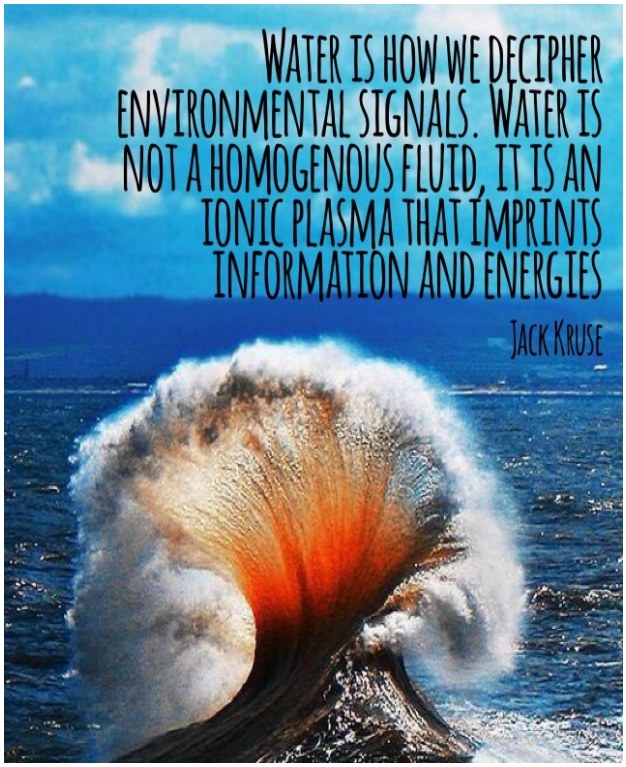
TENSEGRITY #6: HYDROGEN BONDING NETWORKS IN WATER

READERS SUMMARY:



1. WHY IS WATER SPECIAL?

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3. HOW DOES HYDROGEN AND IODINE PERFORM MAGIC IN US?

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HOW DO MITOCHONDRIA IN CELLS COMMUNICATE WITH THE ENVIRONMENT DIRECTLY?

Simple, it is a function of how well we can build our hydrogen bonding network in our cells. Life is all about water having a memory and water memory is all tied to the flow of protons and

electrons within us. All information is tied to the actions of light within water to pass information and energies in the environment to mitochondria.

In my recent talk at the Bulletproof conference, I spoke in depth about the magnetic magic of diatomic oxygen. It is paramagnetic and naturally drawn to mitochondria because of the strong electric and magnetic fields that create nano magnets of mitochondria. You might recall that mitochondria are filled with H^+ ions in its matrix…….for a deep reason. Hydrogen is the other side of the equation for water and for life . It too, is special in its own way. Hydrogen is a gas found in the atmosphere at trace levels which can not sustain life. It is synthesized from hydrocarbons and water. Hydrogen gas makes up the lightest fraction of the H_2O molecule. Hydrogen is both the lightest and most basic of all elements, to most scientists. I don't see it that way. Hydrogen is the most complex of all the elements because of what it can do in an *altered environments.* It is a fairly reactive gas, which enters into chemical combination with most of the elements and is feebly repelled by magnetic forces.

When hydrogen is ionized or charge separated……however, what can happen in life at the cell level changes in a big way…….hydrogen becomes the superman of flow. When hydrogen is ionized and loses its only electron it becomes a proton cation. This makes H^+ the lightest cation in chemistry and given small size of the proton, explains the unusually high diffusion rate of the proton relative to that of other common cations like potassium (K^+). When hydrogen loses its electron is becomes an ionic plasma that acts like a liquid metal. Ionic plasma's have special abilities. One ability is called proton jump conduction or protonicity. These rules are governed by something called the Grotthuss mechanism.

Hydrogen is a chemists conundrum, a biologists enigma, and

physicists dream because it can lose or gain this single electron. I have always been of the belief that hydrogen did not really belong to any group in the periodic table based upon this ability. After many thoughts on this topic, I realized under some environments it can be placed into group 7 or group one in the periodic table. All known elements of group 7 are halogens. The group 1 elements compromise the alkali metals. Hydrogen is often placed in group one of the periodic table by convention due to its electron configuration, but it is not considered by many to be an alkali metal. Why?

Hydrogen rarely exhibits behavior comparable to that of the alkali metals. For example, all the alkali metals react with water, with the heavier alkali metals reacting more vigorously than the lighter ones. The word “alkali” received its name from the Arabic word “al qali,” meaning “from ashes”. These particular elements were given the name “alkali” because they react with water to form hydroxide ions, creating very basic solutions (with pH > 7), which are also called alkaline solutions. Hydrogen forms water with oxygen directly and does not form a basic solution. Adding more hydrogen to it does not cause a special reaction at all, as it does with the other metals in group 1. **Why is hydrogen fundamentally different?**

Water is most famous for forming hydrogen bonds with other water molecules and with other ions dissolved in it. A hydrogen bond consists of a hydrogen shared between two electronegative atoms like oxygen or sulfur. The compound that donates the hydrogen to the chemical reaction is the hydrogen donor, and the acceptor atoms is the hydrogen acceptor. **Water is unique because it can be both an acceptor and a donor of hydrogen.** It means water can be a switch hitter in many biochemical reactions. This is why water is the universal solvent on Earth. In fact, water can even donate two of it hydrogen’s if need be. This makes the water molecule take on the tetrahedral structure in its frozen form linked in a

crystalline hexagonal array in crystal ice.

I told you hydrogen can also act as a group 7 halogen. It means it can gain electrons to become a non metal. When hydrogen does this in water when it is associated with iodine it forms an ionic liquid. Ionic liquids are now receiving special attention in science, owing to their unique properties such as high ionic conductivity, non-volatility and non-flammability. This ability makes these fluids versatile alternatives to conventional solvent-based systems used to make batteries, fuel cells, and super capacitors that hold large charges. They are also quite helpful as heat-transfer fluids to move infrared energies within a system. Iodine addition to iodide-based ionic liquids leads to extraordinarily efficient charge transport, vastly exceeding that expected for a standard viscous system. Hydrogen and iodine form an ionic plasma within CSF of the human brain. The choroid plexus of the human brain is designed to add iodine to CSF. CSF, you will recall is an ultra-filtrate of blood plasma and is made up of 99.9% water.

