The Redox Rx: How to Improve Your Redox Potential

Readers Summary:

1. How do I test or measure my redox potential?
2. How do I improve my redox potential?
3. How is the redox potential described in summary?

How do I test or measure my redox potential to learn if it's good or bad?

1. **Loss of libido, erectile power, lubrication or small ejaculate size** are all signs of a lowered redox potential. Sex life signals of low redox potential.

2. **The quality of your hair, nails and skin** is a big clue where you stand on a redox potential. If they are bad, you can expect to have a leaky gut and "Leaky airway" leading to respiratory issues when the redox potential dips lower.

3. **Poor sleep** is a symptoms of a low redox potential, as are MTHFR SNPs. The more electrons you capture, the bettrer you handle protons, the more you can navigate around a bad collection of SNPs. Having SNPs is not a death sentence.

4. **If you have cataracts this is a very big clue your redox potential is low and your lifestyle is blue light toxic.** The same is true if you are spilling protein in your urine, or you have memory loss, confusion, tinnitus or forget words easily.

5. **Dreaming is usually a sign of a good redox potential**. A

strong redox potential means you membranes have a lot of stored charge in them.

6. **Your BUN/creatine ratios are critical to follow in these battery of tests.** You can layer on other tests like your urine-specific gravity, urinary and serum osmolarity as well to gain a greater understanding of where you are. When it is high, it means your proteins and mitochondria do not have reverse water micelles around them to transfer energy to and fro to allow for 100 energy efficiency. This ruins the zero entropy systems and causes you to have to make more ATP to open water-binding sites on protein. **When ATP generation is low, you will crave carbs to offset this loss.** That is also a cue your redox potential is off. We can see this in advanced cardiac testing using HRV/CAC scores.

7. **Potassium levels tell you about the relationships to cellular ATP.** For every 0.3 mEq below 3.8 mEq that potassium is on a standard blood lab draw, means there is 100 mEq deficit inside a cell. The atomic size and its redox potential is huge for potassium "gluing of water" for it to function as the optimal electrical adapter to transfer energy throughout the cell coherently. ATP is designed to unfold proteins fully to open their carbonyl and imino side chain groups on all amino acids to intracellular water. This action allows binding and polarization to separate water into subatomic particles that are positively and negatively charged. **This action is called building or expanding the exclusion zone (EZ) of water.**

Expanding the exclusion zone allows water to form polarized layers around the hydrophilic proteins, and the earth's magnetic field then orients these polarized liquid crystals by a principle called "spintronics." Controlling the electron spin at a right angle to the direction of flow of electrons allows for the formation of massive super conducting proton cables all over your body. This is why sleeping on a magnetic pad at certain times might be a smart move when you understand

the context of your redox potential.

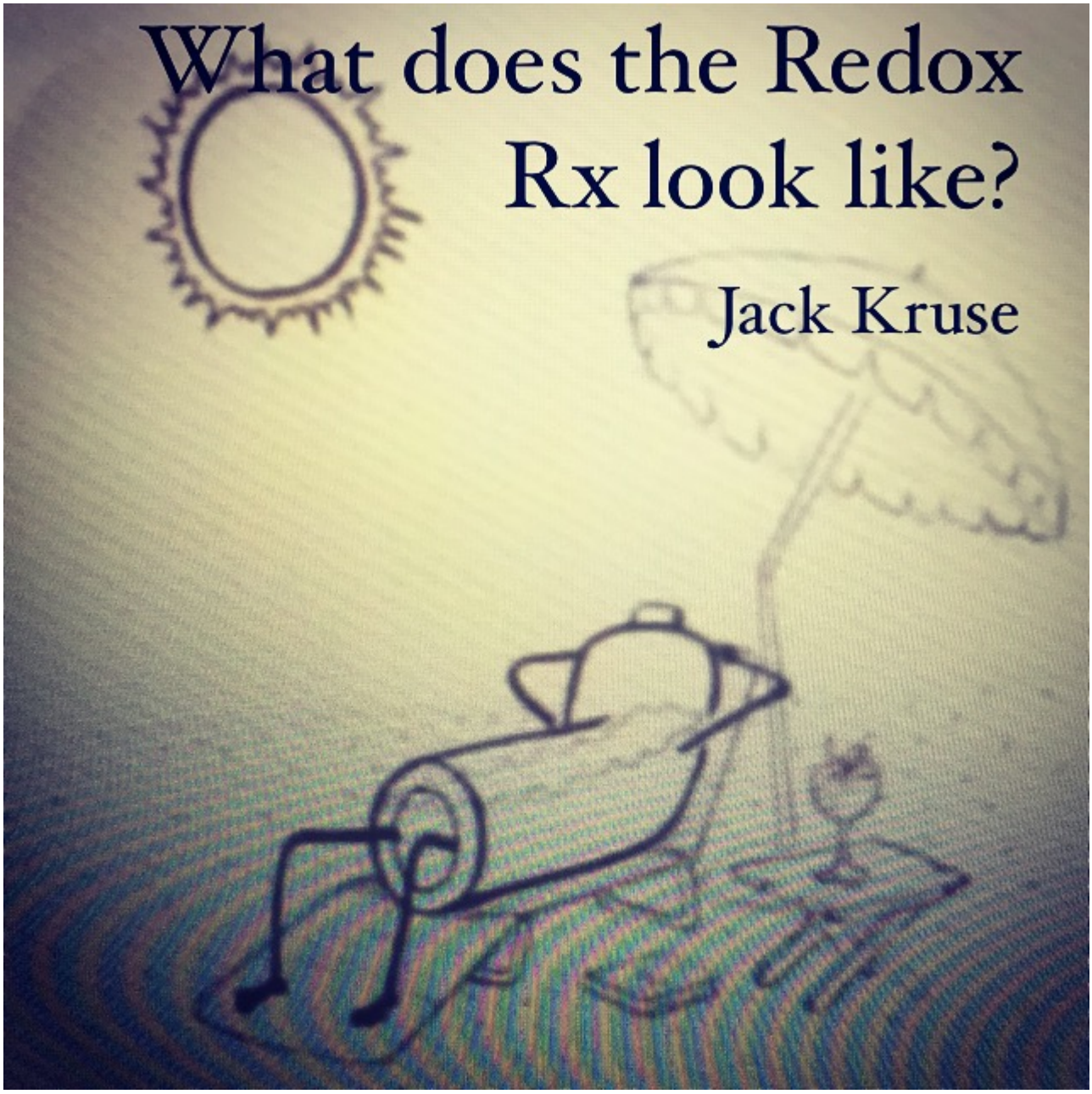
"Spintronics" was described in the February 2014 webinar for members. This gives you alternating positive and negative magnetic dipoles of water molecules that have their electrons locked in at 90 degree angles to the current of flow around these proteins. In this way, the magnetic field can control the action of water and collagen where they meet, both inside and outside of cells. Gilbert Ling found that the orientation of positive to negative water molecule binding was 3.1 Angstroms apart when theses conditions are met.

