Quantum Biology 9: Photosynthesis

Readers Summary

1. Does life use energy to makes of randomness of the universe?
2. What is the sun’s role in all of this?
3. Are we all just stardust at our core?
4. How is the photoelectric effect used in evolution and in life?
5. How does light EMF and water interact to create life?

Life is energy. All life is tied to our sun. Every food web is tied to the sun’s photosynthetic web. The sun powers everything with the photoelectric effect. Today, you are going to see how this quantum effect makes life dance. Take a look at this link.

To synthesize simple carbohydrates from sunlight requires 30 proteins to work together in a cell membrane. Research into the mechanism of photosynthesis centers on the understanding the structure of the photosynthetic components and the molecular processes that use radiant EMF energy to drive carbohydrate synthesis. The research involves several disciplines, including physics, biophysics, chemistry, structural biology, biochemistry, molecular biology and physiology, and serves as an outstanding example of the success of the multidisciplinary research. This process should give us a clue that systems thinking about problems could solve many modern mysteries.

In our universe, and in all life forms, energy’s primordial state is not rest. Energy does not like to sit around like a couch potato. If you do sit around often like this, this is a quantum sign that you are losing energy in the forms of

electrons, photons, phonons, and protons to you own environment. Today's blog is on the quantum biology of energy dynamics. In the universe, as there is in things living energy is always present. The key factor, however, for life is the amount of energy in its therapeutic dose. A body without energy is called a cadaver. A body with a lot of energy is like a trendy party animal. Energy propels our planes, trains and automobiles to move, and it keeps us warm, grows our food, and helps us see the world we live in.

All of our energy initially comes from the sun. In fact, one could say that all life is made from stardust in our universe. A star explodes when it burns through all of it hydrogen and helium. It then progresses through nuclear fusion turning those gases in its core to other elements. Stars, like humans have a life cycle. Stars burn bright because they first burn hydrogen. When two hydrogen atoms collide in a fusion event a photon is given off. It takes this one photon several thousand years to exit the suns core before it reaches the surface. Once at the surface it only takes the photon 8 minutes to reach us at Earth. This process of fusion begins with Einstein's math. Each star attains a balance between the force of gravity, which acts to pull matter toward its core, and the outward pressure or friction is generated by nuclear fusion of small atoms of hydrogen. This balancing act of the laws of nature keeps the star stable until all the initial fuel is fused to iron in the suns core. When a star's core fuses to iron it explodes. The steps of fusion are well known now as a star dies. It's core produces energy from hydrogen fusion first, then Helium, then carbon, then neon, then oxygen, then silicon, and it all ends in iron. Not only is iron toxic for a star, but it is pretty deadly for a cell too. How is that for quantum homology?

The result of this progression fuel changes is a white dwarf or a black hole. When the exploding pathway is determined by Einstein's law of gravity, the star explodes. What is left is

star dust. From this star dust, all the other elements on chemistry periodic table come. We are made from the remnants of that very same dust. In fact, life on Earth requires 85 of the elements on the periodic table. Seven of the most abundant elements in the universe, hydrogen, helium, oxygen, nitrogen, magnesium, silicon, sulfur and iron are represented in most organisms. **This is ingredient list for the recipe of life.** What binds them to create the whole that is life is energy, from the sun's photoelectric effect. It seems highly probable that life anywhere will require the same ingredient list. After all, nature's laws are how the cook has to prepare their dishes. The dishes will vary based on the conditions of existence, but we know the background epigenetic environment for life is water, light, and magnetism.

