UBIQUITINATION 12: NITROGEN CYCLE ECODYNAMICS

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Conservation without evolution is extinction. Evolution without conservation is insanity. This is the most critical characteristic of biologic evolution and our ecosystem. Cross pollination between evolutionary and conservative aspects is the key condition of existence for life and its maintenance.

Nitrogen is so vital to all life because it is a major component of chlorophyll, the compound by which plants use sunlight energy to produce sugars from water and carbon dioxide (i.e., photosynthesis). Photosynthesis is the basis of all food webs on planet Earth. Nitrogen is also a major component of amino acids, the building blocks of proteins. Without proteins, plants wither and die. Healthy plants often contain 3 to 4 percent nitrogen in their above-ground tissues. This is a much higher concentration compared to other nutrients.

Some proteins act as structural units in plant cells while others act as enzymes, making possible many of the biochemical reactions on which life is based. Nitrogen is a component of energy-transfer compounds, such as ATP (adenosine

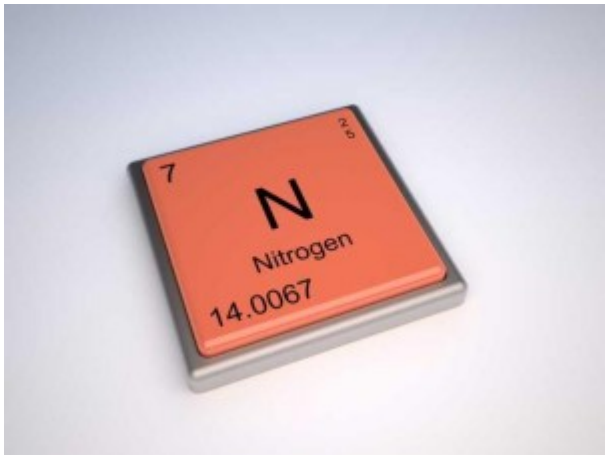
triphosphate). ATP allows cells to conserve and use the energy released in metabolism. Finally, nitrogen is a significant component of nucleic acids such as DNA, the genetic material that allows cells (and eventually whole plants) to grow and reproduce. Without nitrogen, there would be no life as we know it.

THE WHOLE IS MORE THAN THE SUM OF ITS PARTS: HOW DO WE COUPLE TO NITROGEN?

We must trace the first watershed between the atomic material world in abiotic systems and see how those atoms become part of the biotic living systems. Reducing nature to atoms has not given humans the answer to the question, "What is life?" Reductionism began with Descartes and its promise has never come to fruition in building our understanding of life. Descartes ideas work well for the abiotic world but not the biologic one. The systematic ordering of atoms in any thing is correlated with similar orders in other similar structures and this enables them to cooperate in specific functions. The process of photosynthesis is a perfect example. Relational order helps organisms carry out biochemical reactions to cause a coordinated movement of their parts. These movements are characterized by the laws of kinetics and thermodynamics.
In biologic systems at all levels we observe events associated with the emergence of novelty and uniqueness of function. This allows life, to specifically associate with the creative power of nature in how it recycles atoms in the abiotic ecosystem on Earth. This system is based upon nitrogen, hydrogen, carbon, and oxygen cycles. All of these cycles are coupled directly by light and ordered under the power of chronobiology. Time is formed in the relations and collisions between light and particles in atoms. This is what "creates time" in biology. This blog series is really a dialogue between the errors of modern science and with the characteristics of open systems of nature.

The old paradigm of science is materialistic and reductionist. It views the universe and Earth's ecosystem as a mechanical system composed of elementary building blocks called atoms. Life is never at equilibrium until it dies. At equilibrium, matter becomes blind, and when matter is kept from from equilibrium it begins to "see" and become animated. This is when the abiotic atoms in things begin to live. The new paradigm of epigenetics has ushered in a new perspective in the last 15 years, that is holistic in nature. The universe is now seen as an integrated whole that recognizes the fundamental interdependence of all phenomena working together to order the recycling of atoms.

The old science paradigm is Newtonian and has a time reversible aspect to its perspective. Reality, however, is constituted by phenomenologic aspects characterized by irreversibility of time in biology. This trips many physicists up but modern biophysicists are realizing this change in epistemology is a critical point in understanding nature. This allows far from equilibrium systems to couple naturally in space and in time. This creates a huge problem that modern science continues to struggle with. The reason for this confusion lies in HOW the dynamic coupling of atoms that take place in complex systems and that designed by nature to be far from equilibrium. Society, people, and biology are linked to atoms and their components parts, which all have fully open cycles on Earth. This blog is about the atom that is most critical to life on Earth, nitrogen.



Nitrogen is designed to be far from equilibrium so it can harmonize with nature in soil, air, and in water. Technology is uncoupling that relationship of nitrogen to humans in their ecosystem. The older dominate paradigm expects equilibrium in their theories and equations, when it is clear life is not lived in this fashion. Abiotic life follows equilibrium but life is divergent from this perspective. It has become clear in biophysics that these systems and behavior's can only be analyzed by means of relations including time as a directional factor. Time has a direction that its "arrow" must travel for life to work. Quantum mechanics and general relativity are both descendent ideas of classical dynamics, and as such, carry a negation of the irreversibility of time. This is where we have to realize the limitations of both when we discuss the question, "What is life?" Yes, QED even has a limit for us to consider now. Epistemology is a critical overlooked factor in scientific narratives.

Biologic diversity is a function of long term interactions at a genealogic and ecologic level within the ecodynamics on Earth. We know that historical time is very different from biologic time. Nature systems are irreducible, which happens to place profound restrictions on the inherit reductionism that is built into today's science. You cannot see the wood for the trees. The implication is that if you only see the trees as independent details contained within wood, you are unable to simultaneously observe the system in action. The wood acts a cooperative unit of trees working with leaves and roots to support the formation of oxygen and sugar from CO_2 and sunlight. Epistemology in science plays a huge role here. We need to focus in on the epistemology of science because it points out where we went wrong. "The point is that living things require a certain course of action to remain living and fully animated. Human beings face a voluntary choice constantly to embrace live-promoting versus life-depleting courses of action. Most today mindlessly choose life-depleting ones the majority of the time. Some know they are doing it.

Some don’t. And the fallout does affect others besides themselves, and that is also a deep problem for modern medicine.”