You must pay attention to your Potassium (K+) levels. The reason potassium is critical inside a cell and supersedes magnesium and sodium ion concentration is that it is naturally tied to beta and gamma carboxyl side chain groups found in proteins, where potassium specifically binds because of "quantum advantages." These beta and gamma carboxyl bonds allow K+ to ADSORB to this protein site and donate electrons (this is why K+ has the second highest redox potential to Lithium in life; see below) to the polarized water gel crystal.

Each molecule of ATP in a cell controls 8,800 water molecule binding sites and 20 potassium ions to make this liquid crystalline semiconductor inside every cell of your body. Potassium acts like "the glue" to keep your protein back bone and water in a gel state inside your cell to maintain the semiconducting plates together in a cohesive form. **This is why K+ is critical in setting the redox potential of water in a cell.** In this way, you are building a special type of semiconductor that forms "**the fourth phase of matter"** and can act as a "topologic insulator."(TI) *A 'TI' allows quantum effects to happen in warm wet environments.*

Insulators normally do not conduct electrons and are considered non-conductors, but topological insulators are a special form of matter that life appears to use to its

advantage because of some quirky quantum principles it has. It appears it can conduct proton currents below the water surface within a cell, which makes it quite special. The action at water and collagen surface is where the quantum dance of life begins.