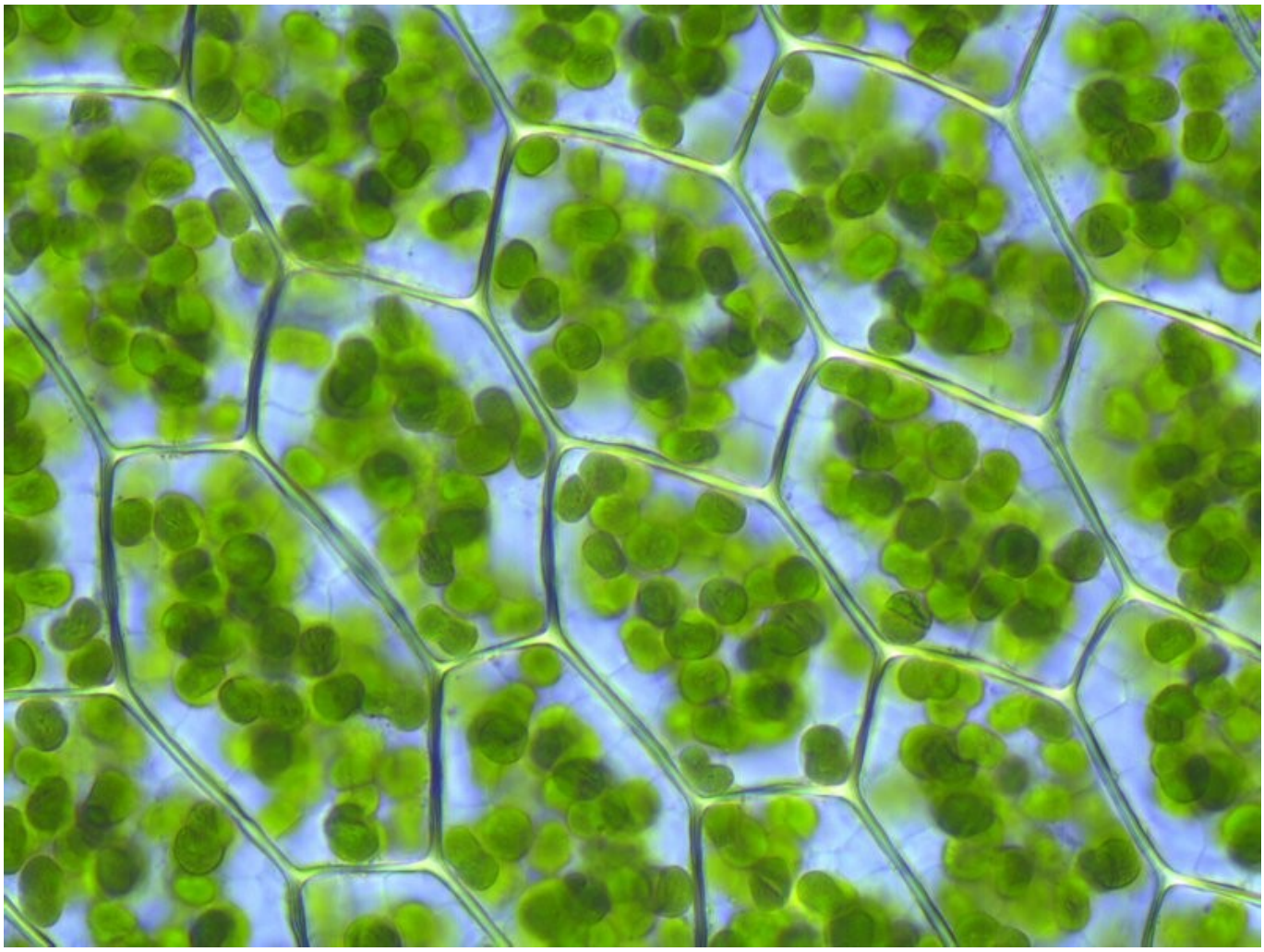
The sun is a big long lasting nuclear explosion that emits energy in the form of the plasma that elicits a photoelectric effect. It hurls solar radiation energy at us at an amazing rate. Many people believe that all solar radiation life faces are bad. That is not true. Radiation has a hormetic effect for DNA repair in sublethal doses that we normally get from the sun. The key is **getting the dose right** and the **exposure time right for a cell**. Low doses of radiation can stimulate DNA repair through the activation of four transcription factors, PARP-1, PARP2, ATM, and Ku70. It may seem counterintuitive and go against the conventional wisdom you have heard, but this is how nature acts in reality. With low dose radiation, Ku70 activates a DNA pathway called non-homologous end joining repair. This is how DNA repairs single strand and double strand breaks it normally faces in life. **The sun's EMF is hormetic for life's DNA.**

