ORGANIZATIONAL STRUCTURAL FAILURE #7 AUTOPHAGY FAILURE

READERS SUMMARY:

1. IS ORGANIZATION OF A CELL MORE IMPORTANT THAN THE FOOD WE EAT?

2. HOW DOES NON OBVIOUS FACTORS DESTROY HEALTH IN SURPRISING WAYS?

3. HOW DOES GUT INTEGRITY TIE TO MITOCHONDRIAL FUNCTION?

4. WHAT ARE THE 5 KEY FACTORS IN AUTOPHAGY?

5. HOW DOES KETOSIS LINK TO CIRCADIAN MISMATCHES?

A radical and transformative thought goes nowhere without the willingness to challenge convention. If you have a new idea, and it’s disruptive and you’re agreeable, then what are you going to do with that? Ideation without execution leads to the deletion of any great idea. Your job is to find better ideas, mine is to cut holes in the ones you already have. Innovation requires embracing paradox. It requires you to be disagreeable. I innovate by listening closely and mixing in curiosity. This is why I see what others miss. I focus on what really matters to the organization of a cell to create life, and it’s not food that is the critical factor. The organization of your cell’s architecture is important. The factors that determine it are critical and there is no one thing that is critical. The combination of factors and the details of how they interact is critical to understand. Health quality is the result of a carefully constructed cellular environment. It has to be the fabric of the organization of tissues, not part of the fabric like food is. What happens in

your gut and the microbiome and its interaction with food is, part of the story. The secret of wellness lies in the organization of the non-obvious factors in life. The only things that evolve by themselves in organization are disorder, friction, and poor physiologic performance. Health is a state of constant order in a cell's organization. A constant source of energy input is needed to maintain that metastability. So how might something so non-obvious destroy your cellular integrity?

A recent new article came up on the forum:

Rising numbers of infants lack the motor skills needed to play with building blocks because of an "addiction" to tablet computers and smartphones, according to teachers.Many children aged just three or four can "swipe a screen" but have little or no dexterity in their fingers after spending hours glued to iPads, it was claimed. …
"It was claimed" is suitably cautious. I'd not be surprised if this were true, however. The rest of the article ought to disturb people's complacency, too, but I'm not sure it will.

Experts have warned that the growth is having a serious effect on children's social and physical development.Last year, a doctor claimed that rising numbers of young people – including one aged just four – required therapy for compulsive behaviour after being exposed to the internet and digital devices from birth. …Mark Montgomery, a teacher from Northern Ireland, said overexposure to technology had been linked to weight gain, aggressive behaviour, tiredness and repetitive strain injury. Carpal tunnel syndrome is an example of repetitive strain injury. He called on parents to turn home wi-fi off overnight to stop children staying awake to play online games on iPads.
Much more here:

http://www.telegraph.co.uk/educatio…oy-building-blocks-due-to-iPad-addiction.html

So why does this happen to infants and young children? ……..I'd like you to think about the parallels I wrote about in Tensegrity 1 about Jeremy's CF condition and the autism of Temple Grandin. Both of them suffer from "electron steal syndrome". The kids in the story linked above have lost their neurologic powers because they have lost electrons from their subcutaneous fat cells. If you remember from Energy and Epigenetics 1 I told you this fat source is what finishes the post natal development of their nervous system. If technology is around the infant or child it cause electrons loss to the environment and to the technology gadget with silicon based semiconductors in it. You might be asking yourself how could that happen?

Most do not see what I do. When two semiconductors are made of two different materials what happens? Electron depletion occurs in one of the semiconductor systems. Modern technology gadgets are made of silicon wafers. Your semiconductors are made of carbon based topologic insulators. Carbon based semiconductors work on the lowest energy requirements possible on the periodic table. When we place two dissimilar semiconductors next to one another what occurs is based upon the natural laws of energy flow. We get avalanche collapse of the lower powered system. Have a look at the periodic table and see where silicon and carbon are located on it. What is the main difference between the two? The main difference is their atomic MASS. When mass goes up in silicon what does it mean? It means the energy to run it must be higher according to Einstein's rules for energy. His mass equivalence equation covers this situation. $E=mc^2$ is that equation. So what does this equation imply about energy flows? The higher the 'mass' semiconductor must draw electrons from the lower mass semiconductor. When we place two dissimilar semiconductors next to one another energy flow is disturbed. This is an example of a phase transition based upon the natural laws of

how energy flows in a system. The result is we get avalanche collapse of the lower powered system. We lose electrons in the carbon based semiconductors.