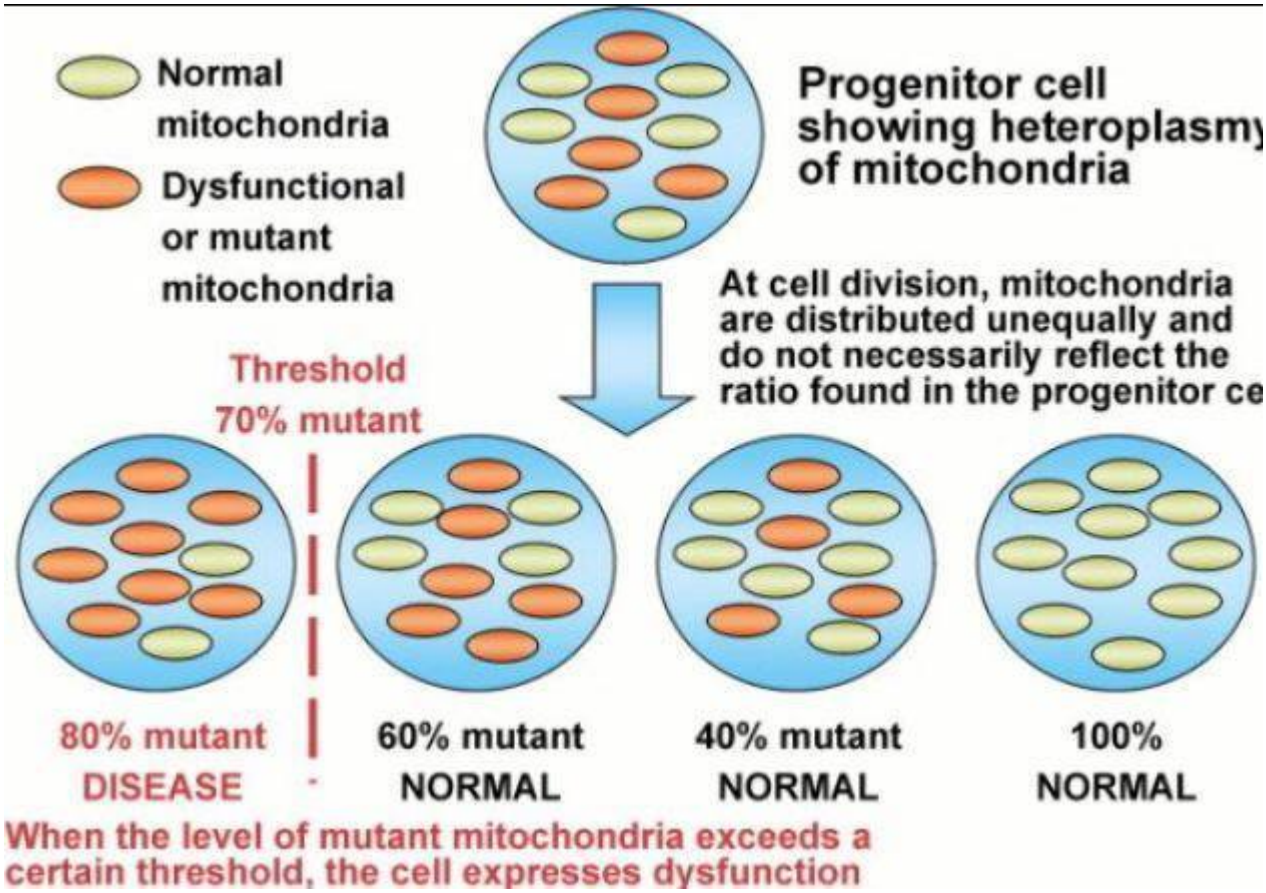


This helps explain why the DC current of regeneration Dr. Robert O. Becker was found on the surface of water and proteins. It is not found deep within a cell. In nerves, Becker found the DC current of regeneration was under the myelin layer but outside the axon. **For this reason, peripheral neuropathy is a big sign of a poor redox potential.**

So is degenerative disc disease. Tissues need a higher redox potential to regenerate. Protein synthesis is the most expensive cost of energy a cell has. This tells us about ubiquitination rates. When you constantly have to turn over protein, you are wasting huge stores of energy stored within your cells.

8. **When LDL cholesterol goes below 200, your redox potential usually is low.** This is also a sign that you likely are lacking that ability to store infrared spectrum light within your cells and their water micelles. Cholesterol is a polar molecule designed to be surrounded by water and energized by its ability to transfer electrons to the cholesterol. If it is not in a state of reduction, cholesterol can open the "doors to hell" inside your circulatory system. **When your redox potential is high, DHA is high and cholesterol becomes sulfated and becomes a life-saving protein.**

9. **Chronic altered hormone panels** are another insight into your redox potential, particularly your Vitamin D status, DHEA and sex steroid levels. This tells us heteroplasmy rate in the retinal pathways are altered.



10. **Your cortisol/melatonin saliva tests are keys to assessing the redox potential.** When redox potential is altered, you can bet your Vitamin A and D cycles are off in the brain. When vitamin D is low in the gut, it opens the tight junctions in between gut enterocytes. Iodine assists Vitamin D in this action in low light seasons. **This is where leaky gut begins for most**. The tight junction between gut cells is broken easily when vitamin D levels dip below 30 ng/dl. Anyone who is struggling to get their vitamin D levels higher likely has a co-morbid iodine and magnesium deficiency due to a lack of water. Magnesium is hydrophilic, and without water, we lose magnesium.

There are three metabolic transactions from cholesterol (Cholecalciferol) that occur under the skin's surface where our "storage version" of vitamin D (Calcidiol) is made. Sunlight is needed to sulfate Vitamin D3. This vitamin D gets transformed in our kidneys and liver to the "active version" of vitamin D (Calcitriol) in the liver. All three reactions require magnesium as a cofactor. It is physiologically impossible to have a 25(OH) blood test ("Storage version of Vit-D") to be less than 35 ng/dl and a

magnesium RBC level to be above 6.5mg/dL. Magnesium and vitamin D deficits walk together and are associated with a lower redox potential in cells, leading to disease generation.

Pay deep attention to metabolites to improve your redox potential:

- Acetyl-CoA
- NAD+
- SAMe
- FAD+
- α-Ketoglutarate

These four metabolites allow for cross-talk between metabolites, chromatin and double-stranded base repairs of DNA and RNA. They all signal different things to be done to chromatin, and they all act upon orders and directions of the redox potential and the electromagnetic force on the cell.

11. **Tissue levels of cysteine, glutathione, and selenium are key elements to a good redox potential**, though tissue glutathione is difficult to measure. Anemia is a risk factor for a low redox potential, as mentioned above. A new way to globally assess this risk is to get a telomere test of tissues. In fact, sirtuin 6 has been recently found to regulate mammalian genomic stability on its action on telomeres. SIRT6 activation ***decreases*** triglyceride synthesis. High TG levels are a sign of a loss of electrons and inflammation.

SIRT 6 also controls your growth hormone levels: as SIRT 6 drops, so will your IGF-1 level. As IGF-1 level lowers or triglyceride (TG) levels rise, you will age faster because your redox potential level is low. This makes following your TG and IGF-1 levels a way to trend your redox potential. The cell membrane of RBCs is another proxy for glutathione measures in tissues, in my experience. Hemolytic anemia patients can teach us many things if we are paying attention.

12. **A bioimpedance assay tester (BIA), a dental pulp tester, a TENS unit, thermography, CAC, or intranasal red light exposure** can all be used to assess redox potential in biohacks for serial measurements.

Most functional medicine practitioners have BIA testers. They can go over the test with you. BIA is a good way to tell about total body water status as well. Dehydration is a recognized factor affecting BIA measurements, as it causes an increase in the body's electrical resistance. For a low redox potential, we want a low electrical resistance in cells and tissues. Semiconductors are designed to have low resistance by their very nature. A high redox potential robs them of that ability.