Nature’s logic system cannot itself, from the inside, decide on whether it is true or false. This requires an observer from outside the system to provide this insight. This is where I come in. My perspective is far from the norm. It has a quantum scale and a macrocosmic scale all at once. This is a characteristic of an open systems working far from equilibrium. A divergent mind can see the order in chaos. This epistemic logic dictates that all of nature’s atomic systems must be open and free to recycle themselves within the ecosystems. When you realize that all the atoms used in biology are, in fact, cycling in an open system, you come to the realization that evolutionary systems do not allow reproducible experiments. This is contrary to modern scientific dogma. The scientific method requires reproducibility when systems that are open can never really give this result. Hence, the reason why you can find studies supporting both sides of any equation we have already studied. Open systems reflect the key quantum tenet. They embrace uncertainity. They, in fact, play dice, as the “uncertainity principle” suggests they should. This idea frightens some. It should not. Fear doesn’t shut you down; it wakes you up to a new perspective.

Science should be the quest in understanding our ecodiversity to atoms. It should not be a “cottage industry” created for the purpose of validating a paradigm that holds people captive to illness. The biologic complexity that we observe today on Earth is the result of spatial and temporal constraints of the atoms on Earth that are tied to their recycling patterns. This recycling is observed in the evolutionary history of how proteins in nucleic acids have organized to make sense of the relations as time elapses. Biologic things occur and are applied only as time elapses in proper cycles spatially and temporally.

DNA only codes for proteins. All proteins contain nitrogen.

Nucleic acids and vitamin D3 are low in nitrogen. In the case or proteins, molecules owe their stability to the same intermolecular forces that bind crystals that are not living. Van der Waal forces are weak electromagnetic interactions that control this process. In biotic systems, very weak forces are capable of holding DNA together. This is true of all proteins and cell membranes. The interesting part of this relationship, is because these electromagnetic forces are weak by design, it allows these structures to change conformation in order to adapt their functions based upon the environments they encounter. This is the essence of epigenetics built into DNA and RNA.

This blog is about the key atom in evolutionary biology and how it collides with light to cause these conformational changes in proteins: **NITROGEN.** Nature is threatened by linear, mechanistic, arrogant, and the crude approach of the modern scientific method. Today, this brand of thinking has become a service to societies and their governments, that tells people their institutions "know the price of everything", while at the same time, demonstrating they know nothing about the value of nature.

LET US BEGIN TO CONSIDER HOW ATOMIC RECYCLING AFFECTS LIFE

The heart of the nitrogen cycle is the conversion of inorganic to organic nitrogen, and vice versa. As microorganisms grow, they remove $NH4^{+}$ and $NO3^{-}$ from the soil's inorganic, available nitrogen pool, converting it to organic nitrogen in a process called immobilization. When these organisms die and are decomposed by others, excess NH_4^{+} can be released back to the inorganic pool in a process called mineralization. Nitrogen can also be mineralized when microorganisms decompose a material containing more nitrogen than they can use at one time, materials such as legume residues or manures. Immobilization and mineralization are conducted by most microorganisms, and are most rapid when soils are warm and

moist, but not saturated with water. This is true for plants, bacteria, and the human gut where microbes outnumber the cells in our own body.

In the 20th century a belief was created that there was not enough ammonia in the world to feed the population, so humans have tried to solve the problem by bringing nitrogen and hydrogen together to make NH_3 to feed the world. NH_3 is fertilizer. On the surface this seems like a good idea, but is it in today's environment? Moreover, what about the coupling reaction to this? If we unbalance the equation by uncoupling ecosystems from their **negative feedback controls**, what happens to carbon, oxygen, and sulfur in the world and in living things?

Catalysis is the act of changing or transforming a reaction without being consumed. Man is now altering that balance by allowing massive amounts of nitrogen to alter life's stage in the nitrogen, carbon, and hydrogen cycles on Earth.

Matter is constantly cycled between living and nonliving parts of the environment. Processes like photosynthesis and nitrogen fixation allow the carbon and nitrogen cycles to regenerate needed substances by recycling earth's atoms. Most people do not realize that nitrogen is the vital link in the chain that connects the ecosystems of land and sea. Light has a very special and deep relationship to the frequency of light in controlling the positive of negative charge of the atmosphere in this quantized dance.

Cycling Of Carbon

In carbon fixation plants convert carbon dioxide into sugars, from which most other biosynthetic pathways begin. The catalyst responsible for this conversion, RuBisCo, is the most common protein on earth. RuBisCo is a protein that uses nitrogen as its key atom to harvest energy from the sun. RuBisCo is the most abundant protein on Earth. RuBisCo is

both a carboxylase, which initiates the carbon fixation reactions of photosynthesis, and an oxygenase, which catalyzes the reaction between Ribulose bisphosphate and oxygen. Few seem to know the key element in RuBisCo is nitrogen. RuBisCo accounts for 25% of leaf nitrogen content. A surprisingly high concentration is needed in plants and bacteria to fixate carbon for biochemistry. ***This points our why nitrogen is the key driver of carbon flows in all living things***. Some anaerobic organisms employ enzymes to convert CO_2 to carbon monoxide, from which fatty acids can be made. This happens in our guts and around the roots of trees. Bacteria also have the ability to reduce CO_2 to CO to generate energy at 100% efficiency rates. The most active known catalysts for the reversible reduction of CO_2 to CO are the carbon monoxide dehydrogenase enzymes of bacteria.

The interaction of light with atomic nitrogen in our ecosystem determines how carbon can be utilized by living things, the soil, sea, and the land and the atmosphere. We need to examine how nitrogen is handled in each system. One of the ways that nature recycles matter is through the carbon cycle. The carbon cycle is carbon cycling through the global environment. Carbon is a chemical element and a key component of many systems in the biosphere, from acting as part of the earth's thermostat to being one of the key elements in photosynthesis, which is when plants make sugars for energy. A thermostat is an example of a negative feedback control mechanism. Two components of the coupled system have opposite effects on one another. It causes a furnace to click on when a house gets cold. The heating system then warms the house's interior, and that raised temperature turns off the furnace. ***Chronic loss of negative feedback control*** in an open quantized ecosystem always leads to a neolithic disease. This is why I always look outside an organism to see what caused the chronic loss of negative feedback control. Disease manifests not from within, but from the loss of this critical couple that cells use to function.

