EMF 4: Why Might You Need Carbs for Performance?

Readers Summary

1. We must always be careful to place more weight on the observations of scientists than its current theory.

Today EMF-4 is going to hit a very controversial topic. Why do the younger performers perceive they need carbs for performance? For years, I have said loudly, I don't believe it is true. Over the last 7 years, I have begun to understand why their belief exists now. **When you suffer from a disrupted circadian clock you perceive you do need carbs.**

It has been shown recently that artificial EMF's make our blood-brain barrier and gut more permeable to carbohydrates. The micropulsations of EMF control biocycles, including the timing of mitotic rhythm and the entire cell cycle. Any major change in their frequency would be catastrophic for cells. In fact, today most of the paleo-sphere is unaware that experiments already have been done that have shown that vibrational rates near normal and slightly above the Schumann resonance, from 30-100 Hz, cause dramatic changes in the cell cycle timing.

It turns out, the most powerful shaper of our development may turn out to be the subtlest force, that is completely invisible to us and perturbs the manner in which we handle macronutrients and recycle ATP.

There are many performance athletes who are using the ketogenic diet to fuel superior performance today. Many more endurance and performance athletes and trainers do not believe this is possible because their own observations have failed to show it to them. We recently have heard several people say

there are no alternative ketogenic fuel sources to get it done.

Some of us chuckled at this notion because we never saw even a brief mention of the major biochemically reducing pathway in humans mentioned in their work. This pathway fuels the recycling of energy substrates in major beta oxidative pathways. It has become clear to many of us, it is just in everyone's blind spot for a very counterintuitive reason most are unaware of. We even have conflicting evidence from Volek and Phinney recent book.

How do we reconcile it?

It is easy to explain, once you realize that you can't access the fat burning pathway when your molecular sense of timing is off. When you molecular clocks are off you can never benefit from true fat burning. You won't find that factoid in your biochemistry book either. After this blog, you'll begin to understand why. Extreme performance requires you to enter the most chemically reduced pathway that biochemistry has for life in humans. That pathway's job is to restore the major "reducing elements" in biochemistry. This means it is loaded with electron density, for those who are not getting the linkage between electron flow and chemical reduction. That biochemical pathway is the **Pentose phosphate pathway**. (PPP)

Truth Bomb: This pathway has only a few major endpoints, but they are all massively important for human life. It is designed to optimally restore RNA and DNA synthesis by providing maximum recycling of ATP, and it allows for the optimal formation of bio-energetic substrates to make replenish the mitochondria's ability to increase **total adenine nucleotides** to re-establish optimal ATP stores from beta oxidation of fats.

It has one more key element that many in paleo forgot; it makes and restores the key reducing chemical element, **NADPH**,

to replenish glutathione in **all** cells, but especially the liver. Glutathione is the major antioxidant in the body and is a critical element for reducing inflammation, oxidation, and detoxification in the body. Most of paleo think we optimally restore glutathione from "whey protein supplements or from NAC use". Nothing could be further from the truth.

As I laid out in the last blog EMF 3, life began on the ocean floor with a constant stream of alkaline laced chemicals loaded in electron density resulting in an environment that was extremely chemically reduced. When I realized this is how life began on the planet, I cut to the chase, and **I went to my biochemistry book to look for a pathway in humans that mimics these effects to optimize it in me**. Here is where I found the story of the PPP and how it is critical for longevity, life, and ultimate performance. It is the mechanistic pathway for the Ancient Pathway found in our brain that we covered in Cold Thermogenesis – 6.

One major catch to this pathway: **To enter it routinely, it requires the human to be able to accurately tell time in your SCN and your liver**. If your endogenous molecular clock is off, this pathway will stay in your blind spot and you will continue to believe you need carbs to replenish glycogen post exercise. This is why so many have missed it. **They never pay attention to molecular timing in biochemistry class**. Today, you'll find out why this is a critical error.

Most were taught and therefore believe glucose is used to replenish muscle glycogen, while fructose replenishes liver glycogen. The optimal way to replenish glycogen for performance is to replete liver glycogen by using the PPP, not glycogenesis. This pathway is poorly studied, by even the brightest in biochemistry, because most do not realize how tightly coupled it is to optimal fat burning.

Why performers think they need carbs

The two fastest pathways in biology to **replenish ATP are creatine phosphate (CP system) and the glycolytic pathway (Krebs cycle)**. Fast is OK when you're chronically depleted, but it will never support optimal endurance because long-term ATP recycling is not working. Neither one is great at making ATP for the long haul because they make few moles of ATP per unit volume of carbohydrate. This is because these systems rely on poor electron density of the substrates that run in these pathways. Beta oxidation, on the other hand, is not a fast system to replenish ATP, but it is quite effective replenishing ATP long term because it makes 4 times more ATP per unit volume than the Krebs cycle does. **So when you are electron depleted for any reason, your body does feel better when you quickly replace the ATP, but you can never reach the maximal performance of the fat burning pathways which make 4 times the amount of ATP.**

The Ketogenic Athlete Alert: The reason fat burning takes 12-24 months to get maximum ATP production, is because the PPP uses **D-ribose** as its energy intermediate chemical to replenish the products of ATP hydrolysis. It seems performance athletes and their trainers missed this pathway in human biochemistry. It is the holy grail for fueling maximal athletic performance and belies the power of the Ancient Pathway. This also helps us understand why a lion, who eats nothing but protein and fat needs 20 hours a day to sleep, but a gazelle, who is a herbivore only needs to sleep 6 hours a day. A gazelle eats a diet high in carbohydrates that replenish ATP quickly, therefore they would not require lots of sleep renewal to replenish their ATP fast. Longer term this leaves them energy poor, but they can refuel fast to get away from their lion. Compare that to a lion who eats a ketogenic diet that uses the D-Ribose to replenish the energy substrates from the fat

burning pathways. Because they need more D-Ribose from the **Pentose Phosphate Pathway** (PPP), they require **more sleep** renewal to get ATP levels higher.

This is why paleo athletes think they "need carbs" to feel and perform better as well. When your clock is off, your perception is skewed to faster ATP replenishment than it is to a longer-term replacement for endurance performance in ketosis. I have several world-class athletes on my forum who have used for over 4 years and I hope they chime in here. **(Barry ALERT)** This would also be reflected in their endurance capabilities, VO2max, longevity and telomere lengths. This also underscores why paleo performers can get by on less sleep than a real fat burner. However, it is also why the paleo performer is always tired and sleep deprived. The ultimate revenge for them will be in an altered ASI (adrenal stress index) and salivary melatonin and limited lifespan filled with diseases they think their diet makes them immune too.

The immediate "keto benefit" is they have more energy to fuel performance and endurance. They also should have better longevity, especially when they have amplified efficiency of mitochondria in their skeletal muscles. It appears sleep levels in animals may be directly proportional to the way ATP stores are replenished in the animal.

Humans are designed to eat an electron dense diet because they have a shortened gut and expanded brain that steepens their energy needs and restricts their sleep needs to 7.5- 8.5 hours. This implies that humans must have evolved around a diet high in electron density from food and their environment. Humans who eat like Gazelle's do, are now known as diabetics, people with fibromyalgia, and **suffering from sleep apnea** (shortened sleep), which cuts their ability to sleep long because they have adjusted to regenerating their ATP from the fast acting CP and glycolytic pathways over the more fuel efficient fat burning pathways of beta-oxidation.