In dentistry, an **electric pulp test** (EPT) ascertains the vitality of a tooth as follows: an EPT is placed on the tooth to be tested, along with a drop in conducting paste. Usually, the patient's saliva or toothpaste suffices as a conductor of electricity. The electric current is gradually increased until the patient signals a sensation, which consists of clicking or buzzing in the tooth. The test is repeated on neighboring teeth and often on the corresponding contralateral tooth. The lowest perceptible current is recorded for each tooth.

A low potential tells us that the redox state is pretty good if it is consistent within every tooth. A very quick and brisk response from all the teeth compared to the adjacent teeth generally indicates inflammation is present in the body and the pH is likely low and O_2 tensions are high. Similar response to neighboring teeth suggests a healthy tooth.

Sometimes I will use a lemon in the mouth to confirm the test. If it does not stimulate parotid (salivary flow) quickly, it can confirm a low redox state. If you have a lot of dental diseases, this method won't help you; it will confuse you. If your teeth are bad, you may want to use the other methods.

TENS units are easy to find on amazon, as are intranasal red lights (enter code use "DrKruse" at checkout on the Vielight website to get 10 off your order). Thermal cameras are expensive but many cities now have thermographic centers where one can generate a full body image to thermal stimuli. The rapidity of response is what tells you about the redox potential. The red light will deliver photons to the capillaries in your blood to energize the plasma. It also contains no blue light to destroy melatonin signaling.

Light can be used to charge the water battery. You can actually use tanning booths in some cases, but to do this hack, you need to know your precise context. Tanning beds have serious risks, so you must know what you are doing before you jump in. Vitamin D light bulbs also work.

I have found red light therapy to be quite helpful in cases of leaky gut because of the linkage between serotonin and melatonin in the small bowel. This takes some time because red light is not powerful or energetic enough to elevate photon energy in the blood plasma when one view where red light falls on the electromagnetic spectrum frequency range.

13. **Heart rate variability** is a measure of your redox potential. And because it is, so is your **pulse oximetry**. Check out this video from Gregg Braden from the Institute of HeartMath:

12. Your **hemoglobin and hematocrit, called an H/H level,** can tell you if you have a lowered redox potential (you do if you are anemic). If you have surgery for any reason at all, you can actually ask and receive a copy of your anesthetic record. Check to see what the trend of your pulse ox was on "room" air before surgery and what it was on controlled O_2 air by the anesthesia machine when you were under the control of the anesthetic. I did this when I had my knee surgery. You can learn more about the science of HRV on wikipedia (I've read this page and agree with it with respct to HRV). Chronic hypoxia does not affect heart rate that much, but it has a dramatic

negative effect on HRV. This is why obstructive sleep apnea and COPD are so bad for health.

14. **For the MDs: You have two ways to determine your patients' redox potential.** One is simple, the other invasive:

- **The first one is an MRI**. MRIs are just like a spectroscopy exam of a star. It tells us precisely how much positive and negative charge are within tissues. MRIs of the brain and spine is the most accurate measure of redox potential I have, and it gives me a clue how bad off someone really is.
- **For your inpatient ICU patients, consider their ABGs and $AVDO_2$ levels if they have a catheter in the venous system**. Their $AVDO_2$ difference is another measure of their redox potential. I use this one in hospitalized patients who are really ill in an ICU setting who do not have MRIs. Most of my patients have a lot of MRIs so this is not one I routinely employ, but I mention it here for the clinicians who may see medical patients in an ICU setting. This technique for the monitoring of $AVDO_2$ is based on the difference in oxygen content between simultaneously obtained samples of blood entering and exiting the brain. Blood located anywhere within the arterial system (for example, the radial artery) can be sampled to determine the oxygen content of blood entering the brain. However, accurate sampling of blood exiting the brain requires cannulation of the jugular bulb, which contains only blood that has passed through the brain and has not yet mixed with that from the face, neck and other extracerebral tissues. The relationship between $AVDO_2$, CBF, and $CMRO_2$ (which is determined by the equation $CMRO_2$ = $AVDO_2$ CBF). If CBF is coupled with $CMRO_2$, then $AVDO_2$ remains constant as CBF changes. However, if CBF and $CMRO_2$ are uncoupled, then changes in CBF while $CMRO_2$ remains constant and are reflected as changes in $AVDO_2$. A lactate-oxygen index greater than or equal to 0.08 indicates the presence of ischemia. Ischemia destroys redox potential in a matter of seconds and liberates the nitric oxide cascade as a result.

How do I improve my redox potential?

1. **Pay attention to sunsets and dim light at night.** Though the light was known to influence the circadian mechanism via melanopsin, according to the literature, its effects on non-circadian processes were considered minor from 2005 to 2013.

That is now changing, especially when you understand how dim light really works in the brain. It has been recently shown in mammals that when melanopsin signaling is altered in the CNS for any reason at all, **mammals lose the ability to catch up on sleep permanently**. As they lose the ability to sleep, and they simultaneously lose autographic efficiency and *their regenerative potential* for all tissues, and **they lose the ability to tap into Becker's DC current.**

When you lose the DC current, it means your redox potential is bad. It also means your tissues are deficient in DHA. **This is why a lack of sleep often leads to disease and an early death**. Over time, these organisms will lose their memory and they will gain more fat mass as this alteration of melanopsin continues. See the updated new risks of EMF as of 2011.

