UBIQUITINATION 13: MICROWAVING KRESSER

READERS SUMMARY:

1. WHY GETTING YOUR ADVICE FROM AN EXPERT MATTERS

2. HOW DOES CALCIUM, NITROGEN, AND PHOSPHORUS AFFECT UBIQUITINATION?

3. HOW DOES LIGHT AFFECT THESE ATOMS AND LINKS THEIR FUNCTIONS?

4. DO THESE LINKS EXPLAIN DEPRESSION, MOOD, AND ANXIETY DISORDERS?

New research reveals new depths of complexity in nerve cells. Most of these pathways are tied to calcium homeostasis in the brain. The divalent cation calcium (Ca^{2+}) is one of the most widely utilized second messengers in cellular signaling. Many of the second messenger effects of Ca^{2+} are mediated through the ubiquitous Ca^{2+} sensing protein, calmodulin (CaM). CaM has no enzymatic activity as such, and its function is to integrate the Ca^{2+} signal and transduce it to other downstream enzymes, like the calmodulin-dependent kinases. So the key to understanding the brain is understanding what processes link directly to the flows of calcium in the brain. Human wellness needs to be built on strategies understanding what to not do or expose yourself too, instead of focusing in on ideas which have little merit. Understanding how calcium flows effect calmodulin and many other down stream effects is something that will help you avoid bad advice.

The Synonyms of Sickness:

Pseudohypoxia = low O2 = Low NAD+/NADH ratio = NAD+ drops in

people with blue light exposure = elevated ubiquitin rates = low levels of electrons = electron density in tissues is a function of the DHA concentrations = low EZ size in cell water = dehydration = higher positive charges (protons) in proteins making them less hydrophilic = low intracellular pH = low redox potential = cell and mitochondrial swelling (cyto c release) = lowered magnetic and electric fields in mitochondria = low ATP levels = a lot of carbs and protein electrons on ECT = altered serotonin and dopamine levels in the frontal lobes = NT release tied to calcium efflux = calcium controls voltage gated channels, NMDA, and glutamate excitotoxicity= low DC electric current = low tissue DHA = altered perceptions of reality and depression/anxiety.

There are 3 layers to how life organizes that parallel the 3 legged stool, light, magnetism, and water chemistry. I recently spoke about this topic in California. The one all of us live in and know best is dominated by Newton physics or classic science ideas. The next layer is dominated by the 3 laws of thermodynamics which are all statistical and not absolute. Few people in alternative health and medicine even realize this nor do they get why this is true. That last concept, the statistical and stochastic ways life is built upon, should stop you and make you think why this is the case.

Why would nature use statistical laws for heat and motion? We know heat is released from our mitochondria and we know motion is a critical part of exercise. Might geometry some how link physics to biology? Is the next level in our understanding of nature built on statistics in some way? Are the cornerstones of life built to work by PROBABILITIES? Do these probabilities form the principles of the upwelling of energy flows in all living things? Quantum computers, like your brain and body work at a scale most cannot fathom using tremendous amounts of possibilities to solve problem in femtoseconds; that level is dominated by the quantum mechanisms that most people have a hard time understanding and accepting. Yet,

physics experiments have shown thousands of times over it not only happens, it happens in cold dry environments and in warm and wet ones.

Today modern research is still uncovering more insights in the thermodynamic realm. One example is some recent research from the Oklahoma Medical Research Foundation (OMRF). It reveals a new complexity to nerve cells in the brain that could affect future therapies aimed at *altering mood and memory* in humans. It did not discuss the quantum mechanisms that are behind these thermodynamic changes that cause protein folding changes epigenetically by altering redox potential. **It did, however, link these flows to the action of calcium in signaling.**

OMRF scientist Kenneth Miller, Ph.D., studied the function of a common protein in these disease called CaM Kinase II in tiny roundworms called C. elegans. His research appeared in a recent issue of the journal Genetics.

“CaM Kinase II is very abundant in the brain, so it has been heavily studied,” Miller said. “But this is the first time anybody has seen results like this.”

Using a method called “forward genetics,” Miller’s lab randomly screened thousands of mutant worms for defects in neuropeptide storage and unexpectedly identified mutant worms lacking CaM Kinase II. Further analysis revealed that CaM Kinase II plays a significant role in controlling when and where neuropeptides are released from neurons. These peptides seem to be related to the “redox state” of the cell under the control of circadian signaling. Circadian signaling is controlled by light and dark cycles. During the day time the DC electric current is very active in EEG signaling. We can also assess magnetic fields from mitochondria using magneto-encephalograms. At night time, optical signaling (optogenetics) seems to control CaM kinase II. So what happens when this enzyme is missing?

Neuropeptides are small protein-like molecules that nerve cells in the brain use to communicate with each other. Excellent signaling is a hallmark of health. Poor signaling is associated with poor health. Disruptions in those communication pathways can affect learning, memory, social behaviors and mood. They are created and stored in containers called dense-core vesicles in cells. Under normal conditions they are only released from those containers in response to appropriate signals in the brain. These things are controlled by signaling from the cell membrane to the interior of the cell.