Guess what happens when you lose electrons? You get electron steal syndrome in the child. When you lose electrons in your mitochondria the next thing you lose is the ability to place DHA in your cell membranes. When this happens your LDL cholesterol rises and your HDL levels drop. As a result of losing DHA, your leptin levels rise and free T 3 drops. When these things all happen in coupled fashion your Vitamin A levels rise in your brain and it swells. This changes the optics in your brain and you lose the ability to transport light from neurons to mitochondria and vice versa. This directly determines the physiologic abilities and thermodynamics of the tissue in question.

You saw in the link above they said kids also seem to get more repetitive strain injuries. What happens to collagen when it loses electrons? It swells and gets bigger. Think of collagen with electrons as a rope and a rope without electrons as unwound rope twine. What does a human hand touch when it uses an iPod, iPhone, or iPad? The hand. In the hand is the transverse carpal ligament. What is the transverse carpal ligament made from? Collagen. So with chronic technology use, electrons are lost and collagen unwinds and it swells. What is located underneath it in the human hand? The median nerve……..that causes what? Carpal tunnel syndrome. This is why children are developing motor loss and sensory loss. Want to know why most of you reading this carry a significant risk of developing CTS? Moreover, why do babies and kids can develop a lack of proper motor skills? The iPhone, iPad, mouse or your laptop is stealing your electrons in the same fashion.

The effect is additive if you expose your retina and brain to excessive blue light. Blue destroys DHA in your cell membranes by oxidation. Excessive blue light is a form of non native EMF. Chronic blue light exposure from modern technology

deplete you of DHA even if you eat seafood to replace it. Why? Modern life exposes you to far more blue light than our normal dietary templates replace DHA with. This unzips collagen, your cell membranes, and causes your brain and waistline to swell. When anything swells it implies you are thermodynamically inefficient and losing energy to your environment. Chronic blue light exposure will age you faster because you lose DHA. DHA loss = electron steal syndrome. When you lose electrons and this short circuits your mitochondria by altering its ability to turn electric signals to light and light signals back to electric signals to be distributed over water proton cables bound around proteins inside your cell. It also hinders electron current over your collagen network by diminishing your piezoelectric ability in collagen and on microtubules.

The fewer electrons that are left over are then “powered up” using this chronic blue light. Blue light uses the photoelectric effect to add energy to the electrons left in your mitochondria present on your inner mitochondrial membrane. These electrons are delivered to electron chain transport. Chronic blue light also dehydrates the MINOS on the mitochondria lowering water content around the mitochondria. The combination of fewer highly powered blue light electrons with a lack of intracellular water has the ability to short circuit your mitochondria electrically. When you consider that blue light also lowers the amount of DHA and phosphatidylcholine on your inner mitochondrial membrane as well, you begin to see how voltages are lost on this membrane to set up a classic overload situation. This overload causes a redox shift to occur in our cytochromes and this directly alters epigenetic expression via autophagy. This is how mitochondrial signaling changes nuclear DNA expression at a fundamental level. The symptom of this process is a low Vitamin D and DHEA level in our blood and/or saliva.

If you use devices constantly emitting blue light powered by silicon chips this means electrons go from your carbon based

mitochondria in your peripheral nervous system and your brain in the lower powered carbon based system into the one that needs the electrons to power it because silicon has a higher atomic mass. Energy in semiconduction flows are determined by the atomic mass of the semiconductor. The higher the mass the more power it needs to function. Therefore a tech gadget in your hand containing a silicon chip will draw power from your carbon based semiconductors based upon the physical laws of semiconduction. Essentially your life force is drained from your body. This is how you lose energy to environment in our modern world. Your nerves work by using water, collagen and microtubules. This is why your brain can work on just 20 watts of power and your laptop needs recharging every 3-4 hours.

Now consider the purpose of subcutaneous fat in the human infant. Please carefully re read Energy and Epigenetics 1. We use SQ fat to finish construction of our brain. So if you are chronically losing electrons to tech gadgets can you ever finish the job?

Gretchen on my forum made this astute comment recently, ” We've had discussions with friends who think iPads are ok for kids. When we talk about the need for kids learning basic skills they just say we're Luddites. To which we laugh…… maybe we are – but our kids, Chaos and Havoc don't need to "practice" using an iPad. They already know how…….. but they do need to build spacial skills such as building with blocks, using their imaginations, and playing outside in nature”

A tech gadget gets recharged when it is plugged into an electric outlet.

You become rejuvenated, restored, refreshed and recharged when you get outside and plug into nature. Your electric socket is the grass, sand, ocean, snow, and mountains, and the plug is your two legs. Your feet connect you to the Earth's magnetic source of electrons and your skin connects you to the photoelectric power of the sun. Technology keeps you inside

and away from your natural recharging stations and the result is your brain and mitochondria get drained of energy slowly but steadily. This lowers your redox potential as time evolves.