When iodine meets water that has been charged separated by IR light or by the hydrophilic proteins within the dura matter a massive amount of H^+ is made in the CSF of the brain. H^+ is equivalent to a proton. Using the Grotthuss mechanism, iodine is able to move protons closer together than we would normally expect, to alter their hydrogen bonding network to allow them to form superconducting proton cables that act like a positive charge electric current. The mechanism allows for charges to be transported not by the movement of particles, by the breaking and reformation of chemical bonds. As water is charge separated by IR light or by hydrophilic substances, many excess $H^{+\ ions}$ are made adjacent to the exclusion zone of water. Gerald Pollack's experiments have shown this exquisitely. The excess protons can then diffuse through the hydrogen bond network of water molecules or other hydrogen-bonded liquids (iodized CSF) through the formation or cleavage of covalent

bonds.

Grotthuss was the first correct concept for the charge transport in electrolytes, and it still remains valid for the charge transport in water. It allows for protons cable construction within an ionic fluid by using a current of protons (H+) that use a hopping mechanism. That hopping mechanism is referred to as quantum tunneling of protons. *Quantum tunneling becomes more probable the smaller the mass of the cation is, and the proton is the lightest possible stable cation on Earth.* Iodine and iodides turbocharge this ability by turning the sea of protons into an ionic plasma. This is why the thyroid gland, choroid plexus, and intestinal gut lining all concentrate iodine and iodides and $\mathbf{H^+}$.

HYDROGEN AND THE DIELECTRIC CONSTANT OF WATER

The dipole nature and propensity for hydrogen bonding are why water has an unusually high dielectric constant of -78 at room temperature. *You'd be wise to remember this fact.* This makes it the most polar solvent in all of chemistry and biology! This fact alone should have gotten biochemists attention that intracellular water is really critical, but it has not.

Why is this a big deal? In QED and semiconduction, anything with this high a dielectric constant becomes easily polarized by an electric field or by light. Hyperlink Both of these things happen in the human CNS and in our mitochondria.
This is why the quantum magic can happen between electromagnetic radiation and forces with water. Hyperlink

So which is more suitable for hydrogen?

It turns out how hydrogen acts chemically, depends upon the environment it is within. Does this means hydrogen can take different forms in our body if the environment of that region is controlled by information in some way? Is it a donor or a

collector of electrons? Is it a metal or a gas? Science depends on compelling narratives, and few people seem to the know the real story behind hydrogen. Above I showed you how hydrogen can act as a metal or non-metal. Hydrogen makes life a cooperative quantum dance and it can make other elements do things they normally would not do.

This is why hydrogen always hangs out with carbon and oxygen in life on our planet. The hydrogen ion (protons) and electrons go to reduce (or fix) carbon dioxide into the carbohydrates and biomass of photosynthetic organisms using both the C3 or C4 pathways, which feed herbivores, and down the food web, the vast majority of animal species. The air-breathers break down carbohydrates by oxidizing them (with oxygen) in the mitochondria of cells to obtain energy for growth and reproduction, regenerating carbon dioxide and water. This completes the living dynamo of photosynthesis and respiration that turns inanimate substances into living organisms.

Hydrogen is the **rogue element in the periodic table** that breaks all the rules we expect, and this is why life uses it in her designs. When a hydrogen bond forms between two water molecules, the redistribution of electrons changes the ability for further hydrogen bonding. In this sense, a hydrogen bond can be electrostatic. Hydrogen bonds, however, can become covalent as well. Iodine's addition to hydrogen favors the formation of covalent bonding in water. This is a fancy way of saying hydrogen makes other atoms do things they normally might not want to do. **Hydrogen's will is strong because of the *closeness* of its one electron to its nucleus.** This gives hydrogen lots of different *isotopes*. It also means hydrogen invokes Einstein's relativity theory more than any other element on the periodic table. You might not understand why now just yet, but more on this aspect shortly to fill in your gaps.

Hydrogen normally has one proton that is encircled by one

electron that buzzes in its electron shell. Its valence shell is designed to hold *two* electrons. So you need to ask yourself is the shell half filled or half empty? Other atoms want to know this too because this is how they decide how they react with hydrogen. This is why hydrogen can be a chameleon. Most elements either gain or lose their electrons in chemical reactions. The pathways that hydrogen electron takes determines the chemical abilities of the atoms in this dance. **Hydrogen swings, either way, depending upon the environment it finds itself in.** This makes it a very interesting player in biochemistry. It's no wonder hydrogen is an integral part of life's plan. Hydrogen is found all amino acids and protein polymers. It also makes up 2/3 of water.

Elements that lose electrons tend to be metals (H^+). Elements that gain electrons are non-metals. Hydrogen can be both and do both extremely well sometimes within the same ionic fluid. This is what makes hydrogen special. However, hydrogen roams determines where life goes and what it is capable of. Hydrogen is a fundamental "symmetry breaker" of all condensed matter in us or in the universe. Hydrogen gives water its special abilities. Life can not exist without hydrogen or its parent, water. Remember, the mitochondrial matrix is filled with **H^+**. Don't forget this point.

<u>WHAT DOES HYDROGEN AND A CELL DO TOGETHER?</u>

A biologic cell is a dissipative system by its very nature. This implies it has the role or purpose to break symmetry and create a metastable system to react to all environmental possibilities that the cell may face. A cell uses hydrogen and oxygen to un-condense our protein polymers, ever so slightly, to allow life to exist. When we sleep we are designed to be fully condensed. This implies that life can only exist when our protein polymers are slightly unfolded. This unfolding happens when electrons are withdrawn from proteins. Cortisol and ATP are electron withdrawing chemicals. Gilbert Ling was

the first scientist to realize what ATP did to proteins. ATP allows for amino acids to unfold to allow for water binding sites to open to the water hydration shells around proteins. When we are awake our proteins have to be somewhat unfolded and un-condensed. This is why I told you in Cold Thermogenesis 2 that I believed that life primordial condition was sleep. I believed we evolved wakefulness when we gained the ability to unfold our protein polymers. Within this sliver of unfolding is where the magic of life happens. Similarly, a cell is designed to break symmetries by using hydrogen and oxygen to its advantage. This ability must be associated with a specific molecule capable of breaking symmetry. H_20 can "unfold" or 'charge separate' into H+ and -OH with the addition of infrared heat from the sun or when it lies adjacent to hydrophilic substances. Proteins are made more hydrophilic with the addition of electrons to them. They are made more hydrophobic when electrons are removed. It turns out all proteins are hydrated in life. *Our proteins are the first smart device* ever *built by nature*. This might be why DNA only codes for protein. When we die we lose that ability and our muscles get hard in stiff in rigor mortis. Liquid water is the perfect chemical to break symmetry with all the protein polymers in all life forms. The reason is found in water's molecular 3 D molecular arrangements. Liquid water has perfect symmetry in that no matter from which direction you look at the molecules, the view is the same from a molecular standpoint. But water, can and does, lose its symmetry in nature naturally.