The pathway performers forgot

The D-Ribose from the PPP, is alternative fuel pathway most of "paleo" does not believe exists to fuel performance. Ironically, few paleo's would argue that predators, like lions, are non-performance athletes. **Fructose and glucose are not the only way to replenish liver glycogen for explosive exercise or performance.** D-ribose restores glycogen levels in the liver of high-performance animals who eat a fat-laden ketogenic diet very quickly. The D-Ribose substrate is the jet fuel restoration intermediate, that many in the exercise physiology literature have missed in their performance template for diet and it is a vital component of the fat burning pathway in human mitochondria that has three major functions:

The main functions of the Pentose Phosphate Shunt:

1. Supply's the cell with NADPH in order to: Convert hexoses into pentoses (which are essential components of **ATP, CoA, NADP+, FAD, RNA, and DNA**).
    - Provide **reducing power** for biosynthetic reactions. (Remember we want to live in the chemically reduced pathway of life from Brain gut series)
    - It serves as a biochemical reductant to **maintain glutathione** levels everywhere in the body.
    - Be utilized by the cytochrome P450 mono-oxygenase system for **detoxification pathways in the liver**.
    - As the electron source for reduction of ribo- to deoxyribonucleotides for RNA/DNA synthesis.
2. Enable the complete oxidative degradation of pentoses by converting them into hexoses and trioses which can then enter the glycolytic pathway. (minor function in a fat burner)

Non-Geeks Truth Bomb: You might begin to see why so many

performance athletes think carbohydrates are needed to get maximal performance when their circadian signaling is off now. It may explain now why a good looking body can be pushed directly into a poor ASI quickly when the person eats like a chimp while exercising to excess? When your diet is electron poor, you exercise to excess, you're disconnected from the Earth, you love using artificial light and technology, you have a definite lack of electrons in your mitochondria constantly. When you couple this all with a 30-year massive influx of EMF to block the ability to sense magnetism and therefore your cells lose track of biochemical timing all hell breaks loose. As a result, there is a resultant altered cortisol circadian cycle 100{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of the time. This is why many paleo performers have long-term fatigue issues, yet they look good in the mirror. (The paleo paradox)

The ATP-CP and glycolytic pathways are horribly inefficient at making large amounts of ATP to replenish energy stores. So when the exercise or diet continues the gradient of decline steepens quickly. This leaves "more space" in your electron chain, and further throws off the nanoscopic precision required to make ATP well. It means **cannot replace your ATP needs fast enough** to offset the losses from your behaviors. Your brain makes decisions (low dopamine) to fuel with carbs because it has learned that ATP can be made fast this way, but your cells can't fully re-energize this way because the fast fill system never fills the gas tank fully!!!! In fact, long chain fatty acids have huge energy potential for the host. One molecule of glucose has only six carbons. Glucose can make 28-30 ATP from it. One molecule of an 18 carbon stearic acid, an FFA, has three times as many carbons as glucose but makes **five times** the amount of ATP (147 ATP), while only having **two times** the caloric density of glucose. This shows you precisely why a calorie is not a calorie and why calories in and calories out makes little sense thermodynamically.

When you continue to exercise to excess with daily CrossFit WOD's, during this time it further robs your mitochondria of electrons, and the result is a poor sleep and fatigue. Your labs reveal a low cortisol to DHEA level and an altered melatonin level. Molecular timing being altered will give high-performance athletes the false impression of what is best for their biology because of the limited fashion they are able to replenish ATP. **This also explains why they crave carbs to replete ATP faster, but not via a more cost-effective manner.** Does this situation sound familiar to anyone?

Our molecular clocks respond to light, dark, and magnetic field. Anything that disrupts them alters your clock and you begin to perceive you need more carbs than you generally would need if you could tell time. Not telling time well, leads to cell swelling, becoming permeable to glucose in membranes and up-regulating the carb burning pathways to try to stay ahead.

This also might help explain the fact that we humans can only store 2000 kcals of carbohydrate but 80,000 kcals of fat. We use fat to make cell water that favors a specific hydrogen-bonded network. Which do you think our body is designed to burn by evolution? When you know better you simply do better.

ATP is very efficiently made by beta-oxidation during the period of autophagy during sleep in fat burning animals. Fat burning requires 1500 hydrogen atoms to cycle through our ATPase per second to work properly. What happens if this cannot happen? Because this system relies on D-Ribose to restore ATP substrates like ADP, AMP, Inosine, and hypoxanthine, hydrogen movements become the key to understanding the PPP. This is **why ketogenic diets** take much longer to see VO_2 max expansion than the experts expect to see. Most people have lost how they control hydrogen movements in their matrix and cytosol.

Cross Fit Truth Bomb: There is one more big problem with recycling your ATP using the two faster systems for most of

your life too. The usefulness of the ATP-PC system lies in the rapid availability of energy rather than quantity. This is extremely important with respect to the kinds of physical activities that we are capable of performing. Cross-fitters live in this pathway constantly because of their WOD are done for **time alone**. The ATP-CP system has a special problem built in for fast ATP recyclers. The methylation of guanidinoacetate to form creatine **consumes more methyl groups than all other methylation reactions combined in the human body**. This implies the more you use the ATP-PC system the more likely you will become a major slow methylator whether you have the 677 or 1298 SNP. This is why vegans, performance, and endurance athletes fall apart early, have horrible vitamin D levels, major dopamine/serotonin issue, trouble with their ammonia cycles, and have horrible endogenous glutathione recycling because of a defect in their NADH and NADPH pools.

This by itself with time can lead to poor performance, early onset heart disease, atherosclerosis, and autoimmune issues. We call this person a "slow methylator". They are slowed because each methyl group has 3 hydrogen atoms that need to be a specific isoform. Most people are not even aware they have this issue because they believe methylation defects are behind these issues. Not true. This is why so many paleo crossfitters slowly fall apart and sustain major muscle, tendon, and cartilage injuries as they progress. Take a look at these two links:

1. Life Extension Magazine, Creatine: Not Just a Sports Nutrition Supplement
2. Methylation Demand and Homocysteine Metabolism: Effects of Dietary Provision of Creatine and Guanidinoacetate

The rate-limiting step for the brain and muscle is the integrity of the methylation system and not creatine levels. This is where looking deeper matters more when your cells can't tell time. This is also why people who live in these fast ATP recycling pathways suffer tremendous ATP deficits

when they stress their systems continuously. **This fuels their perception of a deep carbohydrate need to recycle ATP fast**. Ironically, when they do, they do feel better, but they are paying a biologic toll they never see or perceive.

The change to optimal fat/protein burning can be shortened when you acclimate to making enough D-ribose from your PPP. The life-giving force on the ocean floor was alkaline, made a lot of NADPH, and provided ample electrons and light hydrogen to help RNA, DNA, and glutathione to support life at its genesis. I looked for a pathway in mammals that did the same "mechanistic biochemical actions" in modern mammals and I found it in the PPP. This is the pathway an Ancient Pathway relies upon for performance it provides. The key to understanding the pathway is how it uses NADPH and how the NADPH pool uses hydrogen. This use is codified in methylation and histone acetylation programs. We are only as strong as our weakest link when it comes to mitochondrial function. This is why D-Ribose, Magnesium levels, Acetyl-L Carnitine, and CoEnq10 levels, (and some others) can become those weak links in the inner mitochondrial membrane for fat burning when certain situations in our environment allow for it. Magnesium deficiency causes us to lose the ability to use sunlight properly because to convert cholesterol to Vitamin D we need cell water to complete the isomerization step in the skin. Without structured cell water from the ICF, magnesium cannot work. Taking magnesium, in this case, will actually make you worse. As a person grows older, heteroplasmy rates rise. This is an important lesson to learn. As heteroplasmy rates rise humans develop a greater percentage of body fat, the percentage of total body water (TBW) gradually decreases.
The TBW is distributed among two major components: intracellular fluid (ICF) and extracellular fluid (ECF). ICF constitutes about 40{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of the total body mass in healthy individuals.
All biochemical reactions take place in ICF (Guyton and Hall,

1996). Every second 100,000 biochemical substrates interact per second. None can work without structured cell water made by mitochondria. Each of the 100 trillion or more cells in a human body is a living structure that can survive indefinitely and, in most instances, even reproduce itself provided its surrounding fluids contain the appropriate nutrients. The principle fluid medium of the cell is structured cell water, which is present in most cells other than fat cells in a concentration of between 70{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} and 85{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}. Many cellular chemicals are dissolved in the water, while some are in particulate form or enclosed by membranes. Chemical reactions take place among the dissolved chemicals or at the surface boundaries between the suspended particles or membranes and the surrounding water. I covered this in detail in the January 2013 webinar for those who want to learn a lot more about the details around the Mitochondrial Rx.

Is transgenerational epigenetics the cataract for this pathway?