Technology implications for infants and children:

The FIAF is made by our microbiome, our liver, muscles, and our small bowel wall and when food sources (think electrons and protons) are in short supply. This means we must ‘sense’ a paucity of electrons and protons across the entire gut system to create FIAF and subcutaneous fat that is common to our species to finish brain growth. We know human evolution occurred in the East African rift zone and food from the ocean was plentiful. This created a problem for the ancestral primate gut. It changed because the environment around the primates changed as I laid out in Brain gut 3, 4, and 5.

FIAF builds the sub cutaneous fat mass in infant humans. FIAF grows subcutaneous fat when their is a scarcity signal from the vagus nerve in the gut. This implies that the gut microbiota has to take a lot of the protons in food for themselves. This is also why the human gut shortened from primates. When it shortened it created an ecologic island within the small bowel and in the colon. Island bio-geography is a field within bio-geography that examines the factors that affect the species richness of isolated natural communities. The field was started in the 1960s by the ecologists Robert MacArthur and E.O. Wilson, as this theory predicts the number of species that would exist on a newly created island. It turns out that when things are more isolated it fosters species diversity. This is why the gut shortened before the mammalian body changed from primates to humans. This is why bipedalism showed up in the skeleton of our species before the brain grew.

When this happened it fostered diversity and speciation in an oxygen free zone to pull protons from the marine food chain and left behind the electrons for us to absorb. Limiting oxygen in the gut made the gut environment anaerobic and this allows us to recycle the carbon backbone in food stuffs. This recycling effect lowers our energy costs for the ubiquination pathways which replace carbon backbones in proteins.

Anaerobic digestion within our gut saves carbon emissions twice over, by preventing the serious methane and nitrous oxide gases from reaching critical production within the lumen of our guts. This ability is lost in people with SIBO or GERD, where molecular oxygen does get into the gut lumen and causes us to lose carbon recycling. This has a huge energy cost to our GI tract. This is another way we lose energy within this system to cause disease. Another way for oxygen to enter the gut enterocytes is when DHA is lost in the gut lining's cell membranes. When this occurs it causes the cells to swell releasing zonulin into the lumen of the gut making it leaky. This is how leaky gut can begin. In the blood plasma, zonulin causes hemoglobin and free iron to be released from red blood cells into the lumen and into the gut cells themselves. This has a chilling effect of the gut's ability to function. This effect causes oxygen, hemoglobin, and free iron to be released within the gut. This causes the formation of haptoglobin which is an acute phase oxidant that lowers the redox state in the gut lining. Note that this mechanism does not require any grains to be present. All it requires is a lack of DHA in the gut cell membranes to occur. Fixing a leaky gut should always have a DHA solution as part of its evolutionary Rx. Very few see this mechanism.

The actions of limiting O_2 in our gut and shortening it had huge implication on the development of FIAF. When the gut shortened, it helped craft a strong FIAF signal to develop the

very unique subcutaneous fat mass human babies have to support post natal brain growth.

Our teeth are very different from other primates as well and do not allow us to chew as well even as adults. Babies have no teeth at birth. In fact, children also have a primary dentition that really are underdeveloped that inhabit our mouth from age one to age six. This is during the major post natal brain growth spurt and when major white mater tracts are being myelinated……

HAVE YOU EVER WONDER WHY we humans set of teeth from age 1-6?? Maybe now you can guess why we do. The neocortex is extremely plastic from birth through 6 years old and then it becomes less plastic at its surface after 6 years old. This is why before age 6, language acquisition in humans can still have the natural accents included in the speech. After that age, the learning of a foreign language will not contain the native accents.

The human primary dentition is quite different than our adult teeth. They look even more like a herbivore to generate more FIAF to develop the brain by decreasing our ability to chew our food. It also explains why human children universally do not like vegetables but love protein and fat to deliver the best electron substrate to the microbiome to make FIAF. That is because their growing brain is craving what it needs to mature. Our social and cultural beliefs subjugate their quantum needs and desires. When a small human eats fat and protein with a small set of poorly designed teeth more large undigested fragments of food gets delivered to a complex microbiome. This is the perfect storm to make subcutaneous fat for brain growth by fostering growth of the perfect type of microbiota in our gut. This brain growth continues until 25 years old in humans when the brain fully myelinates in the frontal lobes.