1/3 of what the sun throws at us in solar radiation is bounced back off the atmosphere and clouds and back into space. **The planet absorbs more energy from the sun in one hour than humans will burn in 10 months in 2013.** It warms the planet, makes plants grow by turning solar energy into chemical energy

through a process called photosynthesis.We, in turn, eat some of those plants when they grow. We turn their chemical energy into all other kinds of energy. Some of it is kinetic energy, which allows us to move. Some we store as potential energy in our fat, for when we need it to live. The sun evaporated water from our oceans to form clouds, which generates our climate and wind. The rain made in this process fuels the growth of more plants. Water in rain is energized by the sun's photons and electrons. This energy is transferred to the Earth and to all the things that live on this planet. Life is all about energy transfers. This is a missing link for most biologists. **Energy transfers in physics are measured in joules not calories in open systems**. Biology happens in an open system, not a closed system. This is one of the first mistakes modern man has made in their misunderstanding of nature.

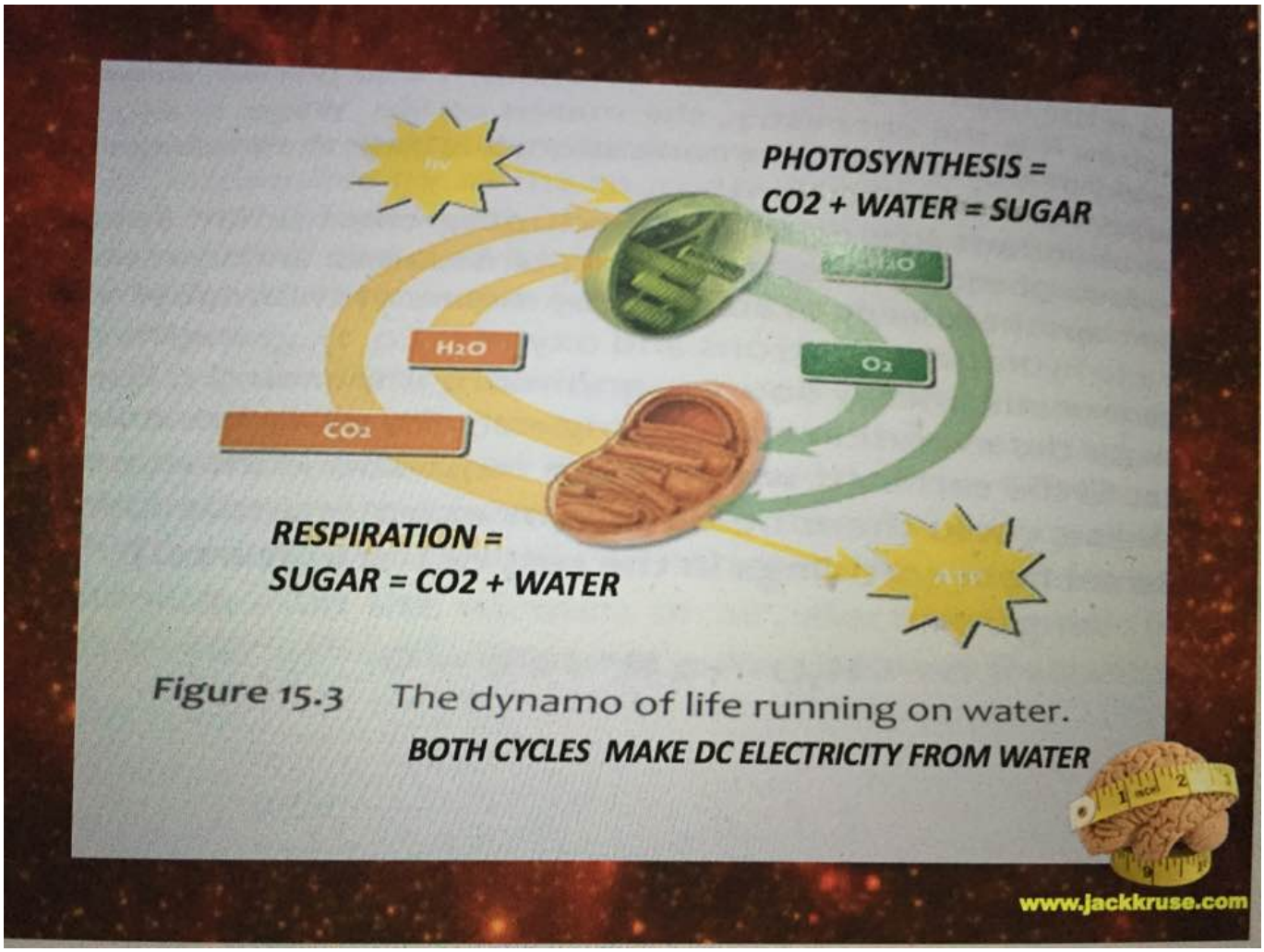
Life's energy transfers all happen on water