If the water freezes to ice, its perfect symmetry is lost and the property of rigidity emerges in its lattice. When hydrogen loses its electron, the following cations can be formed: H^+ and $H_30^{+.}$ The same is true when water becomes a gas or a liquid, a hydronium ion (H^+), a hydride (H^-), or an OH group in reactions of charge separating events of water.

Symmetry is broken by any phase transition in chemistry. Any time symmetry is broken, **energy and information transfers must occur by nature's laws.** This occurs many times in biochemical reaction of cells. And as such, all breaks of symmetry require a transfer of energy by the laws of physics to satisfy the Second Law of Thermodynamics. Symmetry is also broken any time temperature rises or falls or when electrons or protons are moving in any biochemical reaction. Any transfer of energy/information has the potential to break symmetry and therefore to give rise to emergent properties in the protein polymers or products of these reactions.

The line between metal and non-metal status in any element has become quite blurred because of hydrogen. Physics is now awakened to this issue. This is a new problem for modern chemistry. Its implications have not yet been appreciated by biology. When you consider that hydrogen is involved in most biologic reactions, this has massive implications for the biology of you and for life in general.

When I was a student growing up, hydrogen had a clear distinction in chemistry. Sodium and hydrogen are group 1 elements. Not only is hydrogen capable of switching teams, so is sodium its neighbor. Sodium is also used by life in a big way in extra and intracellular ionic fluids. Now we know that hydrogen and sodium "switch teams" based on their local environment. When the conditions of existence in these atoms environment is altered, they can change their chemical abilities. This action seems very counterintuitive, yet it has been proven by experiment. This makes them "metastable atoms". **Life appears to like to use atoms that are cationic, small, and metastable**.

We all think hydrogen is a clear gas. But on Jupiter, hydrogen is under so much pressure with an altered temperature, it becomes an extraordinary superconducting metal. In mitochondria, $\mathbf{H^+}$ becomes a metal like plasma as well. MEG data

shows that the two tissues with the highest mitochondrial densities have large magnetic fields, namely the brain and heart. This is why Jupiter is believed to have a stronger magnetic field than the sun. Hydrogen gas is diamagnetic on Earth while its dance partner gas oxygen is paramagnetic. One repels a magnetic field while the other is drawn to one. So hydrogen acts differently on both planets because each planet fosters a different environment.

In space, hydrogen also acts differently magnetically. Hydrogen is a plasma in space. When air or gas is ionized, it loses its electrons and plasma forms with conductive properties similar to those of metals. Plasma is the most abundant form of matter in the Universe because most stars are in a plasma state. Heating a gas may ionize its molecules or atoms by reducing or increasing the number of electrons in them, thus turning it into a plasma. A plasma contains charged particles: positive ions and negative electrons or ions. I'd like to remind you here that your mitochondrial matrix is filled with H^+. This is a hydrogen proton missing its electrons. Mitochondria also liberate light in the form of infrared light or heat. It too acts as an ionic plasma in you.

Magnetism is the essential force that determines the form of plasma or ionized matter takes in an environment. The hydrogen regions around galaxies are also considered plasmas, despite their degree of ionization being small. The degree of ionization in interplanetary space varies between unionized states or can morph to fully ionized states in other regions of space. ***In space, however, even the weakly-ionized plasma in the hydrogen region reacts strongly to electromagnetic fields.*** Magnetized plasma, such as contained in the hydrogen region, is the dominating state in the universe as a whole. Our sun produces massive amounts of plasma it spits out at us into the solar system as the solar wind or a coronal mass ejection. The sun's plasma is contained by the high electric

and magnetic fields of the sun.

Might this ability also be present in our mitochondrial matrix? After all, H^+ is contained by high electric charges and magnetic fields in mitochondria as well?

When air or gas is ionized, plasma forms with conductive properties similar to those of metals. Heating a gas may ionize its molecules or atoms by reducing or increasing the number of electrons in them, thus turning it into a plasma, which contains charged particles: positive ions and negative electrons or ions. Hydrogen can exist in ionic forms H^+, H^-, and H. Ionization can be induced by other means, such as a strong electromagnetic field applied with a laser or microwave generator, and is accompanied by the dissociation of molecular bonds, if present.

The presence of a non-negligible number of charge carriers makes the plasma electrically conductive so that it responds strongly to electromagnetic fields. Plasma, therefore, has properties quite unlike those of solids, liquids, or gases and is considered a distinct state of matter. Like gas, plasma does not have a definite shape or a definite volume *unless enclosed in a container;* unlike gas, under the influence of a magnetic field, it may form structures such as filaments, beams and double layers. A mitochondrion has two cell membranes to contain all of its $\mathbf{H^+}$.

Sodium is in the same column as hydrogen in the periodic table, but sodium appears as a silver metal on Earth. In human cells, it is not a silver metal at all. It is also part of an ionic plasma in aqueous solution. In 2009, Artem Oganov used high pressures to turn the metal sodium into a reddish-orange non-metal. This finding should shock people in biology, but so far it has not. They do not see why the benefit of Na^+ being in a non-metal state, in an ionic solution with $\mathbf{H^+}$ and

iodine, because they do not appreciate the Grotthuss mechanism exists in water. It clearly shows you the atomic world can be altered directly by its surrounding environment; so it should follow that our environment should be able to do the same to our proteins. All of us are made of these same atoms are we not? This is why I explained to you in Cold Thermogenesis 6 that all of the biochemistry was fundamentally thermoplastic (temperature) and subject to change. When pressure and temperature bring electrons so close they have to begin to occupy spaces that minimize subsequent repulsions. This action will not allow the electrons to roam free as they are used to doing in an aqueous solution. When you control the action of electrons and allow protons to roam free in a liquid plasma, you really are seeing “the wand” of the cosmic creator at work.