In order for the ecosystem to function properly, all parts need an adequate supply of carbon. This is usually not a problem since nature is very efficient at carbon cycling. Since the process is a cycle, we need to pick some place to begin. So let us begin with carbon.

One of the biggest reservoirs of carbon is the atmosphere, which is about *0.038% carbon dioxide*. This amount pales in comparison to nitrogen at 78%. There are two ways for carbon to be removed from the atmosphere. The first is through photosynthesis, where plants take in CO_2, water and sunlight to create sugars for energy and oxygen gas emerges as a by-product. Once inside plants, carbon moves through food chains, where organisms become nutrients including herbivores, carnivores and ultimately, decomposers. Through living organisms, carbon is either re-released back into the atmosphere through respiration (where organisms use oxygen to generate energy from nutrients and produce carbon dioxide as waste), released by combustion (the process of burning something) or broken down into the soil as part of the organism's body. Once buried in the soil, carbon can be converted into fossil fuels over long periods of time and then also reenter the atmosphere by combustion.

If carbon from the atmosphere does not enter a terrestrial (or land) plant by photosynthesis, it can dissolve in the ocean. In open water ecosystems (pelagic), phytoplankton cannot directly tap the resources within sediments. There, soil processes provide nutrient resources to plants indirectly through mixing within the water column. Here it can be taken up by marine plants through photosynthesis – just like in land plants – or it can be incorporated into ocean sediments. Marine organisms can also take up dissolved carbon molecules and use that along with calcium in the seawater to make calcium carbonate, which is a major component of the shells and skeletons of marine organisms.

When these organisms die, their shells and bones settle to the bottom of the ocean, where they can be covered up and remain for long periods of time. Under great pressure from the water and sediment, these shells break down and form limestone rock. The KT crater walls in Mexico are made up of these sediments. We can see them 65 million years later because they were blasted from the seabed.

Limestone is the largest storage reservoir of carbon on the earth. Once formed into limestone, carbon usually stays locked in the rock. However, it can also dissolve very slowly to be released as carbon dioxide back into the atmosphere, or, if the limestone is exposed to weathering and dissolved by acid rain or a change in pH of water by hydrogen protons, be released as carbon dioxide. *The pH controls how cations are directed in biochemistry to accept or reject electrons.* The Cenotes in Mexico were formed by this erosion over the last 65 million years. Here again you see the power of hydrogen to act as a rogue element. It has the power, itself, to reintroduce carbon from the water to air. That same ability is found in you with the way CO and H_2S act in you. This completes the cycle, returning all carbon back to the atmosphere where it began. Carbon return to the atmosphere is a big deal. **CO_2 is the thermostat that extinction events are tied too because it has such a lower percentage to nitrogen and oxygen in the atmosphere.** Anything that alters its small percentage in the atmosphere up or down has a massive effect on life on land or in the sea. So, following this line of thinking, the carbon molecules that are in our body now have been cycling on the earth since it was formed and will continue to do so as we exhale each breath, returning CO_2 back to the atmosphere. CO_2 levels in humans is also important to life and death in physiology.

Cycling Of Nitrogen

Like carbon, nitrogen also has always been present on the earth, and in the nitrogen cycle, nitrogen cycles through the

global environment. Nitrogen is also a chemical element, and it is the most abundant element in the atmosphere, making up 78% of the atmosphere. Oxygen is 21 % of the environment and is very reactive. In colder environments, nitric oxide (NO) protects glucose and oxygen transport in our blood vessels. NO is a free radical transporter in humans. *In warmer (higher powered sunlight) environments with higher energies we use sulfur to buffer glucose and oxygen transport.* Nitrogen is very unreactive with other elements, and it cannot be used directly as a nutrient by plants and animals the way oxygen or carbon can. Nitrogen becomes more reactive when it interacts with light or any electromagnetic radiations but it needs living things to make the cycle complete. NO is used in cold because during winter mammals have huge stores of energy from their fat mass stored in their cell membranes in which to unlock the power of the electrons carried in NO. That capacitor of energy is in the form of the DC electric current.

However, nitrogen can be converted into forms usable by plants and animals either by lightning or bacteria. Lightening is a powerful form of electromagnetic radiation on Earth. Lightening is a form of unidirectional plasma that flows from the top portions of out atmosphere to the Earth's surface for discharge. The direction of these energy flows are tied to the charged environment in our atmosphere. This is why CO_2 levels are so low and why N_2 is at 78%. CO_2 induces a positive charge to the ionosphere as it rises. Positive charge is a synonym for inflammation in living things. When CO_2 levels rise positive charge in the atmosphere rises and the direction and power of lightening strikes are altered. **Lightening normally flows from the cathodes of storm clouds, to the anodes on Earth tectonic plates.**

Lightening is critical in the atomic recycling of nitrogen in our atmosphere and in the ground to act as fertilizer for terrestrial plants and microbes. *Pollution that humans generate on land tend to act like anodes.* Since lightening is

a cathode ray, the more pollution humans create the more electrical storms this area will get as time evolves. This is why tornado alley exists where it does today in America's breadbasket. Today tornado's and electrical storms are increasing south and eastward because of the use of artificial nitrogen in fertilizers. The runoff goes into the the river systems in the southeast and eventually into the Mississippi river to the gulf of Mexico. This has caused death zones in marsh lands in the delta because excessive nitrogen increases ubiquitination. As ubiquitin rates increase in marshes, anoxia in water is the result. *The same relationship hold true in your tissues too.*

The Earth gets hit with 8 million bolts of lightening a day. Did you know that the temperature in lightening exceeds the surface temperature on the sun? Of course this occurs on a short time scale, but the power is incredible. **Lightening is a very concentrated form of pulsed electromagnetic energies that follows anodes.** The enormous energy of lightning breaks nitrogen molecules (N_2 gas) and enables their atoms to combine with oxygen in the air forming nitrogen oxides (NO_x). These dissolve in rain, forming nitrates, that are carried to the earth's tectonic plates. Atmospheric nitrogen fixation probably contributes some 5– 8% of the total nitrogen fixed. **Nitrogen atoms represent 10-15% of the dry mass of our muscles. Myoglobin, another heme protein with nitrogen in it makes up a large part of the muscles ability to store oxygen. Hemoglobin, another heme/porphyrin protein, carries oxygen to muscles from our lungs has four nitrogen atoms that cradle each rust colored iron atom within it. There are four nitrogen atoms the porphyrin ring that surrounds and binds the magnesium atom in chlorophyll. Nitrogen is always close to the action that makes life happen.**

Once nitrogen is converted to usable forms, nitrogen is able to cycle the rest of the way through the ecosystem. This transformation can be carried out through both biological and

physical processes. Important processes in the nitrogen cycle include fixation, ammonification, nitrification, and denitrification.