Modern paleo folks have been born into a world where none of their clocks likely have ever been normal because their grandparents and parents clocks were altered from the fake light beginning in 1874. They then faced escalating manmade EMF's, which permeated their world since the 1940's and have been escalating every decade since. Today they are at catastrophic levels. These changes began to alter chronobiology, first, on their grandparents, then their parents, and now them directly. This is how trans-generational epigenetics works. This explains the abrupt changes in all the epidemiological curves for humans. They are all steamrolled

forward, or frame shifted; in 1978-1988, and this can be seen in NHANES curves for obesity. I would suggest to you now you take a break and look at J.S Stanton's talk from AHS 2012. Pay attention to the comments from the first questioner after his talk, Seth Roberts. Does he want to know why the NHANES curve inflection happens dramatically in the 70's? Well, we cover that in some detail in EMF-5.

Every 10{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} tech spending rises cause obesity NHANES curves go into higher BMI ranges. We need to advocate technology diets to limit screen time. The more screen time you have = the risk of obesity rises. No shocker to any mitochondriac. It might shock those who always blame food for obesity that there is another cause.

I believe the reason is simple for one reason: humans developed cellular tardiness because they lost their control of electrons and protons in their mitochondria. For 4 decades prior to the 70's, we have had a slow unwinding of the precision of our endogenous molecular clock because of our technology addiction. Unbeknownst to us, we then added a massive infusion of carbs, fake light, man-made EMF's. Shortly later, medicine called for the removal of all the best fat's from the diets (thanks, Ancel Keys); while we simultaneously had food companies created non-evolutionary foods, with various hydrogen isoforms using GMO's, added hybridized wheat, and trans fats to more fake foods for over a decade.

The first and most important issue that set the table for this entire mess was ruining our endogenous molecular clock. This is when all neolithic diseases began to appear in epidemiologic studies because of the cumulative effect of the five things I mention in EMF-2.

It also belies why maximum performance from ketogenic diets have remained hidden from modern paleo, science, and mankind,

because they never realized how Circadian Clock Gene regulators (CCG's) have altered our genome and our epigenetic expression. The chemically reduced pathway for life is based in the PPP, and it is **how mitochondrial ATP production is maximized**. Let us begin to look at this issue now piece by piece.

So, what should we do after EMF 1-3?

We left off EMF -3 discussing CCG's. CCG's are wired into every known human gene in the genome. You would think this would clue anyone into just how important timing might be. This allows not only every cell to tell proper time but it allows our DNA and RNA to do the same. If you consider all neolithic disease's present today, the true battlefront in your body begins with positive-charged free radicals called inflammation and a loss of electron flow from a diminished ability to sense the Schumann resonance by cell's is huge. The result of not being able to complete it is pretty simple: The big negative-charged Earth overwhelms little, positive-charged free radicals of inflammation. What does this mean? It means the mammalian immune system genes get a boost in function from those free electrons in the Earth if you are plugged into the tectonic plates as evolution expects us to be.

Is there any way we can prove this statement, Dr. Kruse?

Geeks and Non-Geeks Unite: Yes, there is. When the precise timing of biologic reactions is off, if the TCA/urea cycle spin rate slows for some reason, nothing works with the nanoscopic precision that life or biochemistry has evolved to expect. I covered this in detail in the January webinar when we discussed electron chain transport in the recycling of ATP production. This is repeated in every biochemical reaction in our body. This is why all genes have CCG's tied to their transcription factors. When timing is thrown off, the

biochemistry is completely frame-shifted within the cell. People seem to understand what frame shifting means in genetics, but few people understand how a frameshifting in time alters the epigenetic precision of a cell. A frameshift in genetics leads to a small quick change in one generation. As generations progress the problem slowly worsens. A small change in timing of biologic processes results in changes in time depending upon the lifespan of the animal in question. The result is not as immediate and can be missed if we do not perceive the effect of time on $E=mc^2$ in biology. It goes so slow, that it may remain in your blind spot for your entire life. **This is how all autoimmune diseases begin, in my opinion.**

Why are the symptoms first found in a leaky gut or in skin breakouts? The cells of both organs turn over in 2-3 days in a normal person. In someone with an altered clock the cell cycle timing is altered and they do not turn over all their cells as they are designed to and it causes increased permeability and activation of the immune system. This is why incorrect clock symptoms are found in people with bad skin breakouts and poor gut function. Any cell that turns over quickest will be affected by a clock timing issue first. Cells in the brain are some of the slowest dividing cells so the effect there will take decades to show up. This is why Alzheimer's and Parkinson's disease and gliomas are now being expressed 50 years after the first wave of man-made EMF's and artificial light.

Clock analogy for everyone to understand

As an analogy, think of Fed Ex manager asking this question of one of its quality online foreman. Say they are concerned that overall package delivery has become really poor over a 3 month period of time. Do they want to know why, so they ask the

foreman these questions: How is our supply chain for arrivals? The answer they get is ‘great’, from the foreman. The next question is how is our departure supply chain? The answer is it is ‘great’. The next question is how is our inventory supply chain? The answer is, once again ‘great’. The manager looks puzzled at the foreman. He asks the foreman, “how can all systems be working great, but yet our delivery performance is so bad?” The foreman responds quickly, “well, the arrivals never come in when they are supposed to, so this delays their re-routing to the delivery system. In turn, this also directly affects the timing of our deliveries out the door. The amount of inventory we are moving is the same but we have to pay more for overtime because the timing of the input and output is off! The reason you don’t understand it, sir, is because the systems that we measure directly about our lines all work fine. They just are no longer yoked to be precisely timed as they used to be.” Got it? When systems in cells get more complex it requires timing to be very accurate. Simple life, like bacteria, do not have many redundant systems built in, therefore, their need for precise timing is not as steep. Think of this car analogy. A 1910 Model T Ford and a 2013 Corvette are both cars. Do they perform the same way? The reason is the efficiency and redundancy of the systems in the 2013 car have to lead to many upgrades. These upgrades now require precise timing from a computer in the engine, while the Model T uses its simple gas engine to just move.

The endogenous clock and aging

Things that should happen at precise times in a cell, suddenly do not and can not, because the laws of gravity and mass have been altered by the loss or slow down of electron flow in our batteries. **This means the molecular clock is needed for precise timing**. Einstein told us in 1905, the speed of light is nonetheless invariant and the same for all observers. He also said that space and time should be considered together and in relation to each other. The reason for this is not so

obvious to the ANYONE. Measurements of various quantities are relative to the velocities of observers. In particular, he said space and time can dilate can get bigger as the speed of light is squared. Yes, he said back then that space/time can bend in its dimensions. It means the faster we go (or the slower our cells divide) the slower time elapses and the younger we stay, but the **slower our clocks go the older we get**.

This set up the relationship that loss of electrons is directly proportional to aging and inflammation in humans. Most people know that light bends in space/time, but many biologists and chemists forgot that time speeds up relatively as well when we are energy inefficient in recycling ATP on our inner mitochondrial membrane. This is really why aging occurs at all in life. When he came up with the Theory of Relativity, it was applied to astronomy and physics and not a closed system of living cells. In fact, it was rarely seen to have an application to biology. That was our error and not theirs. Aging is directly proportional to poor electron flow in mitochondria.

Truth Bomb: EMF and artificial light cause us to be energy inefficient by losing electrons (or electromotive force), and the loss of electrons bends space/time in our brains clock, the SCN, causing our endogenous Rolex to be off in a big way. When timing is off, we must be losing energy and altering our mass because of $E=mc^2$. When energy drops, a cell retains a net positive charge that causes inflammation to begin, which link to all modern neolithic diseases. Notice, I did not say **SOME diseases**. I said **ALL** of them. Why? This alteration of space/time in our environment causes us to leak electrons because the electron chain transport must use a constant steady stream of electrons to generate ATP in our cells. **This means that the electron flow is directly proportional to the accuracy of the Rolex in your head**.

This is why our modern epidemics are now global. This is not a "good or bad food" only story folks. **It means if our clock is not working well in timekeeping, we are constantly losing energy and information to our environment.** This underpins why **no diet** has been able to solve all our modern problems today. I want you to begin to think way outside the box about this simple math problem. There are only 3 variables in this equation. In a cell, energy and information in our environment come from mitochondria and mitochondrial function is 100{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} tied to electron flow. Electron flow control how hydrogen is handled in a cell. Anything that alters electron flow, alters the formation of ATP. Without energy, life does not exist.

If you are doing well with your electron flow how can you tell? You will have a very high basal temperature and increased metabolic rate. You will sweat at the correct times. Why? The ATPase in our body is built to be bi-directional and we can uncouple electron chain transport from ATP production to waste excess energy as free heat. Most people rarely get to this place, except elite fat burning athletes. They can go into the freezing cold and radiate heat within seconds.