$E=mc^2$

So how does Einstein’s relativity directly tie to this short narrative on hydrogen? Einstein’s relativity theory allows for space and time bending. It also bends the mind of many people who look deep enough to see how far-reaching his ideas go. It turns out relativity has a major effect on the elements of the periodic table. When we get to an atomic mass of 79 we begin to see the counterintuitiveness of his ideas. Most of us know gold stands out in the metals on Earth because of its color. Gold has its special color because of Einstein’s relativity. I bet you have not heard that before. When we get to the atomic number of 79 the highly charged nucleus the innermost electrons only move at 80% the speed of light. This shows you that atomic mass has an effect on electrons. Gold’s electrons have slowed down relative to platinum (at atomic number 78).

When electrons slow down, this actually increases their small mass by the mass equivalence equation. (magnetism also slows electrons down) Here we see a thermodynamic problem that must be solved. This small change causes the innermost electrons to

get closer to the nucleus than usual. The longer range effect of this shields the outermost electrons from the pull of the nucleus. This causes the outer shells of electrons to expand outward. Here again, you see when electrons energies decrease, mass increases. This topic should raise the question, what happens to hydrogen when a single neutron is added to its sole proton and electron? Does something unique occur?

This is the relationship I mentioned to you in the EMF 2 blog post showing up, yet again. As the outer shell extends and expands, all the normal quantum connections of how electrons fill their shells begin to break down. This quantum effect in gold is seen directly by the naked eye when we see its color compared to the gold's neighbors who have a white grey color. In hydrogen, the effect is not seen by us but it is felt in places where hydrogen is located. When light hits gold the wavelength effects on gold's outermost electrons is altered. It causes metallic gold to look a lot different than the elements that are around gold on the periodic table (platinum or mercury). Gold is the color gold because of a wavelength shift of light by its outermost electrons. This is a quantum effect of its electrons.
What does this issue reflect? You need to understand Einstein's relativity to fully appreciate the long-range implications for biology. It also turns out that this is why the metal mercury is a liquid at room temperature. The low melting point of mercury is also due to Einstein's relativity. Peter Schwerdtfeger at Massey University just proved this in 2013 to small fanfare. Why am I telling you this detailed story?

Because hydrogen's electrons control the chemistry of water too using quantum effects of its electrons too. HYPERLINK
Up until these observations were made the belief in chemistry was that the periodic table was set up based upon quantum mathematical theory. Think I am wrong? HYPERLINK1, HYPERLINK2

It turns out these long-term ideas are dead wrong and most of the biochemistry is based on these ideas. This is a big deal in chemistry and physics right now. There are a couple of red herrings in nature's design and the theory of relativity is one of those red-herrings. This showed chemists in 2013 that there is certainly a limit to the periodic table but science has no idea of where those borders are today. This was music to my ears and it will be really bad news for today's biologic dogma. I am not sure when biochemists will realize the massive effects of these findings.
My prediction will be that soon physicists will be dictating the new laws to clinicians of how biochemistry can act instead of the ideas put forth by modern biologists. The biologic ideas and constructs of life are built around a stable periodic table of atoms. *The periodic table is no longer considered stable by physics because of these effects.*

This means that atoms that makeup living things can be altered directly by physical changes without the interaction of another element in a reaction. Hydrogen, sodium, and potassium are some of the smallest cations used in biochemistry and them manner in which they can turn into an ionic plasma with iodine are massively important to how life is powered. It also points out why biochemistry can occur without two atoms interacting in a molecular reaction. Biochemistry is not the only way life can adapt it appears based on these findings. What it also implies is that we no longer can predict detailed properties of things made from atoms that can swing multiple ways. I'd say that is a pretty big deal in the world of science considering all amino acids and proteins have hydrogen in them while they float in a soup of water, sodium and potassium and iodine.

So why is this narrative important for you to understand?

Hydrogen is tied to every amino acid and it makes up the largest portion of water. **Your topologic insulators/semiconductors are also made from both of these**

components. Your mitochondrial matrix is filled with hydrogen protons and surrounded by water. *To fundamentally understand life you must understand hydrogen's weirdness.* When any part of this thermodynamic equation changes the physiologic abilities of the topologic insulators also change. **Hydrogen is a rogue element that can alter the chemical basis of proteins coded for by DNA.** Hydrogen bonding alters the atomic relationship between atoms to fully unleash the power of atomic chemistry for life to organize around. The anomalous properties of liquid water may be explained primarily on the basis of its hydrogen bonding alone. I spoke about them here before.

HOW DOES HYDROGEN TIE TO THE NATIVE ELECTROMAGNETIC FORCE IN OUR IONOSPHERE?

Most people are also unaware that a hydrogen bond is tied to the electromagnetic force naturally. The reason is that the hydrogen bond is the electromagnetic attractive interaction between polar molecules, in which hydrogen (H) is bound to a highly electronegative atom, such as nitrogen (N), oxygen (O) or fluorine (F). In water's case, that atom is oxygen. The name hydrogen bond is something of a misnomer, as it is not a true bond but a particularly strong dipole-dipole attraction, and should not be confused with a covalent bond. Water can contain many covalent bonds as well if its environment is entrained to make it happen. You saw the importance of covalent bonds with respect to the Grotthuss mechanism mentioned above.