Life transfer's energy using chemical redox reactions. Water provides those electrons and leaves behind a proton crystalline battery. This means they involve the transfer of electrons from one substance as a donor to another which is an electron acceptor. They do this based on the math called the reductive potential. (We spoke about the main reducing element in biochemistry in EMF 4: NADPH made from the PPP and on my recent podcast with Ben Greenfield) The reduction potential is based upon the affinity for electrons compared to the affinity of hydrogen for electrons as a baseline.



It begs the question then, where do the electrons come from to power these reactions? The short answer is the sun via water. The sun splits water from its molecular chemical composition of **H 2 O into (2) Hydrogen + 2 electrons + oxygen**. These electrons are transferred to plants and foodstuffs via photosynthesis. Food is just the way life packages this energy transfer of electrons from plants and animals to deliver them to the inner mitochondrial membrane when we eat to use the power of the sun's electrons to make chemical energy in ATP. We also make Vitamin D directly from the sun in our skin as I recently showed in this blog, by capturing the suns photons and electrons in our skin and transforming it into something our molecular quantum nano-machines can use. The photoperiod is critical in making the ideal amount of Vitamin A in the brain as well. This is why every known opsin is bound to vitamin A. You will soon learn why this is critical in control of biochemical reactions in the body.

Biochemistry Geeks: The electrons and protons from the sun go on to reduce carbon dioxide to carbohydrates, and the oxygen enables the air-breathing organism to survive using the TCA and urea cycles. This is carried out in all green plants, algae, blue-green bacteria. The carbohydrates feed these organisms and they provide the carbon skeleton for making amino acids and proteins. The provided the nuclear bases and sugars to make DNA and RNA via the PPP. The carbohydrates made from the sun's energy contains the chemical energy in its reduced potential that is released via oxidative reactions to power all biochemical reactions in cells. This process in plants is called respiration and a simple carbohydrate like sugar, C6 H12O6, is broken down to liberate (6) H2O + (6) CO2 molecules. So you can see plants are capable of taking the sunlight and **using nonliving pigments** and chemicals to make simple chemical compounds and elements needed to power life. Here we have an example of how "an EMF" brings life to life.



To synthesize one molecule of glucose by photosynthesis, 24 electrons must be removed from water molecules. These electrons are held by the redox potential of oxygen (+0.82V). They are pumped uphill to carbon atoms that are partially reduced to a carbohydrate with a redox potential of -0.42V. The potential energy difference is 1.24 Volts. This change in free energy is in the positive direction. The result of this energy transfer creates 2870.2 kJoules of energy. This is an astounding amount of energy capture when you understand the quantum dance of the sun on water.

Life was quite smart tapping the potential of water for electrons. Water, after all, makes up 71{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of the Earth surface. Coincidence? Moreover, the liberation of oxygen also allowed more complex life forms to evolve using more complex energy/info transfers. This greatly enlarged the energy and informational pool available to the biosphere on earth as it evolved slowly over 3.5 billion years. These transfers are what most readers of this blog are interested in it. *When they fail, you first get ill, and then you die.*