This ketogenic template in children has another big brain

development factor few talk about. During ketosis, the hormonal status in children should be a high glucagon/insulin ratio, in combination with hypoglycemia. This promotes excessive lipid mobilization from the child's subcutaneous fat to mature the brain. It also creates a greater hepatic removal of fatty acids and switches the liver to a higher rate of ketogenesis for active myelination of the brain. Glucagon is a hormone that enhances macroautophagy, especially in younger mammals. This ability is lost in older mammals. It is believed a fetal protein called REST mediates this autophagy effect. REST is a regulator that switches off certain genes, is primarily known to keep younger neurons in an immature state until they develop to perform brain functions under the direction of melatonin and BDNF. REST protein changes are firmly tied to neuro-degeneration risk's. Both of these hormones are destroyed by blue light in the brain as well. In older people with Alzheimer's and other dementias, the REST protein is sharply depleted in key brain regions. This links blue light toxicity to neuro-degeneration. This alters their ability to clear mis-folded proteins in neurons. This alters the brain's optics and thermodynamics.

Because glucagon is normally high in sleep, fasting, and ketotic states, it also augments autophaphy during these times to construct and organize Hebbian circuitry in the brain as it matures. Young humans need to sleep more to grow their brains. Autophagy is critical in growing and maintaining the neocortex size of humans. The quality of their sleep is also critical because it maximizes autophagy and does not deplete our stem cells in the recycling process. The more efficient autophagy is the more you protect your stem cell supply and the longer you can live. Autophagic efficiency is linked directly to energy mass equivalence. The more electrons you have in your brain the more autographic efficiency you will have. All cells created in the young humans brain are newly minted post mitotic cells. Autophagy augments longevity in all post mitotic cells in 5 ways:

The 5 cytoprotective effects of autophagy:

Reduced accumulation of toxic protein aggregates or misfolded proteins
Destroying bad mitochondria via mitophagy
Reduced apoptosis to prevent stem cell depletion
Reduced necrosis
Improved hormesis by increasing the redox stickiness of semiconductors made of collagen and water.
This is why children sleep more than adults and why it is why autophagic efficiency is higher in younger mammals with a better redox potential. Many people report poor sleep with ketosis and this is tied to the type of ketosis they employ. This will be covered in future blog OSF #8. Contrary to modern belief's not all ketotic templates are equivalent thermodynamically. It also points out how fasting, sleep, ketosis, and autophagy all couple together to add in healthy development and exceptional longevity in the human neocortex. DHA content in your cell membranes increase your ability to engage autophagy.

POOR MASTICATION AND IMMATURE TEETH ARE ADVANTAGOUS

When children chew a ketogenic template less well because of their immature dentition, this delivers more unprocessed food to this diverse microbiome in our shorter gut, which makes things for us that drive organ health in many places to continue to under process food for the growing brain to provide it with a massive influx of electrons and not PROTONS. PROTONS are for the expansion of gut bugs when O2 is not present in the lumen of the intestines. The protons provide energy and information to help develop other human organ systems using the power of our gut bugs as leverage. It turns out simple life forms can handle protons better than complex life forms can. They developed on Earth when oxygen was rare. We developed when oxygen was present. This is why we recruited them in our gut when no oxygen was available.

As the various bacterial cells and human gut cells are colluding, they are likely trading energy and information using subatomic particles as their language with cells in another realm. The quantum realm using entanglement, spintronics, and protonicity within the exclusion zone (EZ) of water. The micro-organisms in the mouth, skin, respiratory system, urogenital tract, stomach and digestive system all play distinctive roles with their host. Each microbe has its own set of genes, which can interact with those in the human body by exchanging quantum and molecular signals to direct molecular actions of tissues within us.

The signaling these microbes do is complex and this makes the process ideally suited for a quantum mechanism. They send metabolic signals to each other; and they are sending chemicals and electromagnetic signals out constantly that are stimulating our biological processes. That process is called quorum sensing.

People in different geographical locales and "***zip codes***" can harbor different microbial ecosystems. This can happen within the same house hold. In 2010, scientists reported evidence that the Japanese microbiome has acquired a gene for a seaweed-digesting enzyme from a marine bacterium. The gene is not found in the guts of North Americans, and may aid in the digestion of Nori seaweed wrappers.

Modern diets consist of processed foods that are made of fake fats, altered protein and simple starch, all of which are digested and absorbed before reaching the colon. These simplified foods produce a simple and less diverse gut flora that may also produce more colonization factor antigens (CFA) rather than feces forming gut bacteria.

