

Water mysteries and myths

Introduction

Water is the single most important reason there is life on Earth. Its unique properties go way beyond just those of being a universal solvent. Its molecular properties are profound, and unlike any other compound. We are only now beginning to understand some of those properties. One of those properties is a natural phenomenon referred to as structured water.

For a long time, most health-conscious people, and researchers alike, were under the impression that our bodies required pure water, ie. water that has nothing in it other than two hydrogen atoms bonded to an oxygen atom (H₂O). From the late 1960s to the present, the increased *health-consciousness* has created a huge market for bottled water due to concerns about the contamination of urban water supplies with chemicals. Also, millions of filtration systems are installed in homes, specifically to make the water as *pure* as possible, or chemical free. We were told that this would make us healthy, so why do we still have an escalating increase in disease and a wider range of health conditions in society?

The discussion around healthy water has missed one vital factor: ***the charge in water***. Also, ***natural water has beneficial biology and minerals (including electrolytes) and is devoid of contaminants***, like man-made chemicals, eg. fluoridation and chlorination. Water that is flowing naturally in a pristine environment has stability (in relation to oxidation and reduction and therefore pH), and this stability is influenced by the presence of natural environments (forests), sunlight absorption, along with biology and minerals. However, the major influence is the negative (-) charge produced and sustained by the continuous presence of the vortexes in the water. If we compare water from natural sources with the processed water that we normally consume from urban water suppliers and bottled water, against the structured water present in cells, the body is not getting all the benefits of water, as if we were drinking it directly from a pristine flowing stream.

The Issues

These issues open a wide range of research opportunities (hypotheses) about what is healthy water, for all living cells, including microbes, plants, animals and humans. A good starting point is to reflect on the ideas that emerged from the concept that ***water has memory***, and specifically the work of Jacques Benveniste in the late 1980's. Many other scientists confirmed this idea of water memory in the following decades, albeit that the established science organisations (and their publications) dismissed the idea as pseudo-science.

There is now a well-established scientific base that molecules, including ***water molecules resonate a vibration, and it is this molecular vibration that attracts energy***. Molecules can ***communicate with each other to exchange information*** without being in contact with each

other (even between plants). This electromagnetic communication reaches its fullest potential when the molecules within a cell are in harmony (eg. coherence or in order). Coherence or order can be disrupted by changes (instability) in the environment.

A hypothesis in this essay is that water memory may be best expressed as consciousness (ie. ***awareness and influence of environmental conditions***). The highest level of consciousness is in ***water*** molecules, followed by microbes, plants, animals and humans. For example, human life is highly dependent on water, microbes, plants and animals for human consciousness. Therefore, **the evolution of the brain is not the basis of consciousness or memory**. Consciousness or memory is facilitated in all human cells by oxygen, starting at the point of human conception.

Homeopathy is a good example of water molecules energetically or consciously holding on to the resonance of a substance. Water consciousness can discriminate natural resonance from unnatural (man-made chemicals) resonance when it is in a six-sided, hexagonal, crystalline structured form. This is because the water in this form has harmony or coherence. When water converts to an unstructured form (five-sided, pentagonal form) the water is in an unstable state and can hold on to unnatural energies from man-made chemicals, eg. fluoridation, chlorination, and many other chemicals made by man, and that pollute the environment. That is, water is primarily influenced by its environment (epigenetics) and the state of the water (structured or unstructured).

However, these basic principles of water and molecular resonance have been largely absent from the push to commercialise drinking water. Many approaches to re-engineer water to new forms, are heavily influenced by a classic medical approach to recreate water in a form that is considered healthy for human cells (ie. imitate a medicine). This includes using water that is heavy water (D₂O) and water that has a negative (-) oxidation reduction potential (ORP) or low hydrogen (H). Neither of these engineered waters are natural, stable or carry a permanent negative charge.

Also, when we consider water consumption for humans, we need to take account of the physical and biological pathways that influence water on its way to cells. This includes:

1. The human (and animal) body is a **self-regulating and self-healing system** that strives every second to sustain cellular harmony (equilibrium or coherence)
2. All water that is drunk must pass through the stomach that is highly acidic (pH between 0-3) and therefore the pH of water is largely irrelevant to human health because it becomes acidic within seconds of drinking the alkaline water. It is the presence of alkaline minerals in water that are relevant as these minerals influence cellular water metabolism, blood pH, etc. Therefore, the source water must have these alkaline minerals naturally in the water, eg. Magnesium and Bicarbonate to be effective. Otherwise, these minerals need to be added to the water prior to

processing the water. The question is: what are the long-term health side effects of drinking artificially induced alkaline water or ionized water?

There is an assumption in the marketing of alkaline (ionized) water that the *ORP seems to influence bacteria in the gut. That is, the electrochemically activated (ie. ionized) water possesses a negative oxidation-reduction potential, which means it might offer extra disinfectant properties, ie. helping to protect against pathogenic microorganisms.* The issues with this assumption are:

1. The body regulates pH tightly, and different organs have slightly different pH requirements. For example, the stomach needs to be acidic to breakdown food and to eliminate pathogenic microbes that generally cannot survive a pH below 2.5pH. Therefore, the continuous use of alkaline water (particularly for people with reduced stomach acid conditions) would adversely affect stomach functions.
2. A negative (-) ORP does not translate in a negative voltage or charge in water. Research undertaken in the development of the Phión water devices demonstrates that structured water can have a negative charge (measured with a voltmeter) and a positive ORP (measured with an ORP meter), and this water structure can eliminate pathogenic microbes. Also, most natural or pristine flowing water systems have negative charge and positive ORP that eliminates pathogenic microbes
3. Negative ORP water in nature (eg. swamp or sewage water) has low oxygen, is generally anaerobic and unstable (in respect of ORP processes). These water conditions are the opposite of the commercial claims about the health benefits of negative ORP and alkaline water. Therefore, the claims that this negative ORP/alkaline water have antioxidant properties in the human/animal body should be challenged.