It was the green blue cyanobacteria who first evolved this ability to gain energy from the sun about 2.5-3.5 billion years ago. Life back then tapped quantum entanglement as a process to capture the energy and information of the sun. Back then, the Earth atmosphere was not set up for human life. It was a very reducing atmosphere devoid of oxygen and only supported the anaerobic life. As they thrived they liberated more oxygen via photosynthesis and allowed the environment to become more suitable for aerobic life. When oxygen appeared, life exploded on the scene in the Cambrian explosion. Before about 580 million years ago, most organisms were simple cynaobacteria, composed of individual cells occasionally organized into colonies. Over the following 70 or 80 million years directly after the Cambrian explosion, the rate

of evolution accelerated by an order of magnitude defined in terms of the extinction and origination rate of species present in the fossil record and the diversity of life began to resemble that of today. All present phyla appeared within the first 20 million years of the period in our evolutionary history! Oxygen clearly was the jet fuel for complex life. But the key point in this blog is all life needed to begin was an EMF called light and water. That ability came from the sun's ability to split water up and harness its electrons for life forms to use.

The ability of primitive non conplex life to use the power of the sun gave water its big break too. It allowed water to be in the constant state of have having an endless supply of electrons and protons. This single factor massively expanded the thermodynamic possibilities for energies available to life. When one understands the quantum mechanics of photosynthetic energy transfers the rapid explosion of life from "no where" becomes quite explainable and understandable. It is not a theologic mystery. When energy rises for any reason, life explodes in a positive direction. Einstein said, E = MC2 for a reason. This has deep implications if you are a modern mammal who is sick. It implies sickness and aging is a consequence of a **loss of free energy** from your biologic system for some reason. When we lose free energy, we call that leptin resistance on this blog.

Lets scaled this talk to us now

As oxygen rose aerobic respiration was naturally selected for because the environment radically was changed by massive amounts of cyanobacteria. Aerobic respiration is far more energy efficient than anaerobic respiration. It appears to deliver more information as well. It makes **18 times more ATP** using oxygen than not. ATP is considered the "energy intermediate" that is generated in our mitochondria and is used to measure useful energy. Notice I said "intermediate"

not a high energy intermediate. This is a dogmatic biologic belief that I have rejected. I believe a high information intermediate is more accurate. It does not have enough power to explain cellular kinetics as they exist today. We covered that in the EMF series. This is another big hole in the modern synthesis of biologic sciences.

If your interested in this read a review published in the Journal of Physiology written by Koch and Britton from the University of Michigan from 2008.

What does photosynthesis does for us today?

It is responsible for taking carbon dioxide out of the atmosphere and replenishing both the ocean and atmosphere with oxygen to drive aerobic organisms health. The problem we have is that research from the last 8 years have showed that there **is now a rapid rise in carbon dioxide while oxygen replacement is falling.** The cause is multifactorial to be sure, but when you are sick mammal you are only interested in how to live well in that environment. The bigger factor for us a species is not limiting the carbon dioxide, it is increasing oxygen levels to improve mitochondrial efficiency. We recently focused in on this in my **Mitochondrial Webinar.**

Some factors tied ot our modern life I am concerned about:

1. EMF of all kinds that dehydrate us.
2. Deforestation worldwide that create oxygen sinks that prevent O2 getting back into the air. (Think the Amazon and Pine Belt in the USA)
3. Lignins in forrest trees are more reduced having less O2 than cellulose and starch in crop plants (Think Monsanto)
4. Synthesis of fertilizers that tie up oxygen in nitrates (Think Potash and Monsanto)

5. **The biggest effect on climate and water is the industrial use of ozone-depleting chlorofluorocarbons (CFCs) that change the dielectric properties of water in our atmosphere. Ronald Reagan knew about this but our current scientists and president do not.**

Our problem begins with water. The Earth is covered in it, but most of it is sea water we and plants can not use. **Life needs fresh water.** 71{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of the Earth is covered with water. 96.5{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of it is in the ocean, 1.7{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} glaciers and polar regions, 1.7{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} in ground water and lakes and rivers, and 0.001{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} is in the air as water vapor of the clouds. Out of all that, only a total of 2.5{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of the water on our planet is fresh water in ice and groundwater. Less than 0.3{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} is in lakes rivers and our atmosphere. Life seems ot favor a certain form or water.