The underpinning thought here is when you are human: you are designed to isolate your microbiome by shortening your gut for the species development which fosters a complex flora. Poor mastication of your diet facilitates this process by

developing a more diverse gut flora. This was the first key environmental change that crafted humans before they became encephalized primates. Chimp dentition and gut anatomy are radically altered compared to humans. Remember we have 98.9 % identical genes. These anatomic differences crafted by compliant design changes meant we did not have to utilize the genome to craft these changes. It implies you can only do this well when the food sources come with a dense source of electrons consistently that shape protein changes to get the desired result quickly. The dense diverse speciation in human microbiota needs protons from these organisms to do its job.

MODERN MISMATCHES

The modern diet breaks this evolutionary design. Electrons are what the marine food chain provides densely. DHA is the only lipid that can capture electrons well from our diet. You first have to capture electrons in your cell membranes before you can assimilate or use them properly. This is why human evolution began in the East African rift adjacent to the ocean. The electron is a nearly massless subatomic particle that can carry various amounts of energy and information at a low thermodynamic cost, compared to a proton. Protons have mass (1900 times more than an electron), and as such makes them less energy efficient. The fact that a proton has mass, limits it ability to carry more energy or information than an electron or photon. This is why mitochondria organized around moving electrons and photons on its membranes to reduce oxygen to liberate even more electrons for a complex system to use. Protons are used by Archea and Prokaryotes. Eukaryotes use electrons exquisitely in their mitochondria and cell membranes. When you move away from electrons illness just follows you.

The photoelectric effect can raise or lower the energy and information within electrons. Protons do not have this ability. This is why humans have built their most complex systems, namely the brain and immune system, around electron

collection and not protons. Protons are used to signal things within cells. Protons are the subatomic mitochondrial signals that reproduce what the present environmental conditions are for cells to read and react too. Mitochondria decipher these signals and send that information through the collagen cytoskeleton to all other cells using the piezoelectric signals within collagen when it is deformed by compression due to a volume change in mitochondria. These signals direct cellular homeostasis everywhere in the cell. The signals are all coherent within a cell. These signals even tell the cytochromes how to process foods to electrons. The food electrons are funneled in cytochrome 1 or 2 based upon their energy content, information, and spin of the electron. This is how a mitochondria deciphers what season it is, in our environment. It samples the data in photons and electrons from foods to generate the correct answer for mitochondria.

The other cytochromes are used to signal the “change programs” in mitochondria, namely autophagy and apoptosis, by opening a pore in the mitochondrial membrane to increase or decrease mitochondrial size and volume. Apoptosis removes cells and mitochondria directly by cell suicide programs. Apoptosis also uses a compliant design mechanism to work by altering protein shape and size. Autophagy is the only way to remove our older broken down mitochondrial engines and recycle them, as I mentioned above. Autophagy is the best way to get rid of bad mitochondria without killing the cell. This process is called “mitophagy.” Since bad mitochondria produce most of the “supra-hormetic doses of ROS and RNS”, this is quite important.

This is why the developing brain and healthy brain seek ketones for their fuel source for maturation from our subcutaneous fat. Ketones shrink mitochondrial size and select for autographic efficiency to build and maintain a healthy brain.

Contrast this with the sick human brain: People with

T2D,ME/CFS, AD,PD generally generate excessive amounts of superoxide in the brain as the cause of their disease because they eat too much sugar; doing so does not allow them to make a lot of ATP (38 vs 147) and not being able to make a lot of ATP, is why they crave carbs to fast recycle ATP as I mentioned in EMF 4. They can not make ketones well because high insulin levels block ketone production in the liver. It also lowers glucagon. This destroys autophagy. One of autophagy's main goals is to clear unfolded or misfolded proteins marked for clearance by the ubiquitin system. When autophagy is impaired these misfolded proteins remain in neurons and are not cleared.

When this happens, superoxide rises…….a lot.

Neurons in the developing brain try to avoid superoxide generation at all costs. Neurons usually attempt to increase lactate production as a result to offset superoxide generation to use lactate as a secondary fuel source to ketones. CSF lactate is a signal. This signal is sent through the CSF and into the circumventricular organs to get to the hypothalamus. This is where the leptin receptor senses the redox potential in neurons things from our environment. This signal is destroyed by a lack of DHA in the cell membranes in these neurons and by the local redox changes in these cells. This redox signal alters the 4 channel proteins in the leptin receptor to vary its physiologic functions. Excess baseline ROS /RNS from poorly functioning mitochondria induces many different mitophagy programs directly via other signals. Telomere shortening and redox imbalance have been related to the aging process. I will cover this later in the series. The mechanism is the same but the trigger of the mechanism is very varied with respect to autophagy.