WHY THE WEIRDNESS IS IMPORTANT= IT FORMS THE IONIC PLASMA IN MITOCHONDRIA THAT LINKS THE INSIDE WORLD TO THE OUTSIDE WORLD

When a hydrogen bond forms between two water molecules, the redistribution of electrons changes the ability for further hydrogen bonding. The water molecule donating the hydrogen atom has increased electron density in its 'lone pair' region, which encourages hydrogen bond acceptance, and the accepting

water molecule has reduced electron density centered on its hydrogen atoms and its remaining ‘lone pair’ region. Cite one below gets into these details.
This action encourages further electron donation but discourages further acceptance of hydrogen bonds. **This makes the hydrogen bonding network a chameleon for the transfers of energy and information.** This electron redistribution thus results in both the cooperativity (e.g. accepting one hydrogen bond encourages the donation of another) and anti-cooperativity (for example, accepting one hydrogen bond discourages acceptance of another) in hydrogen bond formation in water networks. It can work together or not work together depending on the environment it is placed in. *The hydrogen bonding network in water is about 90% electrostatic and 10% covalent.* The covalent nature of the network is directly impacted by the amount of polarization of water by light. This is why the amount of light released by mitochondria is awfully important in wellness and disease states.
Water can also become a **gel plasma** when it charges separated and interacts with sunlight. I would remind you that infrared light is released into the water surrounding our mitochondria naturally. The interaction of light with liquid water generates quantum coherent domains in water, where the water molecules oscillate between the ground state and an excited state close to the ionizing potential of water. **This produces a plasma almost free electrons favoring redox reactions; this becomes the basis of energy metabolism in living organisms.** This is what I believe happens in human mitochondria. Light is thought of as always moving and never motionless. Light can be constrained by strong electric and magnetic fields. Moreover, in liquid crystals, photons can also become trapped and form its own crystal and fixed within the living matrix to fuel life’s processes. HYPERLINK

This points out why the incorrect amount of light often leads to the wrong proton signals in water. You saw this revealed in the Multiple Sclerosis blog. It is also why we see protons

spin abnormalities on MRI images.

Here you can see where photon release from the mitochondria can directly alter the physiology of the hydrogen bonding network in water directly. I spoke about water and protein polarization in blog's OSF 3 , 4, and 5. Changes in the hydrogen bonding network in water can lead to compliant design flaws in our protein polymers. Water also polarizes around proteins at all times and that action reduces the hydrogen bond length in that intracellular water to form coherent domains.

Coherent domains in water are designed to naturally trap electromagnetic frequencies from the environment to orchestrate and activate specific biochemical reactions through resonance matching. *Water is a repository of the environment's electromagnetic potential at all scales.* This is how seasons are sensed and it is how all five of our sense work as well. This also happens to be why ionic plasma suspended in water are used in some form by every one of our sensory systems in our brain and peripheral nervous system. **Water is how we decipher all environmental signals.**

Water allows for a myriad of different chemicals to find one another inside a cell naturally to carry out biochemistry you learn in a book. Gilbert Ling was the first person to ever realize this when he saw that the small cation K^+ glued water cables together. He also was the first person to realize that ATP withdrew electrons from proteins to cause them to unfold and take on different physiologic characteristics. These changes define the compliant design in cells.

These actions of the hydrogen bonding network in water will increase the covalent bonding within the cell above the normal 10%. Covalent bond lengths vary much less with temperature and pressure changes in the environment. They are affected most when ice is formed. Dr. Gerald Pollack's work has redefined how ice really forms. It is not how we all think ice forms.

Ice actually has to heat up with some infrared light to liberate **H^+** before it freezes because it has to have protons added to water for ice to form its lattice.

Liquid water consists of a mixture of short, straight and strong hydrogen bonds and long, weak and bent hydrogen bonds with many intermediates between these extremes. Short hydrogen bonds in water are strongly correlated with them being straighter. Shorter hydrogen bonds are stronger. The stronger hydrogen bonding network is in water the apter it can capture electromagnetic oscillations. This is critical in blood.

This is what makes water coherent. This type of water is less dense. **Water is not a homogenous fluid, it is an ionic plasma of small-sized cations with small amounts of iodine that becomes able to imprint information and energies from the environment it senses.**
The hydrogen bonding angle should be around 180 degrees. If the angle is below 150 degrees, then hydrogen bond brakes naturally. Do not confuse water's angle of bonding hydrogen to oxygen with the hydrogen bonding angles. These are different bonding angles between the atoms that make up water. Normal bonding angles between two H-O bonds in water is 104.5 degrees; in the gas phase or 105.5 degrees in the liquid water. Quantum chemistry of the environment of the water cycle is capable of altering water's bonding angle because of the introduction of new electronegative elements and the addition of powerful sunlight high up in the atmosphere which alters atmospheric chemistry. The donut hole next to Australia causes an altered bonding angle in water and this is why Oz is not the ideal place for life to live currently below the clouds that make rain.
It is all about bond angles within the hydrogen bonding networks.

In H_2O, only two of the six outer-shell electrons of oxygen are used for this purpose, leaving four electrons which are

organized into two non-bonding pairs. The four electron pairs surrounding the oxygen tend to arrange themselves as far from each other as possible in order to minimize repulsions between these clouds of negative charge. This would ordinarily result in a tetrahedral geometry in which the angle between electron pairs (and therefore the H-O-H bond angle) is 109.5°. What we expect is not what we find. Because the two non-bonding pairs remain closer to the oxygen atom, these exert a stronger repulsion against the two covalent bonding pairs, effectively pushing the two hydrogen atoms closer together. The result is a distorted tetrahedral arrangement in which the H–O–H angle is 104.5° in the atmosphere. This is what we call water's excited state.
There is a possibility for the main angle of water to deviate significantly from its standard value when water is so-called "excited" by a laser or strong electromagnetic radiation (hard UV from the sun for example). This happens in the donut hole in the Southern hemisphere due to a lack of ozone, allowing the UV light to interact with an excess of chlorine from human waste gases. This creates a hole in the ozone.

This effect appears to miss in humans who have Multiple Sclerosis too because of a lack of iodine and excessive amounts of light released from within their mitochondria.
Normally proton movements through the cytochromes occur in an orderly fashion, but when an excessive amount of infrared heat is released it affects the electrons in the ECT. This change affects protons motions in the matrix and at aquaporin gates system-wide. This interaction of light on this electron stream allows food electrons to release different light photons using the photoelectric effect. This alters the energies and information from our mitochondria into the water hydration. This changes the hydrogen bonding network in the hydration shell resulting in an altered flow of protonicity within the cell. The altered signaling causes havoc. This light release is designed to match the environment that is seasonal on Earth. This is how we recapitulate seasonal

changes in our cells. When we leak too much light, signaling suffers and disease results. The disease occurs based upon where the signaling is most affected.

The length of hydrogen bonds depends on bond strength, temperature, and pressure. The bond strength itself is dependent on temperature, pressure, bond angle, and environment. **This is usually characterized by a local dielectric constant that water finds itself in.** Water normally has a very high dielectric constant (78), but it quickly adjusts to the environment it is found in.