This is a real issue for modern life, because modern depletion rates are astounding. If you read the aqua-diversity literature as I do, you would see in 2010 a major meta-analysis showed that the combined effects of pollution, dam-building, and agriculture run off , conversion of wetlands, and the introduction of exotic species to new habitats is destroying the fresh water cycle we depend upon. We are not going to run out of sunlight, but we are already running dry on water and no one seems to know it. I'd suggest you Google Viktor Schauberger name as a water scientist and see what he

found about this phenomena. You might also like to read about Alick Bartholomew's story of water to get "totally informed" on this issue.

When water falls, oxygen levels also fall for life in kind. They are inextricably linked, evolutionarily speaking. In fact, after the Cambrian explosion life did well for about 250 million years and then the atmospheric oxygen levels suddenly dropped from 30{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} to 15{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} in a short time. This **extinction event** was called the Great Dying Event. During the Permian-Triassic transition, oxygen fell abruptly and caused Earth's largest extinction. It killed 57{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of all phylogenetic families, 83{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of all genera and 90{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} to 96{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of all species. 53{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of all marine families were wiped off the planet, 84{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of marine genera, about 96{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of all marine species and an estimated 70{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of land species, including all insects.

This shows you just how important water and oxygen are to life. Without the ability to generate energy from aerobic metabolism life had to get a do over, from an environmental trigger. What reversed the trend? About 300 million years

ago, high atmospheric CO2 levels caused massive trees growth to evolve. These were large woody land plants with **very active ability to use photosynthesis** to fuel there massive growth. Today, these trees remain the oldest living things on our planet. That should not surprise you if you are following this 'quantum web' I am weaving you about electrons/protons and photons.

When the trees started making massive amounts of oxygen, insects re-exploded on Earth and became massive 747's. The fossil record shows this to be accurate. **It should be no surprise then to you why modern day honey bees and monarch butterfly's are becoming extinct today now**. We, as a species seem to have forgotten what evolution has already taught us once. The reason insects grew so large is that insect transfer molecular oxygen (O2) quite efficiently from their trachea's directly to their cells. This ability increased their mitochondrial efficiencies by a factor of a thousand. About 234 million years ago oxygen fell to our current 21{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} level and this was believed to be due to reductions in low land forests and swamps as the polar ice caps expanded many times in cycle to lead to natural deforestation of climate change. I covered this in the last chapter of my book for those of you who read it. This evolutionary story gives us a correlation between oxygen levels and different cell types which are estimated using molecular clock methods of how life became more complex. This is covered in Nick Lane's book. It also should allow you to make the link between molecular oxygen and molecular timing. Yep, it's pretty damn important folks.

We recently heard in the paleosphere about how "some believe" that polar growth and reproduction are some how tied to eating moose thyroids. When I looked way back at the evolutionary data, I saw something more foundational than this observation. The trend is for polar animals to **become**

gigantic when oxygen is abundant. It has nothing to do with thyroid hormone or carbohydrates. This data is backed up by studies that measured 1853 bottom dwelling amphipod crustaceans (when I came up with the Epi-Paleo Rx) from 12 sites world wide. It showed body length correlates directly with an oxygen content of the seas (R2 =0.98, p<0.0001). In the lab, people have found a 10{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} reduction in oxygen levels decreases the body mass of fruit flies too. When they increased O2 to over 40{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} it fuels a massive increase in the body plan. This tells us something deep about the biosynthesis potential of the TCA and urea cycle. This paralleled what we saw in the fossil record too. Looking at thyroid levels and carb macro levels is way too myopic for the evolutionary Rx. This requires a 30,000 ft view and understanding the linkage of photosynthesis, water, and oxygen levels. How are the linked exactly? They link directly to mitochondria and haplotypes. Read on.

The fossil record also showed that our vertebrate ancestors came upon land about 415 million years ago. There was a gap of 15 million years called Romer's gap. This gap stumped the "bone collectors" until they realized what constrained growth in insect also constrained growth in terrestrial animals too. You might be wondering what the effect of modern life EMF and the fake light environment is on oxygen? It decreases it, **first in the oceans** and then it progresses to land.