NORMAL BRAIN = NORMAL AUTOPHAGY

For post mitotic cells like brain cells, heart cells, and most other cells that we all want to "hang on to", mitophagy is

probably the most important anti-aging benefit within autophagy. This is how we replace bad mitochondria them without losing them permanently. Older, damaged, and poor working mitochondria are phosphorylated by the kinase called PINK1. Then these bad mitochondria are marked for death and ubiquinated by the E3 ligase Parkin. The ubiquinated “poor functioning mitochondria” are then selectively destroyed by mitophagy, which is a form of macroautophagy.

All bad mitochondria are tagged for removal, by their cell volumes and size how many protons they contain and few electrons they process. This is what makes up their redox potential. A poorly functioning mitochondria has a poor redox potential and will leak a lot of lactate into the CSF. The redox potential is buried in the ratio of electrons to protons produced by this mitochondria and it is transmitted in the CSF. When there are more protons in CSF to electrons the brain swells. When a cell/mitochondria swell, it is due to a lack of electrons to protons, and this is the signal we begin the process. Leptin resistance states are all inflammatory states within the CSF. When this happens leptin can not enter the Blood Brain Barrier at is receptor site. This is how leptin resistance fundamentally develops. A ***loss of DHA in cell membranes is always tied to leptin resistance.***

HOW DOES KETOSIS REVERSE CIRCADIAN MISMATCHES?

Increased volumes are a sign of a low energy efficiency, and decreased size is what we see in mitochondria in ketosis. In fact, a ketogenic diet is a potential technique for clearing out deleterious heteroplasmic mitochondrial sub populations. This all works based upon Einstein’s mass equivalence equation. This equation defines the overall thermodynamics of the mitochondrial efficiency. Dr. Doug Wallace video talks about this here.

Heteroplasmy fosters lower mitochondrial volumes because it drives electrons through cytochrome 2 toward oxygen at the end

of electron chain transport, and this makes us more energy efficient. It also decreases brain swelling. This helps to self select these types of mitochondria within a cell to lower mitochondrial swelling, over other ones who use more of cytochrome 1, which favors carbohydrate electrons from food. Carbohydrate electrons carry different energy, information, and spintronics than electrons from fat or protein.

Carbohydrate electrons from cytochrome one cause the mitochondria to increase in size and volume increases and this decreases mitochondrial energy efficiency further. To offset the change in energy, the use of carbohydrates allows for a faster recycling of ATP. I covered this in detail in EMF 4 blogpost. What should be more eye opening to you is that long lived humans, called centenarians have been found to have high levels of heteroplasmy in their mitochondria. The more heteroplasmy one exhibits shows more metabolic flexibility is present in your cells. Heteroplasmy should be built upon a lifetime of seasonal circadian signaling changes, not modern manipulation of your macronutrients based upon your beliefs.

Mitochondria that use cytochrome 1 excessively, do not have as long lifespans, as those that use cytochrome two. This process is controlled by autophagy and apoptosis change programs built into mitochondria in their interaction with the collagen cytoskeleton inside a cell to react to minute changes in mitochondria sizes and volumes. This is how ketosis helps foster heteroplasmy in mitochondria in human centenarians. It has been shown that mitochondria swell in summer and they tend to be smaller in winter in wild animals. Wild animals are forced by life to follow natures design, while modern humans are the only animal that can create its own rules for their environment. It is also fundamentally why carbohydrates shorten your life if you make them your primary fuel source consistently. They are designed to be used seasonally in long light cycles only.

It is now clear to anyone without bias that mitochondria are

subject to selection pressures within the body directed by the environment they are in. The same selection pressure also affects the gut flora. This process is controlled by quorum sensing which is also controlled by the redox chemistry within the gut. Remember the gut should be anaerobic and lack O_2 by evolutionary design, and as such, this favors a proton rich environment that gut bacteria do well in. This creates the signal to make FIAF for the human host benefit. The electrons left in foodstuffs are then reserved for human use. Our mitochondria then direct these electrons to certain cytochrome's for processing. This implies that mitochondrial cytochromes also work by circadian signaling. When you understand this process, you begin to see why long lifespans are associated with low gene defects in our mitochondrial DNA lines.

This observation was an initial shock to most obesity researchers' because they perceived the etiology of obesity as an energy excess state. One would expect using their current paradigm that excessive ROS/RNS from the mitochondria would lead to more mitochondrial gene defects. However the observations made in experiment showed they do not accumulate at high rates in obese humans. The defective mitochondria are weeded out by autophagy quickly. Obesity researchers are still looking at these genes for their answers. It is a foolish place too look, in my opinion. The issue is a metabolic redox shift in the mitochondria.