When water is part of a topologic insulator, its dielectric constant varies over a large range and seems to be controlled by ROS/RNS signals released from the cytochromes to directly affect the light polarization within the cell. The hydrogen bonding around proteins is very complex and varied because of the environmental changes a cell faces. What do the hydrogen bonds in this water due to proteins? Several studies have shown that hydrogen bonds play an important role in the stability of subunits in multimeric proteins like the cytochromes. To show you how detailed and complex this quantum dance is considered the following:

QUANTUM GEEKS: When we consider the quantum chemical calculations of the relevant inter-residue potential constants of amino acids we see a big difference. These are called compliance constants in protein chemistry. The calculations revealed large differences between individual hydrogen bonds of the same type. For example, the central inter-residue N–H···N hydrogen bond between guanine and cytosine is much stronger in comparison to the N–H···N bond between the adenine-thymine pair in DNA. So as the hydrogen bonding network changes so do the tightness or laxity of the double helix of nucleic acids. These changes directly affect DNA's thermodynamic profile. They also directly affect its resonance and its oscillations. **These resonant frequencies are what allow for nucleic acid expression.** Luc Montagnier has

measured the EMF emitted from nucleic acids and all of them are in the low-frequency range. In 2009, Montagnier published two controversial research studies which, if true, would be the most significant experiments performed in the past 100 years, demanding a re-evaluation of the whole conceptual framework of modern chemistry. His work has now been repeated by independent labs to the consternation of many scientists. Why do his experiments work?

Cooperative hydrogen bonding increases the O-H bond length whilst causing a 20-fold greater reduction in the H····O and O····O distances. The increase in bond length has been correlated with the hydrogen bond strength and resultant O-H stretch vibrations. This allows for an easy donation of the hydrogen protons to form "excited water". Dr. Montagnier experiments pull the veil back on how hydrogen works behind the scenes in water. He has unleashed the rogue side of hydrogen for all of us to see.

Excited water is the source of superconducting protons that allow for rapid intercommunication within the body that is associated with information transfer and energy transfers to power cellular work. Thus O····O distances within clusters are likely to be shorter than those at the periphery, in agreement with the icosahedral cluster model for water.
Why is all this complex scale of science important to grasp?

All memory and information transfer begins with the movement of the hydrogen bonding network in water. Hydrogen bonding carries information about solutes and surfaces over significant distances in liquid water. This information is transmitted by proton flows and resonant vibrations in liquid crystalline water of proton flows (hydrogen). This form of hydrogen acts like a liquid metal superconducting cable. This is directed to all parts of a cell and throughout the tissues because water touches every part of the collagen network everywhere in the body by design. Any place along the collagen cytoarchitecture also has this information instantaneously

contained in it at any time. This effect of the hydrogen bonding network is synergistic, directive and extensive for biology. It also operates at the speed of light. Most do not understand this complex dance yet. It's my job to change that.

If the hydrogen bond is substantially bent then it follows that the bond strength is weaker. This is why bonding angles have massive effects on the thermodynamic abilities in the water. This is the deep science behind why the people in Australia have water that has a less favorable energy profile that can lead to more modern diseases. The main criteria to determine the strength of hydrogen bonds are their intermolecular distances and the wave numbers of their stretching vibrational modes and those of the donor hydrogen covalent bond. iodine has massive effects on shortening the intermolecular distance of hydrogen bonds making the ionic fluid a true superconducting fluid that is ideal for heat transfers. This explains why iodine is found in protons around synapses where DHA and mitochondria are most abundant. It protects DHA from oxidation from the heat released in synaptic signaling that allows for neurotransmitter release.

Cations, like K^+, may induce strong cooperative hydrogen-bonding around them due to the polarization of water O-H by cation-lone pair interactions. **This is why potassium, K^+ is considered water's glue in a cell.** Potassium needs to stay bound tightly within cells in order for intracellular water to remain structured. When potassium is released water loses its structure. This causes swelling in the living person or rigor mortis in the dead person. This explains why Gilbert Ling was brilliant. He figured out why small atomic mass cations where the key to intracellular water transfers 60 years ago without using any physics in his experiments. QED was not even completed by Feynman when he came up with his AI hypothesis in 1952-56. He used his experiments to see the effects, and no one paid attention to him, except one physician who went on to invent the MRI machine using Ling's work.

Optimum stabilization of biological macromolecules by salts requires a mixture of a kosmotropic anion with a chaotropic cation. Iodine is the anion and potassium is that cation within the ionic plasma of water with all of its $\mathbf{H^+}$ ions. Ionic kosmotropes primarily achieve their increased structuring solely within their hydration shell, to partition and structure the protons into the more dense water state. Whereas the ionic chaotropes, create disorder within hydrogen bonding networks causing interference with water's hydrogen-bonded network, causing water to have a less dense state.

Potassium and hydrogen isoforms act as an ionic chaotrope to decrease the amount of hydrogen bonding in intracellular water. **Kosmotropes are stabilizing cation solutes which increase the order of water by increasing the strength of the hydrogen bonding network.** This allows water to maximally transmit energy and information flows over its hydrogen bonding network. The movement of these solutes within water can control water flows in the body and brain to fold and unfold proteins. This is the basis of water's memory that Noble Laureate and virologist, Luc Montagnier has found in his water memory experiments. Nobel Laureate virologist, Dr. Luc Montagnier shared the prize for discovering the HIV virus, also discovered the apparent ability of DNA fragments to "regenerate" themselves using an electromagnetic field within water's hydrogen bonding network. Ling found when he removed the cell membrane from cells the intracellular water retained the dimensions of the cell for hours. How this happened was due to all these interactions within water's hydrogen bonding network.

Gilbert Ling was the first person to realize the importance of cations in ionic plasma's to allow the folding and unfolding of our protein polymers to allow more or less water binding sites. This is how life exists in the slightly un-condensed state. When life sleeps it occurs when we are more condensed. He realized that ATP was important for life because it un-condensed proteins to open them up to more water binding sites

by removing electrons.