2. **Meyer cocktails, HBO therapy, and infrared therapy will improve your redox potential.** You will need the help of your doctor to gain access to most of these therapies. They need proper context to your specific issues. There are several additional useful biomarkers for identifying patients in whom glutathione is low. One such indicator is elevated Gamma-glutamyltransferase (GGT), the enzyme that breaks down glutathione from the blood to allow its importation into the cells. Up-regulation of GGT has been observed in cells deficient in glutathione.

3. **Cold Thermogenesis improves your redox potential because**

it improves the flow of electrons on the surface of water and proteins without any energy costs. Cold also increase magnetic flux in your tissues and correlates with good mitochondrial function. This is why hypothermia is employed in brain and heart injury cases clinically. It also changes the density of water, allowing the water to carry more O_2 to your cells.

The second effect is having on water is that it "expands the exclusion zone (EZ) of water" and more O_2 can then be dissolved in plasma because water density rises. As these physical processes happen, eNOS rises within blood vessels to cause vasodilation. A larger EZ also improves blood flow because it makes more protons from water to augment flow and reduces pressures in the heart.

Summer sunlight can grow the EZ layer in water by a different mechanism, because of the infrared spectrum that is present in sunlight during this season. The mechanism is different but the results on water chemistry are exactly the same. Both actions increase the Exclusion Zone (EZ) and by definition, increase the redox potential of water. This allows enzymatic reaction rates to happen at the speed of light or close to it. (Mae Wan Ho video alert.) If you live in a low-light situation or it is winter time, consider using a hot spring, volcanic bath house or a hot tub to augment your EZ by using the heat of each one to create a large EZ in your cells, which I describe next.

4. **The Fournier effect using warm and cold water** is a great way to recharge a low redox potential. It uses heat and cold simultaneously to alter interfascial water in your cells to increase the EZ of water. We spoke about this in the Optimal Reset CT review Q & A of how I do it. Review it.

5. **A constant source of high-quality marine/animals protein is needed to maintain your redox potential.** The quality of the collagen in your body is directly tied to your redox potential. *When your redox potential is low,*

protein is scheduled for excessive turnover by the ubiquitination system. This is energy intensive to the cell. If you have torn tendons or meniscus in your body, these are symptoms tied to a poor redox potential. Collagen is the "electric wire" embedded in your intracellular and extracellular water that conducts piezoelectric/flexoelectric signals all over your body.

Water is life's battery, collagen is the wire that connects the negative and positive charge within the battery, and the sun's light is the constant energy source for the water battery to recharge.

6. **If your redox level is low you should avoid all alcohol no matter what**. You should also **avoid black and red tea and salt** because both are loaded with fluoride salts (F). F- reduces the ability to transmit electric signals in both water and collagen. You also should **avoid all chewing tobacco** for the same reason. Dip tobacco is loaded with halogens and transition metals that act to reduce your redox potential. You can use N-Acetyl cysteine supplementation to help, but please read my caveats to its use in Energy and Epigenetics 12.

7. **Use reverse osmosis water, spring water, or mineral water for your drinking water consistently.** Avoid all fluoride products, drugs, and pesticides. Read labels. Avoid grains because they are loaded with brominated chemicals. Bromine is a halogen like a fluoride. You can use activated charcoal to clear water of bromine and chlorine, but not fluoride. To remove fluoride from drinking water you will need activated alumina defluoridation filters. They are quite expensive at $30 each. They have to be replaced after a few days of use. Do not boil your water if it is fluoridated because it raises the F- level in the water. Soaking in warm water with F- also concentrates the effect.

Avoid any exogenous salts in your drinking water if you can. This is not an axiomatic rule. Why? **Salts.** In addition to metals, salts can also conduct electricity. In cells we do

not want a salt disturbing semiconducting flow of electrons or protons. This creates loss of efficiency for energy transfers because it creates a ***smaller exclusion zone*** in water in a cell. In salt electric conduction, there are no free electrons moving, so the conductivity depends on the specific ions used in the salt. When a salt is in water, it is either melting or dissolving, so that the ions of the salt are free to move to conduct the current. Their atomic sizes however limit coherent conduction with 100 efficiency that is seen in a semiconductor. K^+ is the key element in life's equation with water to create a semiconductor that has the same properties we see in a topologic insulators.

8. **Consider a Magnetico sleep pad** if you can afford it. The more non-native EMF you have in your life, the more the pad becomes a helper to your wellness. However, only sleep on it when it is dim or dark outside. The reason is you must create a marked difference between night and daytime magnetic sense to your body since most of our planet is now affected by atmospheric EMF that drowns out the native magnetic field effect. This is a way to teach the brain their still is a difference between night and day.

9. Be barefoot as much as possible when walking upon the earth or concrete. Grounding shoes are a great option for diabetics who worry about their foot health and want to avoid cuts.

10. **Physiologic ketosis improves your redox potential as well.** Ketosis is a state of elevated levels of ketone bodies in the body. It means our bodies are using fat for energy. The reason it improves redox potential is because ketosis increases your NAD^+ level. NAD^+ and SIRT 6 are linked in very key ways. SIRT 6 has two roles based on its two functions. They are deacetylation of histones and mono-ADP ribosylation of PARP1 proteins on Histone 3 subunits. In addition, SIRT 6 puts multiple mono-ADP-ribosyl groups on the DNA repair protein, PARP1, which also repairs DNA in response to

oxidative stress. Unfortunately, all of this DNA repair by PARP1 uses up NAD^+, which leaves the cell's nuclear levels of NAD+ low. As a result, all of the SIRT1 proteins cannot work since they all need NAD^+ as a **cofactor for enzyme action.** Thus, the dual role of SIRT6 in both telomeric silencing and DNA repair is believed to be a root issue associated with aging. This is why those with a chronically low redox potential should always consider ketosis. Sirt 6 is linked to ketosis, cold, telomere length, and longevity

11. **Lowering stress is a great way to improve your redox potential.** The use of biofeedback, neural feedback, massage, yoga, pilates, music, dance, walking, visualization and meditation of all types help improve your redox potential. Make these staples in your lifestyle if you have evidence of a low redox potential.