The marine nitrogen cycle is one of the most complicated biogeochemical cycles in the ocean. Nitrogen is a biologically limiting element and changes in its form, or concentration, **can cause changes in the cycling of other elements, such as carbon and phosphorus.** Marine nitrogen cycling has been and will continue to be an integral component of ocean biogeochemistry, so everyone should know at least the basics. This is the reason I began to biohack the periodic table of elements ten years ago.

As mentioned, the atmosphere is the largest reservoir of nitrogen. N_2 occurs when two atoms of nitrogen are bonded together very strongly by a triple bond. N_2 is essentially inexhaustible because it makes up 78% of air. Atmospheric nitrogen, however, has limited availability for biological use because of this triple bond, leading to a scarcity of usable nitrogen in many types of ecosystems. **This is the major reason food supply is constrained naturally on Earth.** It needs nitrogen, in the form of fertilizers, to help life grow. Nitrogen constrains or limits growth, but it can also ignite it to cause major uncoupling. Uncoupling of nitrogen from light or lightening is called a loss of negative feedback control.

One form of electromagnetism, lightning strikes, has enough energy to split these atoms in the air (N_2), which then bond with oxygen in the atmosphere to make nitrates that fertilize the soil and are taken into plants as nutrients. *In your body, the stored electric charges in cell membranes have the ability to do the same thing to nitrogen but the stored electric charge has to be directed properly to use it.* This is why electrical capacitance is usually coupled with NO, cold, and ketosis with DHA tissue levels. One provides the needed electrons (in free fatty acids FFA), and the other improves the conduction of electrons so it can catalyze the reaction.

Nitrogen is necessary for all known forms of life on Earth. It is a component in all amino acids, as incorporated into proteins, and is present in the bases that make up nucleic acids such as RNA and DNA. In plants, much of the nitrogen is used in chlorophyll molecules, which are essential for photosynthesis and further growth. Photosynthesis is probably the most important reaction ever evolved on Earth because most of the biomass on our planet comes from this reaction.

Photosynthesis occurs in the ocean by diatoms and cyanobacteria. The processes governing transitions from one form of nitrogen to another are all part of the marine nitrogen cycle. Given that fixed nitrogen is essential for life, nitrogen fixation is one the most important ocean processes. Nitrogen fixation in the sea is different than it is on land.
Here is the irony of this design on land. Plants can not use nitrogen until bacteria or archea unlock nitrogen from N_2. While, nitrogen gas (N_2) is the largest constituent of the Earth's atmosphere, this form is relatively nonreactive and unusable by plants. **It is kept under lock and key because unleashed, it will drive ubiqutin rates higher cause time to speed up and life to die much quicker than the atomic recycling can occur.** *When nitrogen is unleashed it would lead to extinction because of a relative timing mismatch.*

Chemical processing or natural fixation (through processes such as bacterial conversion—see rhizobium) are necessary to convert gaseous nitrogen into compounds such as nitrate or ammonia which can be used by plants. In this way, nitrogen acts **as the breaking pedal to life's growth patterns** in plants. Weathering rates are particularly high adjacent to roots because of the high rates of biologic activity and CO_2 production in the rhizosphere. **Your gut microbiome and enterocyte interface mimic the rhizosphere of plants.** This is why metabolic rates and mitosis rates in enterocytes are so high and these cells turnover every 24-48 hours. Plankton in

the sea unlocked nitrogen making the O_2 that allowed eukaryotes to dominate because it allowed for the evolution of DHA. DHA cannot be made in the sea without plankton and oxygen. Plankton are critical for DHA because they process it to put the majority of DHA in the SN-2 position for mammalian use in their central nervous system. DHA incorporation is incredibly important into enterocytes for similar reason. Plankton are extremely sensitive to CO_2 levels and pH in seawater. So are your enterocytes. Without these coupling catalytic effects eukaryotes and their use of quantum mechanisms in their mitochondria would have never seen the light of day so to speak. Video hyperlink

Nitrogen is present in the environment in a wide variety of chemical forms including organic nitrogen, ammonium (NH_4^+), nitrite (NO_2^-), nitrate (NO_3^-), nitrous oxide (N_2O), nitric oxide (NO) or inorganic nitrogen gas (N_2). Organic nitrogen may be in the form of a living organism, humus or in the intermediate products of organic matter decomposition. The processes of the nitrogen cycle transform nitrogen from one form to another. Many of those processes are carried out by microbes, either in their effort to harvest energy or to accumulate nitrogen in a form needed for their growth. **This is why death evolved on Earth.** You need death and decomposition to interact with lightening strikes (an atmospheric bio-plasma) and microbes to free nitrogen for plants to grow and eukaryotes to breath O_2. When a plant or animal dies or an animal expels waste, the initial form of nitrogen is organic. Bacteria or fungi convert the organic nitrogen within the remains back into ammonium (NH_4^+), a process called ammonification or mineralization. The conversion of ammonia to nitrate is performed primarily by soil-living bacteria and other nitrifying bacteria. This also happens in our gut microbiome.

Why is all this important? In the primary stage of

nitrification, the oxidation of ammonium (NH_4^+) is performed by bacteria such as the Nitrosomonas species, which converts ammonia to nitrites (NO_2^-). Other bacterial species such as Nitrobacter, are responsible for the oxidation of the nitrites into nitrates (NO_3^-). It is important for the ammonia to be converted to nitrates because accumulated nitrites are toxic to plant life. It is also toxic to us. *This is why those with bad gut function often respond to diatomceous earth ingestion.* You are effectively trying to recover coupling of your nitrogen cycle that is uncoupled in your gut microbiome because it is simplified. The usual uncoupler is either excessive blue light exposure which leads to alterations in your lower esophageal sphincter (LES). When the LES does not work, GERD results and alters the amount of oxygen in the gut.

