ASD) Consistent with Electromagnetic Fields (EMF) and Radiofrequency Radiation (RFR).

THIS IS THE FIRST TIME SUCH A STUDY / REVIEW HAS BEEN DONE.

The main criticism of this Bioinitiative chapter on autism and EMF/RFR from the industry and others has been that it was not peer reviewed. To address that concern, the paper was submitted in 2 articles to Pathophysiology and published in October 2013.

Part I <http://www.ncbi.nlm.nih.gov/pubmed/24095003>

Part II <http://www.ncbi.nlm.nih.gov/pubmed/24113318>

One of the primary focuses of their study was to identify whether the ASD body of literature had any overlap with the EMF/RFR body of literature. They reviewed and synthesized the

evidence from both subjects and then documented any commonalities. They looked at close to 1800 studies. The Pathophysiology articles part I & II total about 40,000 words and include 560 citations that were directly relevant to their hypotheses.

Originally, their primary goal was to see if they could find enough congruence in the 2 bodies of literature to confidently recommend precautionary action or whether the concern was simply unfounded.

Another goal was to characterize why we should care about this problem? What is the extent of the problem? Some of the reasons Cindy Sage mentions:

Autism Spectrum Conditions are a \$137 BILLION dollar annual cost in the U.S. alone.

The prevalence of ASD from 1975 to about 2013 has gone up 100% from 1 in 5,000 to 1 in 50 or 1 in 88 depending on what data is used.

We can look at these statistics on the roll out of cell towers over the past four decades; juxtaposed to the massive rise in autism cases we have seen over the same time period and the increases coincide. Virtually no cell phone towers existed in the late 1970's / early 1980's but every year the numbers have increased to the point where we now have a couple hundred thousand cell towers in the U.S. Additionally, the number of cell phone subscribers in this country is almost equivalent to the U.S. population, yet another source of significant exposure.

Cindy Sage cautions us on drawing conclusions from a graph comparison of the rise in ASD and the roll out of wireless technology. We can't simply say the rollout is the one and only cause of ASD because we have also seen increases in chemicals and toxins over the decades and we need to understand what role those agents might be playing as well. She makes it very clear that while other factors may be at play, the issue of wireless exposures is big enough and coincident enough to really make it important to investigate. Cindy Sage said that we really cannot sustain more decades of this kind of increase without every child by 2050 having some kind of neurodevelopment problem. So it is of great importance. She said, "As a result of diagramming all the areas of overlap between the EMF/RFR body of literature and the autism body of literature, they were able to conclude the two are strongly supportive of a link. What people must understand now is that in comparison to environmental toxins, EMF/RFR has the ability to affect the electrophysiology of the body, to disrupt the electromagnetic signaling and synchrony and sensory processing within the body. This is very new, very significant and also pervasive."

HIGHLIGHTS FROM DR. MARTHA HERBERT

Dr. Martha Herbert said she had two reasons why she decided to get involved in this collaboration. The first reason was her general concern about the environmental factors driving the increases in ASDs. Parts of the increase are clearly due to heightened awareness but there are many "fresh" cases that cannot be attributed to greater awareness. And so what is this about?

And secondly, she has come to realize there are some flaws in our understanding of what autism is and from her perspective, as a person who studies brainwaves, the pieces don't quite add up. She has been promoting a whole body approach to autism and eight years

ago she wrote a paper titled, Is Autism a Brain Disorder or a Disorder that Affects the Brain? Dr. Herbert has been increasingly concerned that in spite of the positive growth of the whole body approach to autism, we are actually forgetting about the brain. She is finding what she calls a sort of "neurological incoherence" in the way people are understanding the whole body approach and this is a concern to her.

As a brain researcher, Dr. Herbert is very interested in how the environment can specifically impact brainwaves, the electrical oscillations of the brain. EMF/ RFR operates in the same domain as brainwaves; much more so than chemicals or toxins which have been the primary focus of many in the field of autism research.

After having a very intelligent conversation with Cindy Sage about brain functioning, Dr. Herbert said she had no choice but to say YES we must do this. Cindy said it's essentially about the parallels between 2 bodies of scientific literature. Additionally, from Dr. Herbert's perspective, she felt it was important to pose the question, "What is autism in the first place?" Many people, even the most forward thinking tend to see autism as if it were a fixed trait, a thing. According to Dr. Herbert autism is not something you have; autism is something that's produced every millisecond by the cells in the brain that are having a hard time because of the overall state of the individual's health. When Dr. Herbert and Cindy Sage framed autism in this way, they were able to go through every level of the pathophysiology that has been documented in the autism and EMF/RFR literature and they found remarkable parallels:

The EMF/RFR Body of Literature includes many papers showing:

Increased oxidative stress, increased cellular stress, increased heat shock proteins, decreased glutathione level

Coincidentally, all of the above effects are documented in the ASD research as well.