If you don't think time dilation of our SCN is a real biologic issue, you might want to study how the GPS in your iPhone works. The Global Positioning System can be considered a **continuously operating experiment in both special and general relativity**. The in-orbit clocks are corrected for both special and general relativistic time dilation effects by computers, so that (as observed from the earth's surface) they run at the same rate as clocks on the surface of the Earth. If they did not work in unison, and instead acted on different time scales, GPS navigation would result in directional chaos for travelers. When your SCN is off, this is mimicking precisely what would happen in that altered GPS system as well. When the brain can't tell time accurately biochemical processes cannot

happen with the precision they are supposed to in the cell. The result is chaos and chaos are called inflammation which carries a positive charge.

Theory of Relativity Truth Bomb: When the timing of biologic reactions is off, it does not matter that the reactions proceed as biochemistry books or any biochemists predict they will. What does matter is that these biochemical reactions are all relative to time and not what we believe to be true?

Electrical Geek Fest: To tell correct molecular time in the brain, we need a good reference point. That reference point is counted by the SCN to tell time. Now forget about the brain for a minute and think how this works in your house. The electrical ground in your house provides a reference point for all the other circuits in your house. Grounding also provides a reference point for all the brain's electrical activities in our body. Any electrical appliance needs a ground, a reference point, to define the values of the voltages inside its electronic circuits. Even sophisticated equipment, such as digital-storage oscilloscopes, cannot function properly without a clear reference point. **Any electrical engineer knows this truth.** Without it, all the voltages inside the appliance are ill-defined, and the electronic circuits, which are designed to work based on a reference point, cannot operate correctly. They give random voltage values and the system shorts out. This situation can damage expensive equipment. We seem to get this analogy about tangible electrical appliances, but we don't seem to realize the same exact principle is occurring in our SCN to alter the timing mechanism in our brain, and this slowly ruins our expensive Rolex in our own skull as we live life.

The human body is by far the most complex piece of "equipment" on this planet. It has evolved to be in constant contact with the Earth to monitor its pulse to tell time. When we are disconnected from it we lose electrons. When EMF signals are above the 7.83 Hz that the alpha wave in our brain use to tell

time we lose that reference point. This frequency is set by the magnetic field of the Earth.

All of its internal processes are just like electronic circuits as we have laid out above. The SCN is subject to a constant connection to a steady source of electrons from the Earth's electromagnetism in our environment to "ground us" to operate optimally. Without it, we can accurately predict time. When we cant predict the time, the "M" in E=mc2 breaks down and the result is a loss of energy and loss of electrons. The body has developed several internal mechanisms (ability to raise zeta potential) via natural selection to help it cope with a temporary disconnect from the Earth, but in the long run, the lack of connection takes its toll.

One such system is the use of CoEnQ10 in our serum to protect our serum from electron loss and lipid peroxidation of our serum. Moreover, this explains why birds, bats, and bees have chosen to have a more mitochondrial density in their cells, to support the bio-energetics of flight. The higher one goes above the ground the more electrons you lose because of the loss of the earth's connection and the loss of the magnetic field. To offset these losses they needed more ATP capacity to produce enough energy to sustain flight and life away from earth. Humans did not evolve in the same fashion, yet, we have the capability now to fly more than most birds do. Humans do have massive increases in mitochondria in our muscles compared to reptiles so we can sustain endurance to obtain food.

This may help you understand why humans are subject to blood clots when they fly now. The more we fly, and higher we go, we also lose the connection with the magnetic field. This causes us to lose energy and electrons and increase inflammation in our body. To offset this effect, if we also have a serum with a high zeta potential we can keep our blood flowing, and not clotting. The sicker we are, or the more inflammation we have, the lower our CoEnQ10 levels are and the more our

platelets lose their repelling charge from one another, and they clump together to cause a clot. When our SCN loses connection with Earth or its magnetic field for any reason, it causes a major biologic toll.

Chemistry Geek Fest: Changes in the magnetic and electrical sensing systems of the brain, directly alters the alpha waves frequency in the SCN to cause an alteration in the body's ability to reconstruct and coordinate space/time. When molecular timing is altered even slightly, this causes an immediate change in pharmacokinetics in the biochemical reactions in all systems of the body. All chemistry and atoms are subject to these physics. When timing is off we begin leptin resistance and we can visualize it if we look at the mitochondria because **they develop molecular crowding** as it occurs. The loss of energy causes a loss of charge at all membranes and positive charges enter the mitochondria and cell.

Hunger is directly proportional to the charge lost. Hunger and molecular crowding tend to go together in biologic systems.

When biologist or chemists study biochemical reactions, they like to follow the age-old dogma of the scientific method: they isolate the variable they are studying. If they want to know how various concentrations of a protein or enzyme interact with a food or a drug, they are probably going to toss different amounts of the two players into several test tubes and see what happens. This reductive approach to science is doubly attractive to them and has been conveyed in the discussion of the scientific method. It is certainly convenient when interpreting results, because a simpler system presents fewer confounding variables to control for, and it's a lot more convenient to work with for them. But that system of study opens them up to errors they do not see today. What are some of those errors?

Why is molecular crowding a big deal in all of this?

By adopting a more simplistic experimental framework, their tests may be neglecting one critical aspect of biological systems in flux when energy is being lost: the crowdedness of the cell. We know molecular crowding of cells is directly tied to temperature and timing variables in biologic systems. Moreover, these factors are rarely studied as part of the experimental design process. I mentioned this fact in Cold Thermogenesis-6. This is why most of this information remains outside the perception of modern science. If you don't perceive it, you don't think to control for it. In other words, you are unaware of what you might not know. When that fact turns out to be this important; you have a large problem when drawing conclusions. Well, folks, we have a large problem because of it.

As an analogy, think about trading a real living cells size for a labs test tube. The spaciousness of a laboratory test tube can be as stark a transition as leaving a New York City loft for a wide-open South Dakota ranch, in terms of population density. **So how does molecular timing being off, effect molecular crowding, you ask?**

When timing is off we lose electrons from the electron chain transport in the mitochondria. This loss leaves "space" between electrons. This space-time defect throws off the nanoscopic precision in the mitochondria and we lose massive amounts of energy in ATP because of it. When ATP is lost, the result is that a cell's interior gets positively charged and more crowded because it swells and it becomes more permeable to further positive charges rushing in the electrochemical gradient established by the ATPase. Remember electrons come from food and the magnetic field.

A mitochondrion normally leaks

2-5{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of its electrons at cytochrome 1 for normal mitochondrial function and activate or deactivate telomerase, which controls our telomere lengths. Telomere lengths are directly proportional to our longevity according to the 2009 Nobel Prize winner, Dr. Blackburn. When we leak more at the mitochondria, the science says we first create crowding, and then we swell, get inflamed, and we age faster and die sooner. Truth Bomb.

Geeks Unite: How does alteration in space/time lead to inflammation? One obvious result of a crowded intracellular milieu is there is less available space for each molecule to exist, which increases the effective concentration required to carry out the chemical reaction and it reduces its chemical potential. This is precisely why the kinetics of chemical reactions change when the timing is altered. The reaction results may be the same, but if they are frame-shifted because of the alteration of timing just studying the biochemistry alone does you no good. Products of one reaction need to be available for another and when they are not chaos is the result. **This is why what is published in the literature in many cases maybe worthless.**

This may explain why nutritional and biochemistry research will never elucidate the answers we are all looking for. **They never control for temperature, light, or for circadian timing errors in their experiments, yet, we see examples all over chemistry how these two variables dramatically alter experimental results.** The results of timing errors in mammals lead to changes in their hormone status because of the loss of electrons causes inflammation. Research already has shown that humans with altered melatonin levels get sicker quicker, have memory loss, cognitive problems, and get epithelial cancers. It should make intuitive sense why this happens now. Moreover, it implies that research done on them is going to offer different results than those done on people with

adequate melatonin cycles. A low melatonin status tells us we have higher ROS present in the central nervous system. A low melatonin level means more mitochondrial damage is present = higher {a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} heteroplasmy. Melatonin is the most potent anti-oxidant in the brain followed by oxytocin and DHEA.