Why does this effect animals as it does plants? Nitrities and nitrates have a high solubility in water. For plants the toxicity arises because soils are largely unable to retain anions, nitrates can enter groundwater. In us, we are able to generate massive amounts of anions in our plasma in the form of sulfate as I mentioned in Tensegrity 8. When an animal cannot do this because their skin is not in natural sunlight or they have a broken circadian cycle problems begin in the transport of glucose and oxygen in their blood plasma. Elevated nitrate in groundwater or our plasma is a huge concern for us because drinking water or the our blood plasma because 93% of blood plasma is water. ***The elevation of nitrates in drinking water or blood plasma by any mechanism causes pseudo-hypoxia of the mitochondria systems in animals.*** This is why some humans have a lot of trouble with certain wines high in nitrates. It is not the wine that is a problem, it is their ubiquitination rates that is the problem generated by the environment they live in, that most are unaware of.

THE KEY DETAILS FOR EUKARYOTES: BIOLOGY GEEKS

Pseudohypoxia plays a huge role in disease generation in

humans with a lack of DHA in their cell membranes and in their tissues. Sinclair's 2013 paper shows us this blue print but modern science never has sensed its significance. This NO-superoxide-peroxynitrite linkage is very complex and very misunderstood, in my opinion. Let us look at it carefully. When most illness begin, they are associated with excessive amounts of superoxide levels, but this happens over a short timescale; There is a huge difference between acute and chronic pseudo-hypoxia. NAD^+ is where eukaryotes handle their nitrogen coupling system at cytochrome 1. NAD^+ and SIRT1 availability play key roles in both acute and chronic inflammation. You need both present to regulate inflammation in a cell. In aging and illness, NAD^+ is missing in action. NAD^+ is the key source of nitrogen for cytochrome 1.

In acute inflammation, chromatin departs from, and returns to, homeostasis in an orderly sequence (spatially and temporally). This sequence depends on shifts in NAD^+ availability for SIRT1 activation and deacetylation of signaling proteins, which support orderly gene reprogramming (epigenetics) during acute inflammation by switching between euchromatin and heterochromatin. Remember chromatin change determine if genes are expressed or repressed. In contrast, in chronic inflammation and cancer, limited availability of NAD^+ and reduced expression of SIRT1 may sustain aberrant chromatin structure and functions.

Chronic low O_2 the levels (think OSA) decay into a lack of superoxide pulses from cytochromes in mitochondria and directly alter epigenetic expression via changes in the size and shape of chromatin. This happens when mitochondria become pseudohypoxic and make little O_2 from electron chain transport. Here is where David Sinclair's paper in 2013 becomes extremely important. It links all chronic disease generation and aging to nitrogen uncoupling.

The second key is that nitric oxide contrasts with most

intercellular messengers, because it diffuses rapidly and isotropically through most tissues with little reaction and cannot be transported through the vasculature due to rapid destruction by oxyhemoglobin. So to cause a chronic disease it absolutely needs the pseudohypoxia to manifest, which means superoxide has to be LOW, not high. When this happens NAD^+ remains chronically low. **NAD^+ and SIRT 1 lose their negative feedback control.**

This is key sign that nitrogen cycles are uncoupled from the light cycles in living things.
Three, nitric oxide is not necessarily short lived and is intrinsically no more reactive than oxygen in cells. The reactivity of nitric oxide, per se, has been greatly overestimated in vitro experiments because no sump drain is provided to remove nitric oxide in these studies. Because of this reason, RNS balance with ROS is critical for ACCURATE mitochondria signaling. It is not a bad molecule as most believe. **When these nitrogen radical pairs lose its negative feedback control with ROS all hell breaks loose**.

Nitric oxide is removed within seconds in vivo experiments by diffusion over 100 microns through tissues to enter red blood cells and react with oxyhemoglobin. This makes it very mobile in the body. This is why autism/methylation defects are associated with anemia in most studies. If you have no RBC's then you lose that sump or drain of NO. Then NO can cause nitrogen conversion of tyrosine residues of proteins exposed to the vasculature. The most critical part of tyrosine laden proteins exposes them to the blood plasma. This is why the problem manifests clinically in these scenario's. Fourth key point: nitric oxide is the only biological molecule produced in high enough concentrations to out-compete superoxide dismutase for superoxide. Peroxynitrite reacts relatively extremely slowly with most biological molecules, making peroxynitrite a selective oxidant. So peroxynitrite for most is not a problem unless your redox potential is already on the

fritz. In MTHFR defects, it can be, but it is not AXIOMATIC. Fifth point, it is true that the direct toxicity of nitric oxide is modest but is greatly enhanced by reacting with superoxide to form peroxynitrite ($ONOO^-$). For example, a strong inhibition of the catalytic activity of manganese-superoxide dismutase (MnSOD) by peroxynitrite-mediated PTN has been reported and explained by nitration of the essential tyrosine residues in proteins as I mentioned above. This usually must occur in the face of simultaneous activation of the immune system for any reason……..but autoimmune conditions are prime suspects in today's modern world.

The inactivation of human MnSOD by peroxynitrite is caused by exclusive nitration of tyrosine 34 (Tyr34) to 3-nitrotyrosine. They (AI/SNP people) develop because of a lack of electrons activating the proper T regulators cells because of a total body wide lack of DHA which allows us to capture the electrons from the plasma.
Since smaller eukaryotes are more sensitive to oxygen tension changes in their growing bodies this can alter the relationships between CO, NO, and H_2S in animals, and create a transitional state of pseudohypoxia to stimulate the production of these three gases. I believe this is why second born male children are more at risk for disease on the autism spectrum than first born male children. When this happens epigenetic expression is dramatically altered in neurons and across all cells lines leading to may disease phenotypes. If it is allowed to persist acutely it can interfere with blood-oxygen levels in our children and cause methemoglobinemia or blue-baby syndrome. In today's modern world our comforts have allowed it to go on chronically and insiduously and it leads to pseudohypoxia. When chronic hypoxia is tolerated, mitochondrial respiration becomes uncoupled from food electrons and all foods begin to make us fat. This is the lesson I learned in my recent biohack that I laid out in Tensegrity 5.