Found in the EMF/RFR body of literature is plenty of direct evidence of the following effects; and direct as well as indirect evidence can be found in ASD research:

Damage to lipid membranes; lipid peroxidation, brittleness, vulnerability
Damage to calcium channels

Junction problems including gap/junction damage and connection damage

Gut/Blood/Brain barrier permeability

Dr. Herbert said, "The integrity of the delicate creation of boundaries between biological compartments including micro and macro compartments are compromised by EMF/RFR and this compromise seems to be present in many findings in ASDs."

Also well documented in the EMF/RFR literature is the increase in mitochondrial dysfunction. The mitochondria of the cells are highly vulnerable to all sorts of toxins including EMF/RFR. And there is more and more evidence suggesting mitochondrial dysfunction is a key underpinning in ASDs.

Immune function disturbances are also found in both the EMF/RFR and ASDs Literature.

Ultimately, Dr. Herbert has come to understand the cause of autism as being the result of the overall toxic burden on the individual, what is known as the allostatic load. The ultimate question that came to the surface in their study of EMF/RFR links to autism: How does the condition of the cellular tissue in the body transform the way the brain generates brain waves and result in what is characterized as autistic behaviors? The answer to this question is what Dr. Herbert believes is missing from the whole body approach to autism and it has caused this neurological incoherence in the field of study. People simply don't understand enough about the brain to even ask that question.

Most of the brain research in autism is based on the anatomical findings, which people try to associate with genetics as somehow being the cause. Dr. Herbert has read many of these studies and written a number of reviews as well. In her opinion you can argue that many of these findings are probably "downstream effects from chronic pathophysiological dysfunction". Where these biochemical and metabolic dysfunctions occur, they lead to negative impacts on the electrical signaling and electrical tuning that is so fundamental to the way our organism functions.

Dr. Herbert briefly discusses the De Novo genes that appear to be inherited from the father via genetic damage to the sperm caused by exposure to EMF / RFR. This topic is covered in more depth their report. There is also more of an in depth discussion on genetics and EMF/RFR as a genotoxin. From the early stages in autism research, the focus had been placed on finding the genes that are responsible for ASDs. The genetic premise is losing its validity since there have been over 800 genes and close to 200 rare genes linked to autism. With such variability (close to 1000 genes), we know that genes are not the fundamental cause.

She also notes that adding to the allostatic load in ASDs is the often toxic and nutritionally deficient foods that are being consumed by expectant mothers, infants and young children.

Dr. Herbert said that every single cell has an electrochemical potential across the membrane boundary and all of these can be compromised by the many cellular and sub-cellular types of dysfunction they covered. In her opinion, it's no surprise that the brain would produce altered brain waves as a result. Many people have never seen that connection before and this is essential to understanding autism and where it originates. The connection between the electrical health of our system and the chemical function of our system has been overlooked and we have to take into account this dynamic so we can truly understand the full array of environmental impacts it has on our system.

Of interest to Dr. Herbert is the way people with autism can recover and lose the diagnosis or partially recover or even if they don't recover, occasionally pop out and do remarkably coherent, well-organized things they normally cannot do. Evidence such as this indicates that autism is not a hardwired condition. It's not a thing, it's not a fixed trait but a process.

Some final comments Dr. Herbert made before they moved on to the Q & A segment of the call:

If steps are taken to improve the resiliency of the cells by eliminating the environmental stressors and giving the cells what they need but haven't been getting; an increase in the

energy the brain requires to produce more well synchronized, well-tuned movements will more than likely occur.

And so what we find when we compare the pathophysiology that's been documented in association with EMF and autism this is not only a tale of a plausible relationship in terms of how the damage occurs but actually also a hopeful narrative that reports in principle that at least partial and perhaps total reversibility of the symptomatology is possible.

What I think we are saying is that one of the things we've been missing in the way we talk about the organism is the oscillation and synchronization that takes place in every cell of the body and in particular the brain. The electromagnetic oscillations of the brain are rich and more complex than those found in other parts of the body. Forgive the theological language but it's brilliant, exquisite and even sacred. We have not appreciated it very much and it really does matter when you start to degrade it.

We designed the wireless communication systems before we had the ability or the widespread knowledge to understand these biological effects and we are in a way undermining our collective intelligence to be able to clear these things up. It should be possible to create intelligent ways of utilizing the technology to preserve some of the benefits but also protect the public's health.

Dr. Herbert uses wifi and realizes how we are benefiting from the communication capabilities but at the same time she is aware of the human price we pay. Most people cannot sense any danger until it's too late. Some people, who are electro sensitive, notice these things. How do we convince people to care about something they don't think is affecting them until it hits them hard? You can explain the details of the physiology and people still won't get it.

The poorer quality of the way children function in classrooms are ways that children are manifesting this detuning, this reduced brain coordination. How do you convey this to people? This is very important.