Lowered ATP = Leptin resistance = low melatonin = low brain dopamine levels = upside progesterone to estradiol levels = low testosterone levels = low vitamin D levels. Got it? Your hormone panel becomes train wrecks and its results become the Rosetta Stone of telling the clinician how bad the Rolex in our head is in telling time from the environment.

As time elapses, these alterations in timing, in combination with slower photo-electric speeds, cause a lack of electrons delivered to the mitochondria, as a result. Low levels ATP production change the inner mitochondrial membranes potential and alter the efficiency of oxidative phosphorylation because we do not make enough ATP to keep our batteries charged. When timing is off we get more ROS generation from the cytochromes than the normal 2-5{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} we spoke about in the January 2013 webinar. As a result, the mitochondria make even less ATP, and when more time elapsed it increases the space/time deficit, this alters the physiologic function of organs when we fall below 60 kJ of energy production from the mitochondria. Normally from one mole of water, we normally make 286 kJ of energy. Over a lifetime of bad circadian timing, we lose that power differential more quickly when artificial light and EMF signals dilate space/time and alter electron flow in our mitochondria. It takes about 25-30 years for a good mitochondrial to decline from 286 KJ to 60 KJ based on my math skills, give or take a few years. Are you beginning to see why kids are more obese and sicker today than at any other time in

history? Timing is a big deal for biology. It also explains the NHANES shifts.

Organic Chemistry Geeks: As less ATP is made, molecular crowding worsens rapidly. As more electrons are lost, the electron chain has more "potential gaps" and space/time bends more and more and we age at faster and faster rates. This is exactly what we are seeing today on this planet. This erodes mitochondrial efficiency further. As a result of lowered ATP levels, more molecules are squeezed into the cell because the cell membrane becomes more permeable it loses its charge as energy levels decline. We leak more calcium into the cell. As more electrons are lost the mitochondria become more positive. When the cell becomes more positive the focus in the cell becomes on hydrogen isoforms. The more positive they become the greater the electrical gradient becomes to create ROS and inflammation. As it continues, you're improving the chances that the mitochondria fail and as time elapses. As time evolves it happens earlier and earlier in the species in question. This is why diseases of aging now show up in teenagers. Recently we learned that mitochondria fail in eukaryotes when the lysosome/vacuole **located adjacent to them become more alkaline and less acidic.** This work was just published in November 2012 from the University of Washington.

This pH change alters the mitochondrial function to replenish itself with things it needs according to this latest research. Ironically, the pH gradient is also maintained by adequate ATP levels from the mitochondria, so it has a built-in feedback switch for mitochondria signaling for biogenesis or apoptosis and telomere biology. It is really an exponential relationship in the mitochondria; if you toss in a few more positively charged reactants into the mix that decrease electron flow for any reason at all (**think carbs out of season or a low Mg level**), the chemical potential responds dramatically and further reduces energy production because the effect on the electron chain.

Another effect of molecular crowding is a slowdown of molecular diffusion, particularly for large molecules. ATP happens to be a large molecule. All ATP in the cell has to have magnesium bound to it, for it to work the ATPase. The telomerase enzyme is also magnesium dependent. This Mg binding makes ATP even bigger in molecular size and this slows the chemical potential further causing more alterations in space/time. So if the cell is more crowded and your energy source is a large molecule it will slow all biochemical reactions down even further, as the gradient to make ATP declines further.

Think of this analogy: Imagine moving through a toy store collecting large stuffed animals constantly, propelled by an unwavering need to snap them all up for your daughter's upcoming birthday. After a short amount of time, the load is large and you can't move fast through the store. Lower rates of diffusion mean that diffusion-limited reactions will happen much slower, especially those involving larger constituents.

Slower biochemical reaction rates in your TCA or urea cycle mean timing is off and your hormone panel shows evidence of it. What else is present? Inflammation is the result of timing chaos. This is why inflammation (hs-CRP) is the real etiology of all altered hormone panels and all neolithic diseases. The presence of cellular inflammation is the ultimate scientific proof that this is precisely what is happening. Can we see it?

Yes, when we use lab tests, thermograms, or functional MRI's to look for inflammation in low energy states in you right now. It is too bad medicine does not use any of these effectively for real early detection of disease. If they understood this process they would be using thermography as a serious diagnostic tool for early mitochondrial dysfunction before the disease has a foothold. Instead, we waste time on colonoscopies and mammograms that show disease much later in its progression when organs have been suboptimal in physiologic function for a long time already. Early detection

depends upon your idea of time relativity, I guess.

Truth Bomb Alert Non-Geeks: We can measure that in the blood hormone panels, especially an altered salivary melatonin level, or seen in a plasma with a low zeta potential (low serum Q10 levels). Altered melatonin levels tell us about alterations in the big and small hand on our molecular clock, which is controlled by light and dark. A low zeta potential tells us about the second hand, and this is codified by the electromagnetic cells in the SCN that codified by the Schumann resonance frequency of the Earth. This can be found by checking a person's alpha wave frequency and amplitude on an EEG. Electro-negative ions increase the electro-negative capacity of our serum which increases our serums zeta potential. Inflammation carries an electro-positive charge and this reduces the carrying capacity of our serum. When the serum's CoEnQ10 level is degraded by more positively charged particles in our blood, it stimulates the elevation of the interior pH of the lysosome that supports the metabolic function of the mitochondria. It also has massive effects on lipoproteins in the solution of our blood. When cells lose their redox charge they lose their ability to sulfate themselves and the lipoproteins increase in mass/density. This is why longevity decreases when mass rises and light is lost back to the environment. When mitochondria are young and able to make ATP well, the lysosome is designed to be quite acidic with a low pH filled with H+. The pH of our serum can be sampled to assess health and this is why arterial blood gases, CO2 levels, and BUN/creatinine levels matter a ton to a clinician when inflammation is present.

We can also measure a disruption in the zeta potential by seeing how altered the alpha waves are being produced in the brain with an EEG. We use this in seizure patients but I think we should be using it in others too. Alpha waves normally have a regular slow rhythm and a high amplitude but these waves slow down even further when we drift to sleep to replenish ATP

stores. People with altered melatonin levels or zeta potentials will always default to faster acting biologic pathways to replenish ATP they are lacking.

The "Barry" Bomb: Humans Zoo animals get sub-optimal performance when they do things outside of the design of the Ferrari. MovNat ideas for exercise is the evolutionary Rx for movement, in my opinion. Power and endurance athletes will feel they need glucose and fructose to replenish glycogen and power performance because they can not fully use the pentose phosphate pathway to replenish D-ribose to make ATP **fast enough** because they are doing things in their diet that only a zoo animal thinks is good. The longer molecular clock timing is off, the worse things get for these people. The magnitude of loss of electrons from heavy exercise can also disrupt the mitochondrial system as well. This is why many endurance athletes get cancer, sustain massive heart attacks at races, and succumb to it.

Think about "fit " women who are cross fitters and wind up without a menstrual cycle, or a "fit" guy with 10{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} body fat, who also owns a flat-lined cortisol level and can't sleep. These people are constantly posting questions on the internet looking for answers. Guess what the number one answer is? Eat more carbs. Now you may see why they say it. They do not understand, why they believe it, however.

The less ATP we are able to recycle longer term, implies more electrons are lost as time elapses in the electron chain transport in the mitochondria. When you live like a chimp, you also have to eat like one to support your ATP replenishment pathways because your timing is off and you can't wait for the D-Ribose system to maximally replace ATP. **This is why endurance/performance athletes perceive they need carbs**. Barry on my forum, myself, and many others think a bit differently about this set of circumstances. I think it is time you ponder the implications here for yourself.

When you live in this manner long enough, you deplete your body of electrons, mitochondria, stem cells, and you eventually shorten your telomeres, get sick, then die. It seems however that even chimps know intuitively how best to recycle ATP by choosing where to sleep, but we don't seem too.

Chimp Alert: Speaking of chimps, sleeping, and ATP, David Samson and Kevin Hunt of Indiana University studied chimpanzee nesting and sleeping in Uganda. They thought that differences in microclimate between the canopy and the ground might explain where the animals prefer to sleep. The pair set up portable weather monitors in trees and on the ground near nests from August 2010 to January 2011 to test their hypothesis.