BACK TO NITROGEN ECODYNAMICS:

Nitrogen is tightly controlled on Earth's ecosystem. With nitrogen, the dose makes the toxin for both plants and animals. Nitrogen, however, does not bother bacteria or fish much at all. Nitrate-enriched groundwater can contribute to eutrophication, a process that leads to high algal population and growth, especially blue-green algal populations. Eutrotrophication is the formal name that describes how a quantized ecosystem remains well nourished. The global nitrogen cycle has been far more perturbated by mankind than that of carbon. This key issue is when nitrogen is perturbed, it will eventually lead to changes in the small percentage of atmospheric CO_2. This will have massive implications for life in the sea first and on land second.

Marine life, or land animals that fed on marine life, should be filled with an isotope of nitrogen called N-15. People that eat seafood carry more N-15 in their proteins than those who eat from crops or livestock. This has massive quantum implications when you consider that nitrogen makes up most of the atomic weight of collagen. It also surrounds iron in the main ring of hemoglobin to carry oxygen in RBC's. That relationship is being lost in man in today's world. In plants, nitrogen surround a magnesium atom to create the exciton's for photosynthesis of cyanobacteria in the sea. Photosynthesis is the most important chemical process on the the planet's food webs. Nothing on this planet works if the RuBisCo protein is uncoupled. When this occurs extinction events are associated with this issue.

HUMAN GUT ECOSYSTEM

Negative environmental effects of nitrogen cycles include hypoxia, the depletion of oxygen in the water, excessive runoff of nitrogen and/or phosphorus in the marine environment which causes a reduction in specific fish and other marine animals. This applies to us as it does the oceans. This is why the Great Barrier Reef is 55% dead in 2015 and why humans are

getting sick at alarming rates. This process began to speed up about 50 years ago. The same process that happens in your blood plasma and RBC's with a circadian mismatch is causing the Great Barrier Reef to die. When you uncouple the nitrogen cycle in your gut from the carbon and sulfur cycles all hell breaks loose and the fundamental forces that have joined to bind atomic forces together begin to decouple. When this happens chronically, as it does in modern times, life begins to erode slowly in a disease states.

Eutrophication is the process that unlocks the power of nitrogen in an ecosystem. This process allows the much more rare element phosphorus to interact with nitrogen to raise ubiquitin rates tremendously. This process has destroyed the Baltic Sea, and Upper Klamath Lake because of human added phosphorus. I mentioned above that eutrophication and its associated pseudo-hypoxia *are not directly toxic to bacterial or fish life.* Like ammonia, nitrates can have indirect effects on fish if it contributes to this eutrophication. In the normal biological process, nitrite and ammonia are converted directly into molecular nitrogen (N_2) gas by **anaerobic ammonia oxidation.** This process happens in the oceans and it is "supposed to happen normally in our gut." When it does not happen GERD, SIBO, and IBS are the result.

WHY GERD, SIBO, and IBS ARE ALL A CONTINUUM OF THE UNCOUPLED PROCESS

Our microbiome pays deep attention to the amount of oxygen present in the certain geographic locations of our gut. GERD allows oxygen to enter the gut when it should not be present when the peripheral clock in the lower esophageal sphincter is running faster than the SCN. Today CMS spends unbelievable amounts of money on GERD drugs. GERD is a symptom of a severe lack of DHA in the system that controls the LES and keeps oxygen levels in the gut coupled to solar radiations.

Artificial light destroys this quantum relationship today. This is proof that most humans nitrogen cycles are uncoupled from normal light cycles today. When GERD is present it uncouples the physiologic function of the gut from the brain. This leads to suboptimal brain function in many ways related to neuropsychiatric and neuro-immune conditions. Hyperlink

In the modern world, coupling rarely functions optimally in our gut or the oceans, because of how nitrogen cycles have been altered by man in both ecosystems. Nitrogen has been unleashed from its tight triple bonds in many ways. Humans with altered microbiomes will begin with GERD and decline into many forms of IBS. SIBO, flatulence, and alterations between diarrhea and constipation will be classic findings. Pain in these syndromes will vary, but pain will be associated with mismatched blood flow in the mesenteric plexus with the uncoupled production of nitrogen gases are made in the lumen of the gut and plasma of the mesenteric plexus. This is why IBS/SIBO presents as a spectrum of symptoms that can vary as the levels or RNS and ROS vary, based upon how much or little oxygen is present within the gut's ecosystem compares to nitrogen levels. A circadian mismatch in the proper functioning of the lower esophageal sphincter (LES) and SCN, is the real cause behind much of the gut illness humans face today.

SEA ECOSYSTEM

Nitrogen cannot be utilized by phytoplankton as N_2 so it must undergo nitrogen fixation which is performed predominately by cyanobacteria in the sea. Once the cyanobacteria capture this nitrogen 15 they cause it to sink to the Ocean's depths because of its increased atomic weight. Today most of the nitrogen dumped into the sea is **nitrogen 14** from man made fertilizers. In your gut, the bacterial microbiome gets rid of it in your stool and urine if it is functioning well. Your colon is designed to absorb water from stool. *Water levels in*

this process can alter the processing of nitrogen in your gut. Consider how water affects nitrogen in the oceans.

In the seas, this recycling can occur from sinking of phytoplankton, vertical mixing, or sinking of waste of vertical migrators. The sinking results in ammonia being introduced at lower depths below the euphotic zone in the sea. Bacteria are able to convert ammonia to nitrite and nitrate but **they are inhibited by sunlight so this must occur below the euphotic zone**. This is why bacteria in your gut emit light and why our cells in the gut must absorb that light quickly. If you lack DHA in your enterocyctes that light never gets converted to a DC electric current. This disrupts how ammonia is handled.

If excess light or oxygen are present for any reason, the process won't allow us to get rid of the excess nitrogen we don't need. **This drives ubiquitin rates higher**. This is why colon cancer has gone from the 37th cause of cancer in 1900 to number two today. This happened in 120 years. There is no way that rate of change is tied to a genomic change. It is an epigenetic one tied to unleashing nitrogen from its coupled controls. If we can't control nitrogen coupling because of induced circadian changes in our gut flora, while our enterocytes have little to no DHA in their cell membranes, *hypoxia rules our biology* and this slowly trashes the ecosystem in our gut. Light is a big deal in all systems coupled to nitrogen because they are linked to increased ubiquitination rates. This is why magnolia trees in New Orleans shed leaves in spring and summer when trees in New England only shed their leaves in autumn. Their light cycles, temperatures, and nitrogen cycles support that excessive growth in spring to cause earlier death because growth rates are kept high. If you put a Magnolia tree in Boston it would extinct itself in one season due to its growth rate. It needs an environment that can support high capacity photosynthesis. This is why humans are now getting more ill faster today.