12. **Avoid all unnecessary non native EMF's.** This includes all blue tooth devices. The higher the "G level of the network or the device," the worse it is for you to use. These environments lower your redox potential because you are leaking electrons from your tissues to the environment and you can not see it. Check out the blog on reducing EMF exposure in your home or office.

The importance of redox molecules in fighting disease

Nitric Oxide and Reactive Oxygen species are the principle redox molecules in humans.

The primary source of redox signaling in humans is the nitric oxide system (NO). NO is formed by the action of the nitric oxide synthetase (NOS) enzyme, which has three isoforms; two are constitutively expressed, and one is inducible. eNOS (*NOS3*) and nNOS (*NOS1*) are constitutively expressed and in

general, release short bursts of nitric oxide in a **calcium-dependent** manner. This linkage to calcium and calmodulin signaling is why non-native EMF has massive direct effects on redox signaling. I spoke about eNOS in the Cold Thermogenesis 6 blog post. eNOS is critical in cold climate activation of turning WAT to BAT in humans.

The second basic biological redox system is comprised of O_2^-, H_2O_2, and other ROS, known collectively as ROS. This system can function independently of NO to carry out specific oxidation events that modify intracellular signaling pathways, including regulation of migration, cell mitogenic potential or host defense. The primary cellular sources of ROS are oxidases that generate O_2^- by the transfer of a single electron to oxygen from NADPH (reduced form think EMF 4). Further single electron reduction to hydrogen peroxide (H_2O_2) or other ROS is catalyzed by a series of enzymes that includes superoxide dismutase (SOD) and myeloperoxidase (MPO) through interactions with transition metals or through reactions with NO.

Antioxidants have frequently been touted by nutrition providers as the antidote to the oxidative stress of a low redox potential, but they are only part of the complex chemical story. Although oxidation can lead to toxicity, it is important to realize that redox-based molecules are essential mediators of critical functions in physiological systems and are essential to immunity against all diseases. In this way, **redox molecules are designed to act to "*open the doors of heaven or hell***" based upon the charge status of the local environment of the cell or tissue in question.

The role of redox molecules, such as nitric oxide (NO) and reactive oxygen species (ROS), as key mediators of immunity and wellness protectors, has recently garnered renewed interest and appreciation in the literature. To regulate immune responses, these redox species trigger the eradication

of pathogens on the one hand and modulate immunosuppression during tissue-restoration and wound-healing processes on the other. They play a huge role in the development of autoimmune conditions.

In the acidic environment (low pH due to lots of protons) of the phagosome, a variety of reactive nitrogen species (RNS) and ROS is produced, thereby providing a cauldron of redox chemistry, which is the first line in fighting infections normally. Interestingly, fluctuations in the levels of these same reactive intermediates orchestrate other phases of the normal immune response.

NO activates specific signal transduction pathways in tumor cells, endothelial cells, and monocytes in a concentration-dependent manner. As ROS can react directly with NO-forming RNS, NO bioavailability and therefore, NO response(s) are easily changed by local environmental pressures in cells. The NO/ROS balance is also important during Th1 to Th2 transition and critical in the development of autoimmune conditions due to the inaccurate signaling of the charged particles with non-native electromagnetic force.

An environment with a "low redox potential" means electrons have a weak-charged environment. Non-native EMF is an example of an environment that lowers the cells charged state or redox potential. In a weak, electron-charged environment, genetic expression fails because either DNA base pairs unravel or unwanted molecules stick to DNA sequences. Since the frequency of DNA vibration determines the informational coherence of energy transmissions, stuck-on molecules dampen DNA's directions like a wad of chewing gum stuck to a tuning fork.

Water's exclusion zone (EZ) absorbs UV radiation best in the 270 nm range of frequency. This also happens to be where DNA absorbs the electromagnetic spectrum best as well. This is no coincidence. This is how the redox potential directly alters

epigenetic expression.

When DNA molecules become crippled, transmission of cellular communications is garbled and inaccurate. You might begin to see why cancer and autoimmunity are really linked now. In fact, the production of enzymes and hormones that carry out DNA's instructions begins to go haywire to cause disease. Many get fooled into believing it is a food-only story because of observation only. **Altered redox chemistry is the root of all illness; it is due to a lack of energy and chronic oxidative stress that is not curbed.**

Those with electrical or chemical sensitivities, by definition, also have a poor redox potential because their immune systems are also lacking electrons at some scale.

So let us consider a disease like celiac disease, MS or any autoimmune diseases. If you have a demyelinating disease, these concepts are even more important because you are more sensitive to non-native EMFs. In effect, you are losing electrons from your cells to change your redox potential much more quickly than most, which directly impacts how your signaling molecules work. When the immune system begins to fail we see the development of allergies and food intolerances. **When a person loses more electrons in their T and B cells, autoimmune conditions result**.