Samson and Hunt reasoned, in the American Journal of Primatology, that maybe chimps chose the ground because it is a cooler, less windy place to sleep. They found that chimps do like to sleep on the ground as much as possible as opposed to the canopy. They speculated, chimpanzees sleeping in terrestrial nests, probably spend less time trying to keep their beds stable in the face of unexpected guests and therefore probably sleep more soundly throughout the night. They went on to say, based on estimates of temperature, wind speed, humidity and chimpanzee body mass, the animals sleeping on the ground stay in "energy balance" while those sleeping in trees experience more thermal stress. **I think the explanation is more simple.**

The chimps slept where they got more free energy while they slept on the Earth. In other words, when the chimps were cooled by the ground and not up in the trees. This allowed them to gain energy from the electrons to help their mitochondria recycle ATP better.

LDL/HDL, TG, Platelet Bomb: Loss of long-term ATP replenishment ability is also why we see major charge changes in our lipoproteins when we have lost our zeta potential in

our serum. This loss of Q10 causes our lipid membranes in the lipoproteins to become more "sticky" and cause disease in arteries. This increased viscosity causes slower LDL uptake at its receptor in the liver. This allows the LDL to stay in our serum longer and become exposed to a more oxidized serum that has been depleted in the isoprenoid side chain protections of Q10. CoEnzQ10 has *10 isoprenoid side chains* that protect our serum from oxidation. These side chains use hydrogen in a very specific way. This is one of the ways natural selection has helped us live when we are disconnected from electrons due to starvation or a loss of the magnetic field on Earth. Our nearest ancestors have lower amounts of side chains on their versions of Q10 because their brains are smaller and smaller energy hogs and require less for ATP. **Isoprenoids are replenished by the NADPH reducing the power of the pentose phosphate pathway**. This is another way evolutionary form, meets function. Isoprenoids come from our Archaea kingdom ancestors we mentioned in EMF-3 , for those looking for the evolutionary links.

GeekFest Truth Bomb: Ironically, we also need NADPH from the pentose phosphate pathway (PPP) to restore our chemical reducing powers to synthesize Q10 in large amounts, because we use NADPH to make isoprenoids, like Q10 in the liver.

NADPH also powers the recycling of glutathione, as well. The H in NADPH is key to whether this happens properly. This maximizes liver detoxification and it protects all our cell membranes from lipid peroxidation/ROS damage. This is critical in the brain and muscles for performance. This is why Q10 is tied to the zeta potential of our serum. Increased utilization of NADPH for fatty acid biosynthesis will dramatically increase the level of NADP+, thus stimulating glucose-6-phosphate dehydrogenase (G6PD) to produce more NADPH. **G6PD is the rate-limiting enzyme for the PPP**. NADPH is a potent competitive inhibitor of the enzyme. The H in this enzyme must be a specific isoform to work this way. Thus, the ratio

of NADP+/NADPH regulates the pathway.

This is another biologic reason carbs out of season, are a big problem for our species. Carbs generate huge amounts of NADP, stimulating cells to have to replenish ATP faster, using the less efficient ATP-CP or glycolytic pathways. When it comes to power and endurance all tissues that need this extra power rely on the PPP. When a muscle is being regenerated for any reason at all, the flux through the PPP is up-regulated unexpectedly. This is when ATP is maximally needed. The same is true for DNA and RNA synthesis. You can't reproduce when your energy recycling sucks. This is why women with low body fat who exercise like mad get hypothalamic amenorrhea. It is also why guys with great bodies can have testosterone levels below a 90-year-old guy. It is where both sexes who are fit get their infertility from. This is why these critical pathways are all tied together in unison. The physiologic quantitative importance for the production of NADPH for tissues actively engaged in the biosynthesis of fatty acids and/or isoprenoids is huge.

Those tissues are the brain, liver, mammary glands, adipose tissue, and the adrenal glands. **This may explain why when you are not a fat burner, you constantly live a life with ATP recycling deficits**. This is also why any other mental, emotional, physical, or physiologic, or metabolic stressor can push you off the edge so easily.

This is how the life you live is determined from your mitochondria's perspective, and not yours.

Your brain is the navigator, while your liver is your metabolic engine and your thyroid is just the gas pedal. You need your liver to replenish glycogen using the D-ribose pathway and try not to use the glycolytic pathway with carbs, to see this performance upgrade. This is why it remains in the modern human blind spot.

The more you can't tell the correct molecular time in your brain, the quicker your need ATP, the more you believe you need carbs to feel better. Feeling better is a function of rapidly replacing ATP, not effectively restoring massive ATP stores chronically as we are designed too. Feeling this way is a sign of a low brain dopamine level, and living **outside** the fat burning pathways. I spoke in depth about this in the Dopamine Rx.

Human red blood cells are a great model for those to study who think starches are safe in winter. They rely heavily on the PPP and D-Ribose to replenish glutathione using the reducing power of NADPH. Their morphology changes when the NADPH pool is changed.

PPP Truth Bomb: High glucose/fructose inhibits glucose-6-phosphate dehydrogenase, leading to increased oxidative stress and pancreatic beta-cell apoptosis in the pancreas. This is what causes diabetes folks. If your time perspective is off and this is why the answer remains in our blind spot. This is why cycloset works too!

Non Geeks: This is why carbs/glucose/fructose keep you from finding out that D-Ribose is the alternative fuel for ultimate performance. It is also why bad clock timing leads to diabetes, autoimmunity, and cancer. It helps explain why cycloset is helpful in restoring AM cortisol function and helping T2D in a fashion that **INDEPENDENT OF INSULIN**! See, Taubes did miss this part of the insulin carb story too.

How does this all work to make athletes think they need carbs?

With chronicity of poor decisions built in from poor ATP recycling, (low brain dopamine) eventually, the body will lose its endogenous reference point. The brain is so slick in quantum computing, it can even adapt and rewire to use the

molecular clocks in other organs when the SCN is blinded by modern life's electron loss temporarily. However, as damage mounts with time, that system fails too. The net result in modern life is a slow insidious loss of endogenous biochemical control functions becoming increasingly out of sync, not only with the Earth's resonance frequency but also with our internal molecular clocks that coordinate physiologic functions body wide. You learned about them at the end of EMF-3, they are called CCG's.

For example consider the real cause of auto-immunity: the body loses the ability to recognize what is "self" and what is "not self," as it loses ATP function in the guts T cell's in the GALT, which tell B cells in the GALT when to precisely turn off antibody production to a food antigen, at the correct molecular time. When the timing of this reaction is off, the result is an autoimmune attack on its own cells. If you also happen to be a poor ATP recycler, you might use up all your methyl groups in the ATP-CP system and this further pushes you to any AI you can imagine.

I hope this begins to raises a few more thoughts for you to ponder now. Do cells shift their internal contents to favor certain reactions at particular times? We have no idea because modern science is not asking this question because they are unaware of it. How have the molecular sizes of toxins shifted over evolutionary time? Could this be a cellular response to crowded target cells and more complicated cellular bio-kinetics of metabolic pathways? We don't know the answers to the questions because modern science (especially obesity literature) remains in the dark over these factors and does not even realize they may be the biggest factor in the equation of disease reversal. I began to question these things when I was re-engineering myself, and what I found was enlightening to my knowledge.

Truth Bomb: Timing matters more than what we eat. If your clock timing is off you will never get to optimal. **This is why**

circadian control must be restored before you alter your diet or begin to exercise. If you do not follow this you will never restore the ability to easily recharge your mitochondrial batteries using the D-ribose pathways. You will always rely on the two other less efficient ATP recycling systems, and you will suffer inefficiency for energy, sleep, and have, muscle pain after most activities. We need better mitochondria before we begin to stress them further. This is why it is a cornerstone of the Leptin Rx.

Truth Bomb: Biologic reactions follow the same relativity regarding time. This cellular theory of relativity is found in levee one of the QUILT. It is, that important. It is also the reason why biochemists, researchers, and doctors seemed to be stumped by the causes of modern neolithic diseases. Most people think the problem is tied to diet, exercise, or laziness. They never consider the effect of how the timing of these reactions is set. It is set by the circadian clock of the brain and transmitted to every other cell in the body. Today, we have epidemics of obesity, cancer, diabetes, stroke, fertility issues, and many other neolithic diseases. They are all connected to a loss in the ability to account for time for proper biochemical reactions. The cause is because we are bathed in a sea of artificial light, man-made EMF, and nutritionists who advocate for the electron poor diets. Something ubiquitous has to be behind our modern neolithic diseases **because epidemiology has established that epidemics are not caused by genetics.** They are due to epigenetic effects that appear globally over a short evolutionary history because of changes man has made to his environment by using the entire electromagnetic spectrum as his playground.