Increased ubiquitin rates = faster rates of death from

neolithic disease that show up out of no where when their guts are uncoupled from sunlight and DHA. Today the Earth's seas are slowly dying because of these effects, and so are things on land. Your microbiome also shrinks in size and species when you harbor illness. No one seems to see what I see, because the timescales of this decline in Earth's ecosystem have occurred over 120 years. We all see it in the neolithic diseases are slowly killing us off while we continue to enjoy the modern luxuries on our Titanic technologies.

ATMOSPHERIC ECOSYSTEM

Atmospheric nitrogen must be processed, or "fixed" by a bacterial intermediant, to be used by plants and animals and this is why your microbiome in your gut is of critical importance. On earth, for plants, some fixation occurs in lightning strikes, but most fixation is done by free-living or symbiotic bacteria known as diazotrophs or diatoms around the roots of plants. These bacteria have the nitrogenase enzyme. Nitrogenase is composed of two iron associated proteins, so iron deficient regions cannot support diazotrophic growth. It is also oxygen labile, so nitrogen fixation must be carried out anaerobically; this can present difficulties, which diazotrophs overcome by spatial and/or temporal segregation from intracellular oxygen and oxygen production. You should begin to sense this segregation of oxygen and nitrogen in this blog. It is critical.

Diazotrophs do save energy where possible. There are two isotopes of nitrogen: 14N and 15N, where 15N contains and additional neutron making it atomically heavier than 14N. In the air the ratio of 14N to 15N is roughly 99.5 to 0.5. In the sea there is more N15 available. Whenever possible, diazotrophs will preferentially choose to break the triple bond between two 14-N molecules because it is lighter than an N_2 coupling involving 15N, which skews the ratio of 14N to 15N higher in these organisms.

This is known as isotopic fractionation. Each nitrogenase

enzyme has 34 nitrogen atoms in them. So this makes this enzyme very sensitive to the isotopic fractionation by man's alteration of the normal nitrogen cycle using fertilizer.

You learned about this enzyme in Tensegrity 8. It is a *molybdenum containing enzyme* that is found in abundance in the first two kingdoms of life, bacteria and archea. Mo-nitrogenase is a complex two component enzyme that has multiple metal-containing prosthetic groups (Fe and Mo) contained within it. Since it has 34 nitrogen atoms in it, this makes it quite sensitive to the nitrogen cycle on Earth.

Nitrogenase combines gaseous nitrogen with hydrogen to produce ammonia. This is a key job for all life. *Without ammonia we cannot have food growing in the entire ecosystem.*

Plants take nitrogen from the soil by absorption through their roots in the form of either nitrate ions or ammonium ions. Most nitrogen obtained by terrestrial animals can be traced back to the eating of plants at some stage of the food chain. This is one reason why some animals eat vegetables. This is why photosynthesis is so critical to most food webs. Plants can absorb nitrate or ammonium ions from the soil via their root hairs. This can be transmitted to animals and their microbiomes in their guts just as the nitrogen cycling occurs around a plants roots. If nitrate is absorbed, it is first reduced to nitrite ions and then ammonium ions for incorporation into amino acids, nucleic acids, and chlorophyll. Chlorophyll is 100% quantized process involving 39 steps to use CO_2 and sunlight to make glucose and O2.

Animals than can use this O_2 in their mitochondria to complete the cycle and add CO_2 back to the environment for plants to use. In this way, all three kingdoms of life form a perfect Rayleigh–Bénard convection coupled cycle to control energy flows from the sun. Here you see once again how light and nitrogen are coupled. This process is repeated over and over again in nature, but humans keep overlooking it.

Mitochondrial respiration is also a 100% quantized process that uses electrons from food to make water and O_2. This allows

animals to exist and couple to the photosynthetic webs of plants and sea cyanobacteria. Everything is coupled in nature by nitrogen atoms and light frequencies in quantized fashion. ***Most of us do not realize just how tight this coupling is.*** Light and the atoms of gases in the atmosphere are how all this music of life are created using quantum mechanisms.

Ammonia is converted by the bacteria into other organic compounds. This can happen in a root system or in our gut. How microbes deal with nitrogen determines the frequency of light they emit during this metabolic process. Nitrogen's atomic mass is critical in this quantum dance with light. N-14 is the dominate isotope in the air and on land, but N-15 is dominate in the sea. Why? N-15 makes it less likely to work well with light because it has a higher atomic mass; this allows more light to be available to work with DHA in the seas. Light is supposed to be coupled with DHA in the seas for photosynthesis to occur with algae and cyanobacteria.

Man's dumping of N-14 into the oceans have disturbed this quantum balance with respect to light and this has fueled massive red algal blooms. The frequency of light microbes emit when they absorb nitrogen acts like a musical note in a sheet of music. By itself, it is not all that important, but when those notes are created together a signal or a musical piece is generated by these microbes for marine life to sense with their DHA laden cell membranes. Light can be changed back and forth between an electric signal and light signal by one lipid. That lipid is DHA, and it is highly conserved within the third kingdom of life called eukaryotes. When bacteria in your gut emit their light signals, DHA takes that light signal, and transduces its message to an electric and magnetic one, we can use but they cannot, as mentioned above.

That message is used by our gut to signal our immune system's T-regulator cells in the GALT just beyond out gut lining. This is where many information signals from the environment meet our body, to transmit key information parameters in our environment. This is where autoimmune conditions really begin

at a fundamental level.
Most biological nitrogen fixation occurs by the activity of molybdenum-nitrogenase, found in a wide variety of bacteria and some Archaea. *You would be wise now to recall that mitochondria are remnants of an ancient bacteria at this point in the series.* This is why there is deep atomic coupling of the kingdom's of life. The bacteria that became a mitochondria, happened to emit one specific frequency of monochromatic light called infrared light.