Antioxidants, loaded with electrons, provide water with these new electrons, and water transfers those electrons back to the T and B cells. In apparent contradiction to the need for antioxidant electron abundance, powerful free-radical oxidants are precisely what an immune response relies on for optimal functioning. It takes armor-piercing singlet oxygen to destroy pathogens and unwanted molecules to clean our cells.

Water is the battery that supplies the soldiers in the war on infections and allergy. It also is the key to reversing autoimmune conditions. This implies when you increase your

ability to "***harvest and catch these electrons***" within your Maxwell Demons proteins what you can eat will also change because your redox potential has changed. When your redox potential changes, you change, and your health reverses.

Electrons determine the biochemical reactivity of chemicals in chemistry and they also affect the biochemistry of all life forms. In fact, the news is even better for sick humans, because the rules governing electron behavior are time independent in quantum physics. This means **all diseases that are tied to the loss of electrons are COMPLETELY REVERSIBLE**. This is why improving your redox potential is critical to wellness. This is not something many in biology fully believe yet, but quantum physics dictates electron behavior not biology's opinions about electrons.

Using cell phones safely

Modern technology is all based on electromagnetic frequencies and signals that steal electrons from living tissues as collateral damage without us perceiving it. If you are going to use your cell phone, try to keep it in airplane mode when it is not needed. It limits its bidirectional microwave output because a cell phone is a two-way microwave walkie-talkie.

If you live in a rural area with poor cellular coverage, **realize that your phone *may hurt you more*** than if you live in a city with good cell coverage. This advice seems counterintuitive to many. The real problem with today's cell phones is their antenna design and this causes the cell tower technology to need to have higher electromagnetic power releases to connect phone calls.

What society needs is better cell phone design so we can lower power output from cell towers to protect the redox potential in all of our brains. It is clear cell phones are not going away from modern society. We need to understand how to

mitigate their risks to keep us healthy with a high redox potential. Right now we are destroying it.

You might be shocked to know that the new iPad's and 5 and 6-S iPhone now **have body heat sensors** in them and when they sense you are breaking the "safety rules" in the setting part of your device they automatically turn down the power of the device. This is proof that the manufacturers know the dangers of their wares. They just do not want you know it as well.

Make the decision to change your health!

Molecule behavior is not restricted to humans alone; redox chemistry is fundamental to all life forms. This principle should illuminate current misconceptions, how technology has gone wrong and what steps we need to take to sustain life on earth. Man alone has the choice of staying too long at the industrial party, of continued overpopulation and mismanagement of our environment, of contaminating our spaceship we call earth.

We also can change our behavior by altering our choices when we become informed of how incredibly important the redox potential in our cells is to wellness. We cannot and should not expect an "external deity" to intervene in this mess! Without individual empowerment, the human herd will march nose to tail into oblivion at the cliff's edge. This is how important your redox potential is, whether you realize it or not.

It's only at the precipice that we evolve, only on the brink do we change.

Geeks-Only Section: How to measure cell potential

The batteries in your remote and the engine in your car are only a couple of examples of how chemical reactions create power through the flow of electrons. The cell's potential is the way in which we can measure how much voltage exists between the two half-cells of a battery. We will explain how this is done and what components allow us to find the voltage that exists in an electrochemical cell.

The cell potential, Ev-cell, is the measure of the potential difference between two half-cells in an electrochemical cell. The potential difference is caused by the ability of electrons to flow from one-half cell to the other. Electrons are able to move between electrodes because the chemical reaction is a redox reaction.

A redox reaction occurs when a certain substance is oxidized while another is reduced. During oxidation, the substance loses one or more electrons and thus becomes positively charged. This effects the proton motive forces in the matrix: TCA cycle and the urea cycle in the cytosol. Conversely, during reduction, the substance gains electrons and becomes negatively charged. This relates to the measurement of the cell potential because **the difference between the potential for the reducing agent to become oxidized and the oxidizing agent to become reduced will determine the cell potential**. The cell potential (E_{cell}) is measured in voltage (V), which allows us to give a certain value to the cell potential.

An electrochemical cell is comprised of two half-cells. In one half-cell, the oxidation of a metal electrode occurs, and in the other half-cell, the reduction of metal ions in solution occurs. The half-cell essentially consists of a metal electrode of a certain metal submerged in an aqueous solution of the same metal ions. The electrode is connected to the

other half-cell, which contains an electrode of some metal submerged in an aqueous solution of subsequent metal ions.

The first half-cell, in this case, will be marked as the anode. In this half-cell, the metal in atoms in the electrode becomes oxidized and join the other metal ions in the aqueous solution. An example of this would be a copper electrode, in which the Cu atoms in the electrode loses two electrons and becomes Cu^{2+} .

The Cu^{2+} ions would then join the aqueous solution that already has a certain molarity of Cu^{2+} ions. The electrons lost by the Cu atoms in the electrode are then transferred to the second half-cell, which will be the cathode.

In this example, we will assume that the second half-cell consists of a silver electrode in an aqueous solution of silver ions. As the electrons are passed to the Ag electrode, the Ag^{+} ions in solution will become reduced and become an Ag atom on the Ag electrode. In order to balance the charge on both sides of the cell, the half-cells are connected by a salt bridge. As the anode half-cell becomes overwhelmed with Cu^{2+} ions, the negative anion of the salt will enter the solution and stabilized the charge. Similarly, in the cathode half-cell, as the solution becomes more negatively charged, cations from the salt bridge will stabilize the charge.

How does this relate to the cell potential?