The Take Away: When timing is off molecular crowding begins to accumulate within mitochondria and with enough time, chaos ensues in the cell to destroy cellular signaling.

Chaos in space is called entropy, and in chaos in molecular biology is called inflammation. Inflammation is positively

charged, and inflammation leads to more mitochondrial inefficiency and loss of electron chain transport efficiency. When we lose energy we lose the ability to run processes in cells. This results in a loss of cellular signaling and once this happens all types of chaos ensues. This is how all neolithic diseases begin and progress to things like cancer and infertility.

When our brain can't tell time either can our cells; this implies we can't sense our external or internal world correctly, and the result is a mitochondrial disease.

We lose our intuition and our brain dopamine levels fall and our hormone panel gets destroyed. Cold Thermogenesis helps slow your electron loss while your "new behaviors" like Epi-Paleo Rx, EPCOTx, Leptin Rx, grounding, avoiding EMF, increasing your personal magnetic field to deliver more electrons per unit time you are alive, and this allows you the "time" to recover from your energy deficit to refill your inner mitochondrial membrane with electrons to fuel ATP production to restore health.
This is the **Circle of Life**.

Click here, if you want to see step one in a reversal of your current problem.

Even a 5th grader knows what is best for them.

Brain/Time Summary

The control of time in the brain is codified in three dimensions. Light, dark, and by electromagnetic cells in our hypothalamus that pay attention to the Schumann resonance of the earth's magnetic field. When the clock's measurements are off kilter for any reason, we get resultant low dopamine levels in the brain and an altered hormone panel. Modern life has brought to us, ubiquitous artificial light and constant pulsed EMF's over the last 100 years. If you look back at

Brain gut 11, I spoke about the effect of light on a diet in the human brain. 48{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} to 10 {a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} neural tracts are allocated to photons over food electrons. **Light and dark are two just two dimensions of how the brain tells time.**

Just like a watch has three hands, an hour, a minute, and a second hand, our SCN has three as well. One for light, and dark, and another that tells us about the changes in the magnetic resonance in the environment. That frequency is codified by magnetic cells in our SCN, and the harmonic output is found in the alpha waves frequency of our brain waves. These waves control the circadian cycle and coordinate organ function. If anything blocks any one of the hands that tell time, we see changes in the clock, and we immediately frame shift electron flow in our mitochondria. That energy loss decreases the charging ability of our mitochondria to main cell membrane gradients. When we lose the charge of our batteries, disease soon follows. Light, dark, and the Schumann resonance allow us to yoke all our circadian cycles to our present environment. A poor diet just makes things worse, by causing more electron leakiness in the mitochondria decreasing our ATP levels even further. A diet that has more glucose in it because you eat it to fuel workouts, will cause further electron loss, and further decrease ability to replenish ATP from the best source, beta-oxidation. When you do this over and over and over, again you begin to believe you need carbs to fuel performance and endurance activities. You do not. The answer is found in the most chemically reduced pathway of life, the PPP.

So you may be asking, can the brain or organ clocks be reset, after we screwed them up with carbs and crossfit?

Yes, I believe our chronotype can be reset. I spoke about

cycloset in the EPCOTx webinar. The Leptin Rx uses food to do it, by altering your epigenetic switches, the hormones like leptin, eicosanoids, and cytokines. The Epi-Paleo Rx prescribes a diet loaded with electrons/protons from animals that have swum their whole life bathed in electrons from the oceans. Modern humans need electrons more and more every day, because modern life steals them faster than we can replace them. Adrenal Fatigue Rx helps you stop leakiness at the PVN in the brain. I have given you many tools on the blog already to help change your epigenetic switches already. You just did not know the **WHY**. Now that you do, maybe, you might begin to implement the **HOW**, now.

Time is our most valuable asset. I think I have laid that out here. This all implies that we can reset our epigenetic switches as well if we begin now. We can alter our chronotype if we understand the "**WHY**". Once you understand the way it makes the "**HOW**" easy to put into action. There are other Rx's yet to come are also part of that "how." Right now I am just shining a light on the "**WHY**."

Tying it together

Geeks: So the first thing a cell would see in an earth day is a period of day and night and the earth's magnetic field. It also has to eat to make energy and it also has to control its own cellular division. So, in essence, the circadian cycle has to "yoke" to the metabolic cycle and its growth cycle. When it is night time, the cell becomes more reduced chemically and electrically. The chemical reduction is measured in something call TAN. (total adenine nucleotides) The electrical reduction is measured by something called the zeta potential.

During a low redox time, cells are usually recycling their components using autophagy (sleep). During the day while energy is being made to explore the environment, the cell is more oxidized because of increased leakiness of the

mitochondria. Another interesting coupling occurs between the circadian cycle with the cell cycle. They are linked via the PER 1 and PER 2 genes. PER 2 directly affects the cell cycle in mitosis and also alters our response to glucose and carbs!!! (Another reason why light, EMF's and timing alters glucose metabolism directly.)

Mitosis is the phase of the cell that occurs just before cell division to generate an offspring. It is stimulated by ELF-UV light release from cells after they enlarge and swell. The mammalian period 2 (PER2) gene plays a key role in tumor growth in mice; mice with a mPER2 knockout showing a significant increase in tumor development and a significant decrease in apoptosis (Levee 19). This is thought to be caused by mPER2 circadian deregulation of common tumor suppression and cell cycle regulation genes, such as Cyclin D1, Cyclin A, Mdm-2, and Gadd45±, as well as the transcription factor c-myc, which is directly controlled by circadian regulators through E box-mediated reactions. E-box reactions are the chemistry that controls telomerase and our longevity. I mentioned these in some detail at Paleo Fx but it fell on deaf ears there, in my view, because they did not have the perspective of these EMF blogs as yet. This means that sleep is tied directly into to cell cycle functioning and directly into a cell mediated immunity at some deeply important level. That level is the expression or repression of telomerase which controls telomere lengths. It appears that sleep directly affects the chronic diseases of aging and likely plays a role in all neolithic disease such as cancer development. This means timing is huge for aging, performance, and longevity.

Deep Circadian Geek Fest Review: Adenosine opens the door to sleep, but the alpha waves created in the SCN have to be present at the right time to allow it recycle ATP and our proteins. Timing is critical. This is why circadian biology trumps all the biochemistry pathways in books. It also completely explains why every human gene has a CCG in its

transcriptional promoter region. **What good are the biochemical pathways if they do not occur when they are supposed to?** Alpha waves are the guardian of properly entering circadian cycling in the brain. When the alpha wave resonance is altered because of the frequency of certain EMF' present, this throws off all the nanoscopic precision required in biochemical reactions everywhere in the cell.

When this occurs in the mitochondria we lose maximum power. We learned in the January webinar that the mitochondria produce four times the amount of kilo-joules per unit of water that we need before we see abject organ failure. Organ disruption of failure begins at 58 kiloJoules based on data we have today from physiology. When mitochondrial function falls below the 50{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} efficiency ratio, that we discussed in the December 2012 webinar, we begin to see cellular evidence of **molecular crowding** and this "throws" biochemical reactions "off-kilter" in every cell of our body because this circadian cycle is "hard-wired" to the growth and metabolic cycle of all cells. They are linked via the PER 1 and PER 2 genes. PER 2 directly affects the cell cycle in mitosis. Studies in animals and plants suggest that cryptochromes play a pivotal role in the generation and maintenance of circadian rhythms. Cryptochromes (CRY1, CRY2) are evolutionarily old and highly conserved proteins that belong to the flavoproteins (B vitamins) superfamily that exists in all kingdoms of life.

Cryptochromes are found in the light transduction pathways of all mammals including man. In, EMF 1, hopefully, you saw this in the video I asked you to watch in the beginning of the blog. If not look at this shorter video.