In Miller's lab "they tagged the neuropeptides with a fluorescent protein so we could see where they went". "In the worms that were missing the gene that makes CaM Kinase II, the neuropeptides were *virtually missing altogether* in the parts of the neurons where we expected them."

That's because without the protein, the dense core vesicles couldn't hold onto the neuropeptides "electrostatically". Electrostatic binding is a quantum atomic effect involving both electric and magnetic field actions. Instead, Miller found, they were all released before they got transported to their storage location, like an apple would release from a tree branch before it was ready. In humans, such an event would be extremely unpredictable, possibly even causing a psychotic break episode clinically. **This suggests why we might be why we see depression, mood disorders, and ADHD exploding today.**

"This is a very significant demonstration of how neurons and likely other neuroendocrine cells package neuropeptides, move them around the cell, and release them where they will be most effective," said Michael Sesma, Ph.D., of the National Institute of Health's National Institute of General Medical Sciences, which partially funded the research. "The high-resolution visualization inside entire living neurons achieved by Dr. Miller and his colleagues is a technical tour de force,

and also demonstrates the enormous value of the genetic model system C. elegans for studying the internal workings of living cells." This work was done with scanning electron microscopes that are able to show us the smallest subatomic scales of cells.

By understanding more about how neurons work, at this scale, we might be able to finely hone our targets when working with patients.

"Before this research was done, we didn't even know that neurons had this special mechanism to control neuropeptide function," he said. This is why it's important to understand how neurons work, down to the subcellular and molecular levels." I think he needs to shrink his perspective, further, to the subatomic level. Hyperlink

Calcium/calmodulin-dependent protein kinase type II alpha chain is an enzyme that in humans is encoded by the CAMK2A gene. It's proper action is coupled to phosphorus and nitrogen cycling in cells. **Phosphorus** controls activation and deactivation or proteins in cells, while nitrogen is tied to ubiquitin function and control of the cell cycle and carbon flows from food. **Both atoms are tightly coupled to light and dark cycles.** This enzyme is a protein kinase that catalyzes the transfer of the gamma phosphate from nucleotide triphosphates (like ATP) to one or more amino acid residues in a protein substrate side chains, resulting in a conformational change affecting protein function by changing their size and shape. Changing these parameters alters their thermodynamic physiologic capabilities. Protein kinases of this type are one of the most widely utilized second messengers in cellular signaling in the eukaryotic kingdom. Calcium flows in cells is vital in control of this signal cascade. Since nnEMF naturally causes non linear changes in calcium flows we should expect to see non linear changes in cells affected by nnEMF. Abe Liboff and A. S. Pressman have shown these non linear effects in physics experiments using ion cyclotron resonance

of calcium movements in alternating electric and magnetic fields. This creates a unique problem for modern scientists and clinicians. Why?

Non linear changes presents a serious impediment to recognition of the impact of environmental EMFs on human health involves the cognitive structure within which most studies are designed. Most studies done to date have ever built this factor into their study design to precisely measure the effect. Typically, investigators assume that any real response triggered in a subject exposed to an EMF must be “precisely reproducible” to show biologic effect. The problem with nn EMF (non native) exposure is that is causes a non linear response so reproduction of results cannot be expected by definition. Biology does not understand non linear systems because they make the assumption that all biologic cycles occur at equilibrium and not far from it. Biochemists and clinicians still have not evolved from its equilibrium bias, even though modern epigenetics shows that all cells function physiologically non linearly.

Reproducibility is indeed the imprimatur of causality in evidence based medicine today. But this blog raises a deep question: What exactly must be reproduced for medicine to accept the evidence?

> An ignorant man’s report of what a wise man says can never be fully accurate, because he unconsciously translates what he hears into something he can understand.

Here I want to defer to the advice of Dr. Andrew Marino, a true expert on EMF. He holds a PhD in physics and owns a law degree that he used to fight electric power companies and mobile carriers in court depositions. He also has testified about microwave radiations from many sources in our modern world. His book ‘Going Somewhere‘ is a treatise on the

subject. His opinion is expert in this area. Marino says, “A common assumption is that the numerical value of the measured effect is the requisite reproducible observation. If a putative effect is +50 units, “reproducibility” is taken to mean that +50 units must be observed when the putative cause is reproduced or, allowing for the apparent stochastic variability exhibited by living systems, at least something close to +50 units. Under this assumption, an observation of 0 units or −50 units counts as evidence against a causal link, and observation of −50, 0, and +50 in three independent trials would be interpreted as strong evidence against the reality of the effect, based on averaging. But adoption of this assumption in a one-size-fits-all manner emasculates our ability to understand nonlinear biological phenomena, for example those caused by EMF’s. To see this, suppose that +50 and −50 were each observed five times in ten independent trials, an entirely permissible result in a fully deterministic system governed by nonlinear laws (nonlinear differential equations). Under the common assumption, a strong inference against the existence of an effect would arise because the data averaged to zero. Nevertheless the results were reproducible in the sense that they were consistently non-zero.