RUBBER MEETS THE ROAD

Symbiotic nitrogen-fixing bacteria such as Rhizobium usually live in the root nodules of legumes (such as peas, alfalfa, and locust trees). Here they form a mutualistic relationship with the plant, producing ammonia in exchange for carbohydrates. This same relationship exists between your gut microbiome and you in your intestines. Because of this relationship, legumes will often increase the nitrogen content of nitrogen-poor soils. Our microbiome is capable of doing this when oxygen is present to excess.
In your gut, your microbiome increases the ammonia content to liberate nitrogen for you to use for your ubiquination pathways. The more simplified your gut flora is the more nitrogen you liberate to drive cell growth. An anaerobic microbiome restricts decomposition of nitrogen in plant soils and your microbiome to limit growth. Aerobic decomposition unleashes nitrogen and facilitates decomposition. This drives growth and the amount of CO_2 consumed by roots of plants and expired in the guts of mammals. This begins to explain why GERD is so prevalent today. You also happen to get fatter when this happens. As oxygen becomes depleted by aerobic decomposition denitrifers gain a competitive advantage. They use most of the metabolic machinery associated with aerobic respiration to transfer electrons from organic matter to nitrate, producing N_2O and N_2. Nitrates are limited in anaerobic environments. **Nitrates are prominent in oxygenated environments because oxygen is the highest energy yielding**

electron acceptor in biology. Nitrates tend to be highly mobile in aqueous environments making them the perfect coupling chemical to transfer electrons anywhere over long distances. This shifts the microflora to fermentors that are able to break down labile organic compounds to acetate, hydrogen gas (H_2), and simple organic compounds. Fermentation products are then used by sulfate reducers or methanogens, depending upon the amount of sulfates present, which transfer electrons to sulfate or CO_2 to produce hydrogen sulfide (H_2S) or methane. Electrons generated in this way must be transferred to electron acceptors. In soils and the gut the choice depends upon the reducing power of the acceptor.

Oxygen is the most powerful electron acceptor in life > NO^{3-} > Mn^{4+} > Fe^{3+} > $SO4^{2-}$ > CO_2 > H^+. So as pseudo-hypoxia begins we begin to deliver electrons to nitrogen oxides. This cause a chronic lowering of NAD^+ at cytochrome 1. This is essentially what David Sinclair's paper has shown in humans in chronic illness or aging. **When the gut flora is more diverse, the less ammonia you liberate, and cell growth is controlled and constrained because ubiquination pathways are tightly coupled to this mechanism in soils and our guts.** This is ubiquitous across all living things, hence where is name came from. This is why ammonia is liberated in the guts of people with liver and kidney disease and they develop brain symptoms like asterixis. Most ammonia in the body forms when protein is broken down by bacteria in the intestines. The liver normally converts ammonia into urea, which is then eliminated in urine. This is done in all terrestrial animals.

SUMMARY

Health is merely the slowest form of death we create. Build well.

Symbiosis is a big deal in the human GI tract and in the ecosystems that couple the air, sea, and land on Earth. The

parallel's in both ecosystems are remarkable, but few people have linked them coherently. In this blog I have done this for you. Nitrogen cycling is a huge issue. How it links to oxygen levels controls the use of carbon by chlorphyll and mitochondria.
A few non-legumes can also form such symbioses. Today, about 60% of the total fixed nitrogen is produced industrially using the Haber-Bosch process. The Haber-Bosch process (manmade) now matches the entire nitrogen-fixation output of the oceans and exceeds the microbial fixation on land. Haber used this process to build explosive and won a Noble in 1918. Alfred Nobel fortune came from manufacturing explosive from this process!! ***The global nitrogen cycle has been far more perturbed by humans than that of carbon.*** *The world, for nitrogen, was constructed as a much smaller place than we have all assumed.* Adding phosphorus to an uncoupled nitrogen cycle is deadly.

The Haber Bosch catalytic reaction uses high temperatures and pressures to convert nitrogen gas and a hydrogen source (natural gas or petroleum) into ammonia. Do you remember when I told you on the forum long ago that your gut microbiome cares more for protons (H^+) in food than it does electrons? This is the fundamental reason why this is true. It also points out why our gut flora co-evolved with our intestines filled with DHA in their cell membranes.
If DHA is not present in our enterocytes membranes, disease ensues. The microbiome takes the nitrogen from our food using protons in the form of proton tunneling reactions in the absence of molecular oxygen in out gut. This helps the bacteria stay diverse and full of light, while also giving the eukaryotic cells it exists with the key things they need. **The microbiome lives for free on nitrogen, because it can use nitrogen as a terminal electron acceptor, while its host (us) is incapable of doing this.** This reality leaves behind a feast of photons and electrons for the eukaryotic cells to process in its cells and mitochondria. The gut microbiome needs the

protons and cannot use the electrons because they do not use mitochondria to drive their energy sources.
This should also point out why now reverse osmosis water or supercooled water build health. It provides a huge army of protons without any food added in this process. This helps you maintain a diverse flora best with small risks and low O_2 levels in the gut.
Not only do eukaryotes get a feast of electrons, but they get the electric light orchestra of quantized signals from the microbiome from the light they emit in this process. This light signal is deciphered by DHA in the intestinal lining. These signals are sent to the immune system in the GALT and to the brain by way of the vagus nerve and the incretin gut hormones as proxies for the signal. The vagus nerve enters the brainstem at the area postrema which has no blood brain barrier. Here this signal hits the CSF in the ventricular system and it affect CSF's hydrogen bonding network all over the surface of the brain. This is how the gut connect coherently with the brain.
Here, these protons "flicker and make collisions to disturb the atoms in water of CSF. These oscillations from water are sent coherently to every cell membrane on the neocortex which begins to "play its tune". What does the tune sound like? It depends upon the size and shape of the proteins and lipids in the cell membrane these photons collide with. The cells change the frequency of that incoming light to extreme low frequency UV light used for signaling. Light must be monochromatic and in the low end of the spectrum for life to work. Hyperlink.
DHA determines what other proteins should be in its cell membrane, using "cytosocial" quantum signaling. In this way DHA controls cell membrane physiology at a quantum level. DHA essentially picks the strings of the guitar that the music of life plays upon. That is how quantum jazz is developed in the brain from the gut via the carbon, nitrogen, and oxygen cycles of our environment. Your cell membranes are a very sensitive and specific antenna for native electromagnetic signals.

Everything is about electromagnetic oscillations interacting with atoms in anisotropic crystals, like water. Anisotropy dictates how light interacts with our surfaces in our eyes, skin, and gut. This atomic arrangement gives energy its "specific" directional flows to create and organize life efficiently thermodynamically.

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