In fruit flies (Drosophila), cryptochrome (dCRY) acts as a blue-light photoreceptor that directly modulates light input into the circadian clock, while in mammals, cryptochromes (CRY1 and CRY2) act as transcription repressors within the circadian clockwork. Transcription repressors are elements

that directly alter the transcription of mRNA and all protein synthesis in every cell that uses it. Some insects, including the monarch butterfly, have both a mammal-like and a Drosophila-like version of cryptochrome, providing evidence for an ancestral clock mechanism involving both light sensing and transcriptional repression roles for cryptochrome. Cry mutants have altered circadian rhythms, showing that Cry affects the circadian pacemaker as well. Drosophila with mutated Cry exhibit little to no mRNA cycling. Recently scientists have actually spliced and moved the human cryptochrome gene to these mutant flies and they restored their ability to sense magnetism and restore their molecular clocks of these insects proving definitively humans sense magnetism.

Today's blog shows you **WHY** that ability is a **BIG DEAL**.

So you might be asking how does the cryptochrome tie directly into the main cell cycle gene PER 1 and PER 2 to cause disease? Well, the insect experiments showed us a point mutation in Cry-b, which is required for flavin association in CRY protein for functioning, results in no PER or TIM protein cycling in either insect. **You might be shocked to hear that cryptochromes exert their biologic effect using a photo-electro effect on the flavin proteins in the cryptochrome**.

Einstein already proved that light bends in relation to gravity and to time in a jungle in Africa in 1922 with the help of Eddington. It seems we now have evidence our environment transmits quantum effects (energy and information), or what we call quantum sensations, that our quantum computer (brain) pays strict attention too to recreate our reality in space/time. It implies that our current idea of time is really a quantum sensation and not a real reality at all. I know that just hurt your head, but it is true. I believe this will become obvious to many in biology. In EMF 5 you will see a nuclear physicist bring this point home right in your grill. Quantum biology is no longer a physics

problem. It is a huge problem for you and evolutionary biology to deal with.

Why has this all remained a mystery to science for so long? Quantum effects have always been in the domain of subatomic particles and not the macroscopic parts of life. Life's mysteries have always been studied using biochemical equations, with the belief that the effect of physics is already built into those equations. Well, up until now one has thought, just maybe that time was relative to the very biochemical equations themselves, to directly alter energy production. Remember E=MC2. **Light and mass are both affected by electromagnetic fields of all types!!!**

Summary

This is evidence of evolutionary change in the how the molecular clock was refined in higher animals (eukaryotes) after the K-T event. Post-K-T is when the mammalian clade exploded onto the Earth's stage. As chronologic earth time has elapsed, evolution has simultaneously sped up, implying that accurate timekeeping in all cells becomes more important as life evolves to maintain optimal ATP production. This means proper and precise yoking of time is quintessential for survival if you're an animal that is going to be able to accurately account for cell growth and the cell cycle. Today, we can no longer do that well past two decades of life, because of the epigenetic changes we have forced upon the world. We have altered natural light signals, increased EMF signals to ridiculous levels, all while the Earth's magnetic field has declined according to US Geologic surveys.

These three things have caused a **quantum change** in how we tell and perceive time and the result is a neolithic illness because these mistimings are directly related to the cell cycle via lower ATP levels. It appears if we do not get the message soon we are all headed for the 6th extinction event.

I hope this helps you understand how powerfully important molecular timing is to all life. As life gets more complex on the eukaryotic tree circadian biology increases its effect on biochemical reactions. Accurate timing of our biochemistry is our most valuable and critical asset in any disease reversal.

This is foundational biology for my Quilt document at my site; where quantum mechanics and physics teach you biochemistry can be frame-shifted very easily, and why what is in the biochemistry books. Maybe a big fallacy because the kinetics of the cells reactions are all relative to time. Biology has a way of showing you its truths, even if you do not believe them.

The moral of the PPP: What comes easy won't last you long, and what lasts you long won't come easy.

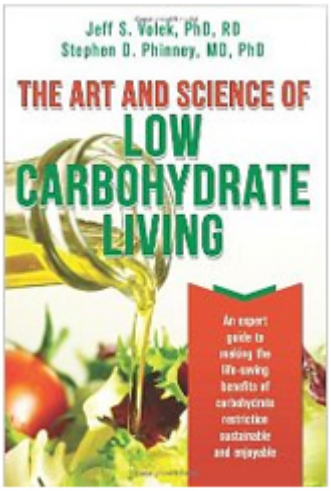
You just have to keep your mind open to the things you may not know. All science is based on constant discovery. When you discovered something then it becomes a new jumping point for the next journey.

Leave a Comment

More Support: Webinars by Dr. Kruse

- Mitochondria Energy Rx (January 2013)
- Factor X (May 2012)
- PPP: Fat Burning Pathway (April 2013)
- EPCOTx Protocol (September 2012)
- Fat Loss in Women (December 2012)

Your Shopping List for this Post

	magnetico sleep pads
The Art and Science of Low Carbohydrate Living	Magnetico Sleep Pads

- View All Recommended Products from the EMF Rx
- View The Epi-Paleo Store

Additional Resources

- EMF 1: Does Your Rolex Work?
- EMF 2: Einstein, Meet Leptin
- EMF 3: The Origin of Life
- EMF 5: What are the biologic effects of EMF?
- Cold Thermogenesis 1: Theory to Practice Beings
- Cold Thermogenesis 2
- Cold Thermogenesis 6: The Ancient Pathway
- Cold Thermogenesis Protocol
- Vitamin D: The Sunshine of Your Life?
- The Dopamine Rx = Good Choices or Bad
- My Leptin Prescription
- The Quilt: Cellular Homeostasis
- The Quilt: Apoptosis
- Brain Gut 6: Epi-Paleo Rx

- Brain Gut 11: Is Technology an Achilles Heel?
- Brain Gut 16: Adrenal Fatigue Rx

Cites

- Circadian Feeding Drive of Metabolic Activity in Adipose Tissue and not Hyperphagia Triggers Overweight in Mice: Is There a Role of the Pentose-Phosphate Pathway?
- Endocrinology 2012 153: 690-699
- Dehydroepiandrosterone reduces preadipocyte proliferation via androgen receptor
  Am. J. Physiol. Endocrinol. Metab. 2012 302: E694-E704
- http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3265077/
- http://www.kaganovichlab.com/uploads/7/2/5/6/7256268/ellis_-_2001_-_macromolecular_crowding_obvious_but_underappreciated..pdf
- http://www.sussex.ac.uk/Users/ctf20/dphil_2005/CSNs/Minimal{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}20Genome/Bray1998.pdf
- http://www.biochemsoctrans.org/bst/028/a193/028a193b.pdf
- http://blogs.smithsonianmag.com/hominids/2012/05/chimpanzees-sleep-in-trees-to-escape-the-humidity/#ixzz2Hv9lnTZQ
- Ober, Clinton; Zucker, Martin; Sinatra, Stephen T. (2010-05-06). Earthing:The Most Important Health Discovery Ever?
- Dehydroepiandrosterone Inhibits Glucose Flux Through the Pentose Phosphate Pathway in Human and Mouse Endometrial Stromal Cells, Preventing Decidualization and Implantation
  Mol. Endocrinol. 2011 25: 1444-1455
- High glucose inhibits glucose-6-phosphate dehydrogenase, leading to increased oxidative stress and {beta}-cell apoptosis FASEB J. 2010 24: 1497-1505
- Applewhite R. “The effectiveness of a conductive patch and a conductive bed pad in reducing induced human body

voltage via the application of earth ground.” European Biology and Bioelelectromagnetics 2005;1:23-40

- Chevalier G, Mori K, Oschman, JL. “The effect of earthing (grounding) on human physiology.” European Biology and Bioelectromagnetics January 31, 2006; 600-621
- http://science.howstuffworks.com/humans-age-in-space.htm
- http://spaceflight.nasa.gov/station/crew/exp7/luletters/lu_letter13.html
- “Relativity and the Global Positioning System”, Physics Today (May 2002), at equation (2)
- http://www.nature.com/ncomms/journal/v2/n6/full/ncomms1364.html (human magnetic sensing abilities)
- http://en.wikipedia.org/wiki/Cryptochrome (how they work in mammals and insects)
- http://www.cee.mtu.edu/~reh/courses/ce251/251_notes_dir/node3.html (MIT physics geek link)
- http://www.oddee.com/item_96973.aspx (Sunrises in orbit)