Our current global warming trend is bad news for fisheries and fisherman and those of us who eat the Epi-Paleo template. **When sea water temps rise oxygen diffuses out of it and leaves a lot of deuterium in the liquid phase.** This is simple physical chemistry 101. This is also why I scoffed when I heard "leaders' remark that cold thermogenesis was 'just hormetic' for humans. The cold increases the density of

electrons in water. That includes the CSP around our mammalian brains. This increases our current and it is behind why cold allows mammals to survive well in cold. They don't die because they can sustain their core temps while increasing their current in their intracellular water.

The rise in ocean temperatures is bad news for fish because less dissolved oxygen happens as the temperature rises while simultaneously causing a dramatic rise in the fishes metabolic rate to offset the mitochondrial losses of energy. This is why the salmon are dying on the west coast and why people are moving all the artificial light and cell towers around river beds that feed the oceans into these systems. **Cold water has more oxygen dissolved in it, pure and simple.** This is yet another reason why cold thermogenesis **is not just** hormetic for life. It is primordial because it links high oxygen levels to the environment that all life evolved in and from. I hope that did not surprise you. This is why fish who live in the cold water columns in the sea are more electron dense. They have more density of electrons in their flesh because the water in the cells of their flesh have more density of electrons in its composition to provide to our inner mitochondrial membranes to drive our currents because cold water has more oxygen dissolved in it. This increases the fish's electron density because they have more current strewn along their inner mitochondrial membrane because they eat foods in this marine environment as well. Here again, the lesson you learned about current from the last blog is clearly operational in life. Form meets function when you observe it with an open mind.

Moreover, in a "normal marine EMF environment", there is a linkage of two other elements critical to life. Aluminum an Oxygen are kept in tight equilibrium in living cells by chemical factors intrinsic to nature. When ambient EMF rises in the environment, that allostasis is lost. **In fact, aluminum levels become a proxy of EMF exposure, in my view**.

This may help you understand why there are so many epidemiologic studies today linking aluminum metabolism to Alzheimer's disease as EMF has been exploding in our modern world. These links between Al and O are also found in the chemical fluxes reaction chemistry of making steel melt in the steel industry. I do not think people are making these connections yet. Quantum physics has made this connections already many times.

What else?

Warming of our oceans and seas will hit our phytoplankton first. I recently gave a talk in Nashville in February of 2013 to the GILLS society about this very issue. **Roy D. Palmer** invited me to speak about these biologic factors. Many of the people in his audience seemed stunned by what I said that day. The climate linkage to quantum mechanics is not new. It is just new to those in biologic sciences. The world society of aquaculture members know that plankton is the base of the food chain for all marine life. It is based upon photosynthesic rates in our oceans. Plankton replenish oxygen quite fast in sea water for all marine life to thrive. When the temperature rises our marine environments in our polar waters, the photosynthetic rate and the metabolic rate **rise simultaneously**. This is bad news for plankton because they are the most efficient life form on the planet in using photosynthesis for energy transfer. This stunts their growth tremendously. When plankton levels are stunted, no oxygen is dissolved into the water. Today our oceans are warming at alarming rates, killing plankton world wide quickly. This ocean warming fuels massive hurricanes, typhoons, and tornados. These storms come to pass because the ocean transfers this energy to the atmosphere. The atmosphere gains this energy via energy transfers in liquid water to water vapor in cloud formation. Storms then re-releases this energy back to water, in the liquid rain, wind, and electrical discharges.

When phytoplankton die we can not re-oxygenate the oceans. Marine life slowly dies first and then air breathing animals are next to die. This is precisely what happened in the Great Dying extinction, I mentioned earlier. We would be wise to re learn this lesson that happened once already on this planet. It appears today it is happening again for different reasons. The key point is the linkage of photosynthesis and water energy transfers. This makes it a quantum story, not a climate or biologic one.

Summary

Oxygen coupled to water, powers human life and metabolism in the matrix of mitochondria. I showed you the details of this in the mitochondrial Rx webinar. Review it and layer this quantum story to it. Think about what I said in EMF 7. Layer it with this blog with it. You may begin to understand why people are sicker today and have an illness we have never seen before in terms of scope and incidence. **When energy transfers are working optimally life simply explodes with health. When it fails, life declines with sickness, and it happens quickly**. What modern medicine and biology are missing is the scale. Today's blog showed you ample evidence for these statements, and my beliefs.