For electrons to be transferred from the anode to the cathode, there must be some sort of energy potential that makes this phenomenon favorable. **The potential energy that drives the redox reactions involved in electrochemical cells is the redox potential; this involves the anode becoming oxidized and the**

potential for the cathode to become reduced. The electrons involved in these cells will *fall* from the anode, which has a higher potential to become oxidized, to the cathode, which has a lower potential to become oxidized.

This is analogous to a rock falling from a cliff in which the rock will fall from a higher potential energy to a lower potential energy. The difference between the anode's potential to become reduced and the cathode's potential to become reduced is the cell potential. In this way, you can see why fluoride limits redox potentials because of its high positive redox charge.

You can also see below that K^+ has an almost equal and opposite redox charge of fluoride and why it has been found to be extremely important with respect to water concentrations in the cell by Gilbert Ling. K^+ is critical in opening water binding sites in proteins to increase the redox potential even further than its own ionic charge. It unlocks the potential energy in water. (see below)

Electrochemical cell

Here is the list of the all the components:

1. Two half cells
2. Two metal electrodes
3. One voltmeter
4. One salt bridge
5. Two aqueous solutions for each half-cell

All of these components create the Electrochemical Cell.

The standard reduction potential is in a category known as the standard cell potentials or standard electrode potentials. The standard cell potential is the potential difference between

the cathode and anode. The standard potentials are all measured at 298 K, 1 atm, and with 1 M solutions.

$F_2(g)+2e^- \rightarrow 2F^-(aq)$	+2.87
$K^+(aq) + + e^- \rightarrow K(s)$	-2.924
$Li^+(aq)+e^- \rightarrow Li(s)$	-3.04

A negative number for this potential indicates a reducing agent (gives up electrons easy) whereas a strong oxidizer will have a positive redox potential (hoards electrons). Potassium has a very negative redox potential and this is why it is critical inside the cell with respect to how it binds water molecules to protein side chains.

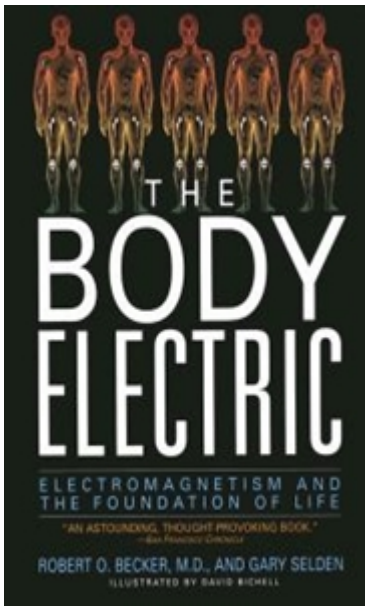
Leave a comment

Additional Support: Webinars by Dr. Kruse

- Quantum Sleep (October 2013)
- EMF Deep Dive: The Experiments that Led to Discovery (July 2013)
- EMF: The Secret Barrier to Optimal (March 2013)
- Managing Your Energy with the Mitochondrial Rx (January 2013)
- EMF Bootcamp
- Heal Your Hormones Bootcamp

Your Shopping List for This Post

magnetico sleep pads		
Magnetico Sleep Pads	Inflatable Portable Hot Tub Spa	Tens Handheld Electronic Pulse Massager Unit
		
Essentia 9.5 pH Reverse Osmosis Drinking Water	Poland Spring Bottled Water	Groundals Earthing Shoes

	
810 Infrared Intranasal Light Therapy Device	The Body Electric by Robert Becker

- View The Energy and Epigenetics Store

Additional Resources

- Cold Thermogenesis 6: The Ancient Pathway
- Energy and Epigenetics 12: Is Your Battery Charged?
- The Evolution of the Leptin Rx
- Simple Steps to Reduce EMF Exposure in Your Home or Office

Cites

1. Petrucci, Harwood, Herring, and Madura. General Chemistry: Principles and Modern Applications. 9th ed. Upper Saddle River, New Jersey: Pearson Education, 2007.
2. Zhumdal, Zhumdal. Chemistry. 7th ed. Boston, New Jersey: Massachusetts Houghton Miffle Company, 2007.
3. http://chemwiki.ucdavis.edu/Analytical_Chemistry/Electrochemistry/Voltaic_Cells/The_Cell_Potential
4. http://cpa.ds.npr.org/kpcw/audio/2014/02/Public_Affairs_Hour_-_This_Green_Earth_-_February_4,_2014.mp3 (listen @ the 39th minute in for the cell phone link)

5. Life, 55(7): 375–385, July 2003. "Redox Reactions and Electron Transfer Across the Red Cell Membrane" Eleanor C. Kennett and Philip W. Kuchel, School of Molecular and Microbial Biosciences, University of Sydney, Australia
6. Randall, Capt. T. C. Forbidden Healing, The Redox Solution to Disease and Bad Aging

Make the decision to change your health!

Molecule behavior is not restricted to humans alone; redox chemistry is fundamental to all life forms. This principle should illuminate current misperceptions, how technology has gone wrong and what steps we need to take to sustain life on Earth. Man alone has the choice of staying too long at the industrial party, of continued overpopulation and mismanagement of our environment, of contaminating our spaceship we call Earth. We also can change our behavior by altering our choices when we become informed of how incredibly important the redox potential in our cells is to wellness. We cannot and should not expect an "external deity" to intervene in this mess! Without individual empowerment, the human herd will march nose to tail into oblivion at the cliff's edge. This is how important your redox potential is whether you realize it or not.

It's only at the precipice that we evolve, only on the brink do we change.