The more hydrogen bonding is present in water the more useful water becomes to help sense the electromagnetic environment it is in. When you marry this ability of water, with DHA's ability to turn light into an electric signal you can see why CSF is adjacent to the neocortex of the human brain. This signal is sent down the through the six layers of the cortex and through CSF. The cerebral cortex has massive amounts of mitochondria with their dual-layered membranes. Here the electrical signal is turned back into the light. This light is polarized and sent down the white matter tracts by magnetic flux lines. The white matter becomes a giant super capacitor holding a lot of charged plasma and that signal is sent via our nerves to all parts of the body. This is how environmental signals are changed at the mitochondrial level to recapitulate what our environment is telling us. This is how the outside world is rebuilt within our mitochondria. Any place water is found, collagen is next to water as the major electric company in your cells. This electric company uses electrons to generate a piezoelectric current and it uses intracellular water as a metal like ionic plasma to develop protonicity flows. These piezoelectric and protonicity signals are sent everywhere within our bodies at the speed of light to transfer energy and information to your body. This is how signaling works at its most fundamental level.

This is how lady evolution built a very sensitive electromagnetic antenna to sense the native EMF's on Earth. The movement of these cations with iodine/iodide ions added to the mix is what causes water to alter its molecular structure by altering hydrogen bonding networks. Iodine added to iodide-based ionic liquids leads to extraordinarily efficient charge transport. This is why iodine and DHA are fundamentally coupled in the food chain and why they are part of my Epi-paleo Rx for reversing disease.

If you are following this blog closely, these abilities in

water, sound very much like how a plasma in space operates. I spoke about this in detail above. This changes its ability to carry energy and information directly alters its physiologic abilities of our protein polymers when they are ‘slightly un-condensed during light hours. All of this occurs on a subatomic scale far away from the scale of measurements in modern biologic experiments. Ironically, Ling and many other scientists have measured these effects because they knew what to look for and designed experiments to find these effects in cells.
The effect is reinforced by additional polarization effects and the resonant intermolecular transfer of O-H vibrational energy, mediated by dipole-dipole interactions and the hydrogen bonds. Pollack found the like likes like phenomena in his work. He found that protons could be drawn together close if there was a negative charge on them. Iodine and iodides are capable of providing this negative charge to make superconducting cables in cell water, CSF, and in our thyroid glands using Grotthuss’s mechanism. This mechanism provides for the reorientation of one molecule which then can induce corresponding motions and vibrations in the neighbors to lead to rapid communication within the system.

This is why the OSF 3-5 blog’s information about light polarization changes should begin to resonate now with you. Misfolded proteins all alter light polarizations and they lead to disease. When the polarization of light changes in water or proteins, it means tissues have lost their ability to sense information and energy from the environment. We have 5 senses, and at their core, our sensing ability is buried within water’s molecular magic providing the mechanism to how we sense things everywhere.
Thus, solute molecules, like iodine, and sodium in water can actually ‘sense’ these changes. They do it by reacting to the effect each other’s solubility in this water. This directly

changes the hydrogen bonding network angles. When most halogens are in the water they also reduce the hydrogen bonding network. This is why chlorine has massive negative effects in the atmosphere of the southern hemisphere. The smaller atomic mass halogens like fluorine, chlorine, and bromine reduce water's dielectric constant by hoarding its electrons. This is why these halogens are not good for health.

Halogens act as 'ionic kosmotropes' by lowering energy in hydrogen bonding networks and they also lower the size of the exclusion zone in water possible within a cell. Sometime in the right spot, this is a benefit. A 'kosmotrope' is a chemical that is an order-maker. It decreases randomness by structuring water or proteins. A 'chaotrope' increases chaos (disorder-maker) by destabilizing proteins and membranes; ionic kosmotrope's need to be thought of differently. They are not described as 'structure-makers' or structure-breakers' at all.

Iodine is an example of this special case. Iodine or iodides, act as an ionic kosmotropes, by primarily achieving its major effect by increasing the structuring of water around proteins associated with their hydration shells. Iodine makes the water '*denser*' around proteins to allow electrons from DHA to move into and out of them easily by altering the hydration shell. Iodine allows for more dense water clusters around DHA and proteins so we can move electrons in it rapidly. This increases their electrical abilities with respect to the movement of electrons.
The biggest natural occurring halogen is iodine and it has a paradoxical quantum effect on water very similar to the gold's story mentioned above. Iodine has a huge beneficial effect on the exclusion zone (EZ) of water. *Iodine specifically alter's water's hydrogen bonding network unlike the other halogens to make it transfer heat and charges like a superconductor at higher temperatures. It does not require colder temperatures*

to do so.

Since its atomic mass is highest of all the halogens life uses, it cannot control its electrons well. Its outmost 7 electrons are far away from the control of its nucleus. Iodine becomes the ideal halogen atom to share electrons with DHA to protect it from oxidation from heat or light. It transfers the heat to the proton network around it to shield DHA. **This is also why iodine is always found where DHA is found in the CNS. It is also why the choroid plexus in the brain adds iodine to CSF for DHA to use**. It protects the most sensitive parts of the CNS that undergo oxidation. Neural synapses have the highest rate of oxidation risk in the brain and spinal cord. Moreover, this explains why iodine is always linked in the marine food chain with DHA too. Iodine also protects DHA from oxidation in neural synapses everywhere in life.
Iodine has an atomic mass of 127. Spectroscopic studies of the hydrogen-bonded structure of water around the halide ions F^-, Cl^-, Br^- and I^- indicates that the **total extent of aqueous hydrogen bonding increases with increasing atomic size.** So the experimental data matches the beliefs you find in my theories about how water acts in CSF and synapses.

Without iodine, DHA won't work optimally to change light into an electrical signal properly. In the brain, iodine is found in the choroid plexus, the area on the ventricles of the brain where cerebrospinal fluid (CSF) is produced. Children with autism have been found to have a poor ability to concentrate iodine in their CSF. When water lacks iodine it can not sense the environment well. This is why all children with autism appear to have sensory abnormalities in their behavior. The interaction of iodine and DHA to move electrons and protons rapidly while shielding them from heat is fundamentally how circadian signaling begins in the neurons of suprachiasmatic nucleus of the human brain. If you do not have the component parts of the clock mechanism you cannot tell time well, energy

and information cannot be imparted to the tissues, and diseases ensue.

HOW DOES THE ENVIRONMENT ALTER LIFE'S EPIGENETIC SWITCHES?