Most research today remains gene centric. It would appear that defected genes cause all of our diseases and maladies. Gene expression levels are directly tied to covalent modification of biomolecules (by electrons). This is an example of an electron can alter the biochemical responses that lead to cellular or organelle heterogeneity. The key point missed in this discussion is that current mitochondrial signaling research is telling biology that the mitochondrial wiring diagram yokes the cell membrane voltage to the inner

mitochondrial membrane redox potential. Both voltages are controlled by electronic induction by electrons on proteins in both places. This quantum mechanism was discussed at length in OSF 3 blog.

Centenarians tend to have a lot of heteroplasmy within their mitochondria. This supports looking at the mitochondria and away from the nuclear genes. This implies heteroplasmy must be good, when you have a basic understanding of this complex quantum event. Nick Lane has made the key point of differentiation in several recent reviews in the literature that there are tissues where heteroplasmy may in fact, be bad. For example, cells with high ATP demands, tend to do poorly with heteroplasmy? Why is that? It is because water is lacking in these cells for some reason. He is pointing out, what I have, in the EMF 4 blog post. The answer is found in thermodynamics.

All thermodynamic problems are basically mass equivalence issues at their core. That last statement is foundational to my Quilt document. Nothing in life is really a biologic process, they are all quantum thermodynamic ones. Doug Wallace, an NIH mitochondrial researcher is saying this loud and clear, but biology folks do not understand what he is really implying. Biology does not understand how mass equivalence links directly to cellular bioenergenics yet. Changes in mass and volume of cells are direct energy efficiency signals that trigger metabolic variations in pathogenic steps in cancer, viral infection, or variable drug responsiveness in diseases.

Mitochondria are organized according to the statistical nature of the Second Law of Thermodynamics, and as such, it deals directly with the mass equivalence relationships of energy everywhere in cells. Since an electron has no mass effectively, it is by far the most favorable sub atomic particle for life to organize around because it carries a small thermodynamic cost. This is why the human brain can

operate on just 20 watts of power. This makes it the choice subatomic particle of the evolution of complex life. This is also why DHA has never been replaced in 600 million years of eukaryote evolution. This is why the input to human mitochondria is called electron chain transport.

This is fundamentally why apoptosis and autophagy are directly linked to cell volumes and mass as well. Taking the scale further we can see where changes in mass directly affect longevity because of the effect of mass on time. In physics, Richard Feynman said that time is a direct function of mass. Time gains its direction in life because of the redox potential. The more "electron life" can organize around the longer life will live. This directly links changes in mass to alterations in telomere lengths of chromosomes in biology.

Ketosis increase telomerase action in cells. Ketosis also decreases heteroplasmy in tissues as we age allowing us to get more use out of the mitochondria we have by making them more efficient by controlling their size best. This implies ketosis as we age may be as important as it was during the first 6 years of human life for a reason we do not yet understand. Moreover, this mechanism allows us to recover our mitochondrial DNA protein synthesis. This occurs because ketosis provides the most dense source of electrons to our mitochondria while lower delta psi. Since electrons are the only source of "massless energy", It would stand to reason why electrons have the most favorable thermodynamic profile of all subatomic particles.

This is why proteins associated directly with cell mass and size are deadly to humans. For example, consider defects in the protein laminin. This defect kills people with a disease called progeria. CFTR defects cause kids with Cystic Fibrosis to die earlier. Cells lose the tensegrity of their collagen cytoskeleton and get larger. Anything that gets larger is losing electrons and has more protons. More protons means a higher atomic mass and mass requires more energy to organize

around. Protons have a mass, and electrons have 1/2000 of their mass. Electrons impart the piezoelectric current present in collagen to limit its size. So do you still think life is about genes or about electrons and protein thermodynamic changes?

A study in 2004 in Nature Genetics by Alan Wright has shown why the "gene centric' approach in biology maybe wrong. He showed that if you could extend lifespan, you could simultaneously postpone all the disease of aging with an ingenious experiment. He asked a simple question. What happens to different animals with different lifespans when you knock out the same nuclear DNA gene? He looked at Huntington's, Parkinson's, and Alzheimer's disease in this experiment among seven others. They found a tight correlation between disease progression and the leakiness of the mitochondria in all these diseases. It was irrespective of the nuclear gene deletion! It is now clear to us that our old beliefs about nuclear DNA dominance is no longer applicable. It appears that disease onset is married to the cellular physiology of longevity built into the mitochondria. In all degenerative diseases, it appears cells are lost by apoptosis and mitochondrial leakiness and volume changes are what determines this cellular fate with respect to cytochrome C action. This was a correlative study and not a causative one, but the linkage was very tight. Later in 2004, another study appeared in Nature, from the Karolinska Institute that suggested strong causation. I suggest you read about them in Nick Lane's book , Power, Sex, and Suicide. Since that time the it is clear the change in volume, links directly to mass equivalence and thermodynamics. No one in medicine or paleo seems to know this. Moreover, these findings requires no RCT because it is a universal physical law. $E=mc^2$ is the law everywhere. This is also lost on many researchers.