For life, the rate of energy capture by photosynthesis is astounding when you put pen to paper on it. Approximately 100 trillion watts (1 terra watt= 1 trillion watts) are made by photosynthesis yearly. This shows you we have a lot of power to draw upon to power life. It also shows us the quantity and quality of our semiconductors are "our weakest link" in quantum biology. This amount of energy the sun produces is ten times the current power consumption of modern humans world wide. When we expand it to all life forms who use the power of the sun, they convert 100-115 petagrams (1 petagram =10 to the 15th power) of carbon biomass per year.

Oxygen and water are the jet fuel that primates used to become human as their environment changed in the East African Rift zone. The presence of both increases energy efficiency and the complexity of metabolic networks available to dispense this energy. This is the power that fueled human evolution. Metabolic network studies have been done looking at the core factors tied to energy efficiency in humans and 42 other animals. In all three life domains, from bacteria to us, they used the tools of graph theory and statistical quantum scaling. The results showed that the metabolites that life use to power life is not random at all. It showed the major factors were related to connections per node via power laws. Does anyone remember when I last mentioned power laws of mathematics with respect to life? It was Factor X from my book. Surprised? You should not be, because Factor X was a story all about power law mathematics that dictated eutherian mammal survival 65 million years ago. That was the last time the sun was dimmed for and caused a brown out for things with a chloroplast or mitochondria.

This implies that most metabolites have one or a few connections, and the number of nodes with many connections drops off rapidly as you go down the list studied. Take a guess what was the most connected metabolite when studied this way? It was all the things connected with energy generation. Einstein was correct again. **Life is energy and energy is life.** Water was on the top of the list. How water acts will be covered soon in some more detail. I have just scratched the surface on that in Quantum biology one blog.

In each of our cells, there is a fractal network of carbon nanotubes that constricts water to a certain dimension to make quantum magic happen using the photoelectric effect and allow free use of protons to flow in the molecular network of water. **We call this protonicity**. Current is much higher when the particle being moved has mass. Electrons have no mass. Protons, however, do. We covered this in directly in

Quantum biology 8 in the formula for current and on my recent podcast with Ben Greenfield. We move those protons using the power of the sun's electrons we get from water.

Oxygen presence was strongly tied to NAD, SAMe, CoEnz A, ATP, carbon dioxide, pyruvate and 2-oxoglutarate strongly were associated with the oxygen node in the statistical node studies I mentioned above. This gives us more insight to what is important in higher animals and why. The most complex group 4 reactions in humans were all exclusive found in the **presence of water and oxygen**. The number of reactions was over a 1000. When you know how energy is used in the open system of life, then and only then you begin to understand how to fix it. Closed systems of energy transfers are measured in calories. Open systems use joules, not calories……still think calories matter? Well, if you do I have some beach property to sell you in Saudi Arabia from the Great Dying.

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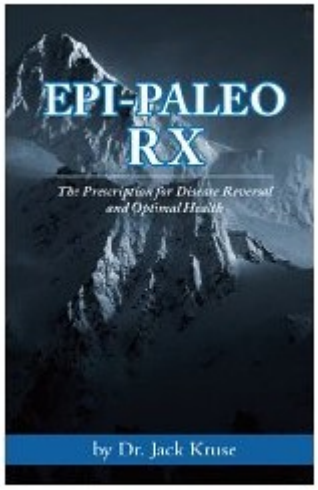	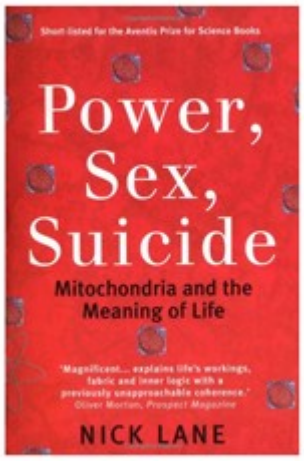
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- Quantum Biology 1: The Zero Entropy System
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