T 4 has 4 iodines and T3 has 3 iodines. The thyroid gland, brain, and gut all concentrate iodine and iodides. Now you see why they do. They need the iodine to make superconducting proton cables. The general picture that emerges within the forming brain that T4 and T3 hormones enter the brain through specific CNS transporters as the brain forms. T4 is converted to the active hormone, T3, in glial cells, astrocytes, and tanycytes, although the main target cells of these hormones are neurons and maturing oligodendrocytes within the suprachiasmatic nucleus. This is ultimately how the *direction of time* is initially set within this newly forming brain. T3, acting through the nuclear receptors, controls the expression of genes involved in myelination, cell differentiation, migration, and signaling. I went over this in Energy and Epigenetics 1.

Few people understand why iodine and DHA are critical in human SCN and myelination patterns. In addition to transducing the proper T3 signal, the nuclear receptors also have activity in the unliganded state. When circadian signaling is off in the maternal germ line, before fertilization, this favors the un-liganded state and this strongly favors the development of hypothyroid phenotype centrally within the brain of her developing child. This is where leptin resistance begins fundamentally. Many bad childhood tumors begin this way.

This is why early-onset hypothyroidism in the maternal tree is always a key clue to the astute clinician that a circadian mismatch is a key feature in many diseases. MS, Hashimoto's, and melasma being common ones in modern women. This un-liganded action occurs via aporreceptors that repress normal

thyroid transcription. This is how epigenetic switches are set in the germline. This effect is how transgenerational hypothyroid phenotypes occur in subsequent generations of children. Today we live in this world. 99% of all cases of hypothyroidism are now caused by Hashimoto's thyroiditis.

When you understand this mechanism you begin to see these offspring do not even need to face the same environment their mothers did to get the same disease. They will manifest the disease much earlier in life if they face a lack of iodine or DHA in their first 6 years of life. They begin with the breakdown of the quantum chemistry between iodine, DHA, and water in the unfertilized egg. These effects then become generalized within the developing embryo after fertilization to affect brain function and the mitochondrial development in all their tissues. This is how the redox shift occurs transgenerationally in humans. The interaction between iodine DHA and water is critical in setting the proper signaling in how mitochondria can handle electrons at a very fundamental level. (Bernal 2005).
Hydrogen bonding also reflects the movement of electrons within proteins. You should recall that the more electrons that are added to proteins the more hydrophilic they become. The more hydrophilic they become the better they charge separate water to make a battery. This battery is what drives biochemistry, not ATP. Conversely, the more electrons are removed from proteins the more hydrophobic they are. These quantum thermodynamic alterations directly affect the shape and size of the proteins. Water molecules that lie are next to flat hydrophobic surfaces and unable to form extensive exclusion zones or what some call "clathrate structuring" in the literature. This clathrate structure is less dense. Ice is an example of this structure and this is why ice floats in water.

In order for water to interact with hydrophobic proteins, some hydrogen bonds must be broken and the water molecules will

tend to change orientation to meet the atomic structure of this particular proteins. Hydrophilic proteins have highly irregular surfaces that allow water's hydrogen bonding network to strongly interdigitate to the protein. This tightly coupled arrangement allows for cooperation and coherence between water and proteins to exist. This is how nature built its topologic insulators.

Network effects reach each other at distances of several nanometers and surfaces may have effects extending to tens of nanometers. This long-range correlation of molecular orientation has recently been confirmed using hyper-Rayleigh light scattering and is a reason for the high dielectric constant of water. Remember when I told you to remember that water has a dielectric constant? Here is why it is critical. When inflammation rises, for any reason, the dielectric constant of water collapses. This is is how ovulation works and how white blood cells are activated. When this happens you are pulling the plug on electron and proton flows of water. It is a generalized power failure. What has this process been called elsewhere on my blog? It is called leptin resistance.

When the temperature is raised there is a reduction in this dielectric constant of water and the number of hydrogen bonds is reduced. Inflammation is associated with higher temperatures and this un-condenses matter. Inflammation is leptin resistance. Magnetism is always associated with cold temperatures to condense matter. So are excessive amounts of protons from mitochondria in relation to electrons will unfold our protein polymers excessive to cause protein misfolding. As proteins misfold polarized light released interacts with these proteins and leads to the wrong information being sent throughout the system of tissues that make us up. This is how disease and epigenetic switches break. This is how aquaporin 4 gates get altered in our brain. **An excessive amount of protons also increase the electrical resistance of the inner**

mitochondrial membrane. This occurs because of the action between the transition metals in cytochromes to slow electron tunneling. When ECT slows, hypoxia results and O2 levels drop because not enough electrons are delivered to oxygen to reduce it. When we get hypoxic we also become unable to deliver DHA to all our cell membranes. This won't allow us to turn sunlight into electrical signals in our brain to signal mitochondria how to handle electrons in our mitochondria.

This electrical resistance in these metals increases with temperature, so as the "wire" heats up, even more, energy and information are lost. As energy is lost, we leak light. Heat loss is a loss of infra-red light from mitochondria. When cold thermogenesis acts on water, it increases water's dielectric constant, increases the number and strength of the hydrogen bonding network and this allows for a greater amount of energy to be transferred to and fro on water networks in a cell. This is why CT should always be used when you are reversing a disease. Cold condenses water. Cold increases the magnetic force in mitochondria and it also increases melatonin levels in the brain. Excessive protons or inflammation destroy these things. *These actions make water more responsive to the magnetic field water senses.* It is like fine-tuning your car's battery to become able to do more work. When you understand this blog well you begin to see why Cold thermogenesis is not a hormetic effect but it is a huge magnetic effect to increase energy for a cell when the sun is not present. It is a natural effect based on the physical laws in nature.

This is why cold is always associated with survival and increased semiconductive currents of electrons or protons on silicon semiconductors, MEMS, or topologic insulators. How electrons and protons are handled in mitochondria determines the wellness or illness we get because this changes the interactions of protons within the water of our cells. Protons are hydrogen ions that act as a metal plasma to do amazing things in cells. The environment is the key metric for

protons…….or hydrogen ions in mitochondria. Tensegrity #5 gave you the scoop on how oxygen works fundamentally. Tensegrity #6 give you the scoop on how the rogue element hydrogen works in your mitochondria and in cell water. Now you have both sides of the dance partners that make up water. No life exists without water and I hope you are beginning to see why.

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