If an organ has mostly defective mitochondria, the organs function will be suboptimal, but the organ can amplify the

least damaged mitochondria for years using autophagy and apoptosis programs. Mitochondrial fusion and fission, together with autophagy, have been proposed and shown to form a quality-maintenance mechanism that facilitates the removal of damaged mitochondria from the cell, a process that is particularly important to forestall aging and organ failure. This is commonly seen in kidney and heart failure. Both kidney and heart sizes also increase when they fail. Interestingly, the human heart fails most commonly by autophagy with diastolic failure.

Mitochondria usually last about 3 weeks in most cell lines. The choice for mitochondria in life is limited; divide or die. In this fashion, defective power plants are constantly weeded out. Let me give you an example. Take a brain neuron. They usually are as old as we are and are rarely replaced. Their function does not crash if there is a power plant mutation. Instead, its function is diminished to a very small degree over time. The more defective mtDNA is, the more oxidation will be found in the cell. Oxidation is an electron steal phenomena and this results in an enlargement of the tissue in question. Oxidation destroys the DHA content in cell membranes. Blue light is a form of non native EMF and it oxidizes DHA. When this happens vitamin D and A levels are altered in the nervous system. When DHA is lost, electrons are lost. When electrons are lost and things swell. When things swell in a cell it also cause enzymatic fluxes to slow and signaling is altered. All energy dynamics begin to become inefficient.

Ironically, this oxidation does not affect energy delivery from the diet, in the cell as we once thought. Studies have been done in damaged organs and cannot find evidence for increased oxidative damage. What is changed in these cells, is the generation of transcription factors and genes by the new cellular redox state. This redox state is the warning system for the cell of possible impending doom over time. This is

tied to the ratio of electrons to protons within the mitochondria and on its inner cell membrane. This is why the redox potential is the most critical factor in human life.

Nuclear regulatory factors 1 and 2 get activated (NRF 1 and 2). NRF_1 is what signals the nucleus of the cell to manufacture of new mitochondria and NRF_2 is the signal that shuts it off. This signaling system accounts for the chronic inflammation due to oxidation that underscores aging and disease propagation in humans. The level of oxidation chronically resets itself depending upon the current cellular terroir. This implies the redox state within the cell is the biggest factor in how protein signaling occurs within a cell.

We know in humans that this state can exists for decades. I follow these trend with a battery of labs I spoke about in the Redox Rx, which tells us what is likely going on at the mitochondrial levels from electron transport.

When the redox state is low, we may notice we have less energy, we take longer to recover from exercise, but it generally won't kill us. With this explanation, it should be clear that the trade-off for removing bad mitochondria is long-term organ failure. this happens, however, slowly over time by depleting stem cells from our subcutaneous fat stores. We call this aging today.

The better the redox potential on the inner mitochondrial membrane the more heteroplasmy we see because it tells us the organism is best able to handle the changing signals in the environment. When the redox potential is not as good, our mitochondria use too much apoptosis or cell suicide, and not enough autophagy. When this situation exists on a chronic basis, we deplete stem cells, organ failure is more common, and life shortens.

Where do the human stem cells come from? The most plastic human stem cell is in human subcutaneous fat. This is why

plastic surgeons use fat transfers in their work on the human face. We talk about this tissue later in this series. Einstein's mass equivalence equation tells you why life organized around what it did…..the redox potential. Electrons = a high redox potential and excess protons lower it. Electrons build complexity. Protons do not. They are the signaling particles from the environment to the mitochondria. You gain electrons and the power in their photons from having DHA in every cell membrane of your body.

What did I say in the April 2014 webinar Q & A about oxygen? Oxygen allowed complexity because it has electrons within its atoms, O_2.

Electrons carry a massless form of energy and information to reduce oxygen. More oxygen generates more electrons in the CSF.

Electrons build complexity, because they are free of the thermodynamic constraints of mass. Mass requires more energy thermodynamically.

What do humans have within their skulls, that primates do not?

Where do we develop that complexity?

Still think macronutrients and calories matter?

Only a simple mind does…….

It is the reservation of electrons for construction of the brain and immune system that separates us from our nearest ancestors. How do we capture electrons best as humans? DHA. How do we assimilate them best? When DHA, water, collagen, and cell membrane chemistry are all working properly together.

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