Suppose the analytical method used to evaluate the data obtained in the ten trials returned a positive value each time the putative cause was applied, regardless of whether the measurement yielded +50 or −50. In this case the cause-effect relationship would be captured by the analysis and the scientific requirement of reproducibility would be satisfied. The biological effects of environmental EMFs must be viewed from this perspective of nonlinearity.

Otherwise the chronic error of the power and cell-phone companies—the false negative result—will continue to occur, with all the harm that the error entails. The nonlinear perspective would permit rationalization of causality based on

the frequency of the kind of observation made (consistently non-zero), not on the arbitrary (and certainly wrong) assumption that a non-zero average of the magnitude of the observation is a necessary property of reproducibility."

MARINO VS KRESSER

This is why understanding the scale and context of the science is critical. Recently, an acupuncturist, Chris Kresser, who influences the opinion of many young people, said in a blog that "microwave use" is not as dangerous as some of us believe. Hyperlink This article went on to say, that the "evidence is mixed" on microwave use/exposure. Marino explains why it appears mixed to the *undiscerning eye* above. That level of sophistication was not built into any of the articles cited in the review of microwaves mentioned in his blog. Moreover, every cite used in that review had large false negative results, so the results were designed to give a mixed result to protect an industry interests. The reader has to figure that out for themselves, because the blog author clearly did not realize it.

You need to seek high quality advice on nnEMF from sources before making any decisions of what is safe or not. Make sure you vet your expert advice based upon their experience in the field in question. The main effect of microwave exposure is on cell water and hydrogen binding networks. When a cell is dehydrated how it interacts with sunlight is also altered. Light is able to liberate electron's from proteins in our skin and able to create proton flows in plasma. Plasma is 93% water by volume. Water makes up the majority of the chemicals in a cell and it surrounds every mitochondria in eukaryotes to help drive all biochemical processes. Microwave use exposes your tissues to its effects. It dehydrates cells and tissues to reduce their ability to generate energy, and this is what ultimately reduces the cells redox potential to cause the non linear biologic effects. Anyone who has microwaved a leftover piece of steak can tell you what

microwaves due to tissues. *You should not have to rely on an alternative practitioner precepts to figure this out.*

Dehydration of cells and tissues seriously affects tertiary and quaternary protein folding in cells, as discovered by Nobel Laureate Stanley Prusiner on his work on prions. Caveat emptor, is my advice, if you continue to follow an 'acupuncturist viewpoint' over a seasoned physicist or clinicians who have done thousands of experiments on these issues. They are detailed in many books on these subjects. I suggest you read them before making a choice for your family.

Microwave exposure has also been linked with massive changes in calcium efflux via ion resonance experiments in physics. These were detailed by Abe Libroff and A.S. Pressman. Pressman's book in the 1970's was a masterpiece on this science. ***Anything that alters calcium flows within or outside of cells can effect the calcium calmodulin signaling system inside cells.*** Calcium signaling is crucial for several aspects of plasticity at glutamatergic synapses because voltage gated (DC current alert) and NMDA receptors are under the control of calcium release in cells.

This shows you why nnEMF has massive effects on any voltage gated system in the central or peripheral nervous systems. This is why depression, ADHD, most cases of neuro-degeneration and prion mediated disease should be expected to show up in any environment that allows for non linear calcium efflux in cells. **All forms of nnEMF exposures cause calcium efflux and aberrant release in non linear fashion.** Mr. Kresser needs to do a lot more reading of non biased scientifically vetted material. We all need to worry about this, but few do today because they don't understand the detailed physics.

The Ca^{2+}/calmodulin enzyme is composed of four different chains: alpha, beta, gamma, and delta. The alpha chain encoded by this gene is required for hippocampal long-term

potentiation (LTP) and helps develop spatial learning maps within the brain. In addition to its calcium-calmodulin (CaM)-dependent activity, this protein can undergo ***autophosphorylation***, resulting in CaM-independent activity that appears to be under the control of the redox state within the cell based upon the environmental cues the cell senses. In contrast to water and carbon cycles in cells, mineral elements like nitrogen and phosphorus are recycled very tightly within all biologically coupled systems. **Annual inputs and losses of both nitrogen and phosphorus in cells are quite small in living things. We are back to bio hacking the periodic table aren't we?**

Phosphorus cycling in humans is very tightly controlled, allowing it to act as an on and off switch to direct communications carefully inside a cell. It is almost always coupled to nitrogen cycling, known as ubiquitination. The nitrogen cycle is always associated with control of growth and signaling in both plants and animals. Once again, you see how the environment and redox chemistry control how proteins react and fold to stimuli from outside their cell membranes. These are tightly coupled cycles. We covered these details in the April 2015 webinar for members in much greater detail.

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