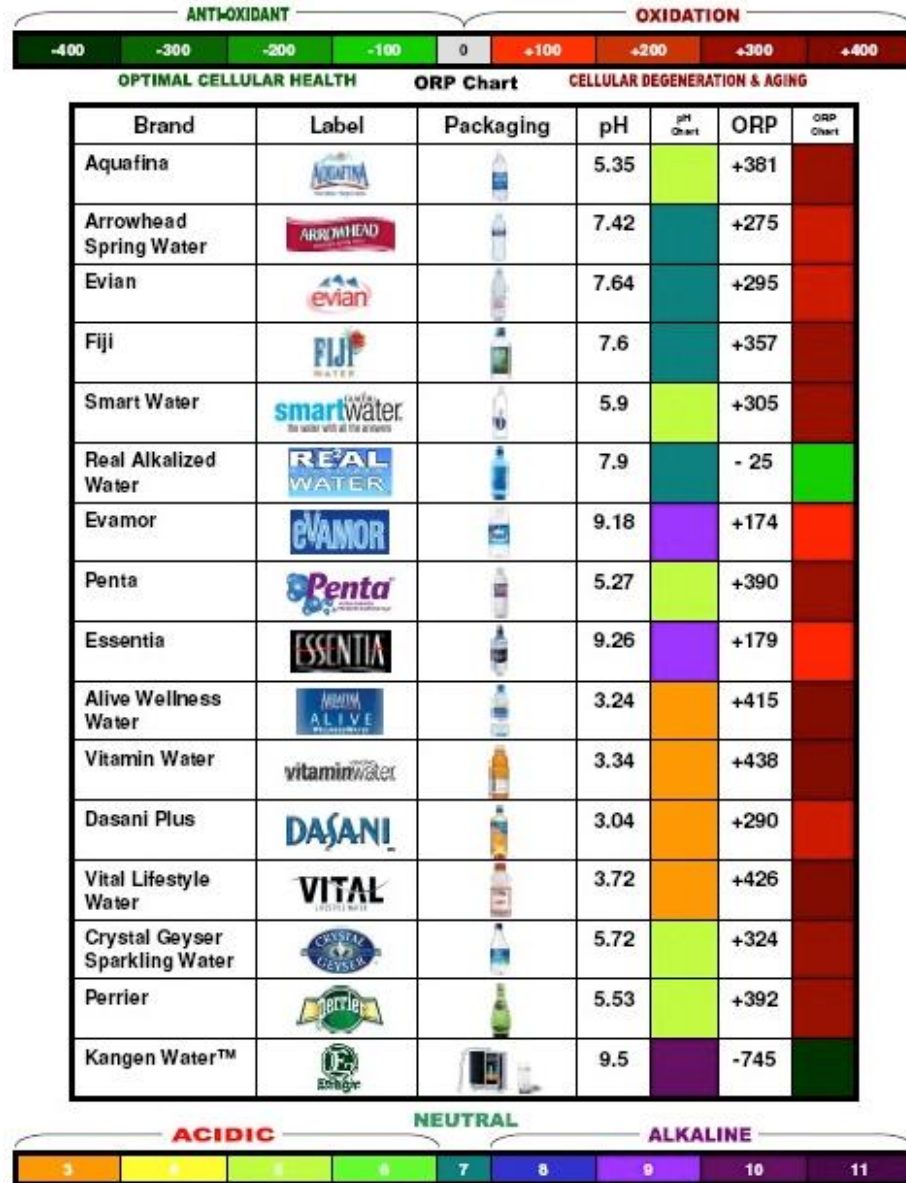
The comparison of bottled water products on the global market (see image on page 4) suggests that these waters can be divided into antioxidant and oxidation. This should be labelled as ***unstable (negative ORP) and stable (positive ORP)***. It can be seen in this table that most of the waters have a positive ORP (oxidised) and only the ionized waters are negative ORP. This is because, naturally sourced waters will have a positive ORP. However, it can be assumed that ***none of these waters would have a permanent negative charge (voltage)***.

It can also be assumed from the table of these bottled waters that:

1. There will be significant variation in minerals and specifically the concentration of alkaline minerals (Li, Na, K, Mg, Ca, Rb, Sr, etc.)
2. The greater the concentration of negatively charged alkaline minerals (eg. bicarbonate: HCO_3^-) may lower the ORP values and account for the lower ORP and higher (alkaline) values in some of these waters
3. There can be a wide range of adverse oxidation and reduction (ORP) processes occurring in these waters during processing prior to bottling, including the introduction

of ozone (O₃) into the water, and any residual chemicals left into the water after processing.

Comparison of bottled waters in relation to ORP and pH



Note: a natural alkaline spring water (eg. Evamor and Essentia) can have a positive (+) ORP, however a processed alkaline water (eg. Kangen) will have a negative (-) ORP.

The Nature of Wilderness or Natural Systems

All wild or natural systems are open systems. That is, they are influenced by their natural environment, comprising climate, weather, light, geology, soils, vegetation, etc. This makes such systems extremely complicated and difficult to measure in isolated or laboratory conditions. These conditions also apply to water that is extracted from these natural systems.

Often, natural (unspoiled or unpolluted) systems are called **living systems** due to the dynamics or continuous interactions of the environmental conditions (epigenetics). By way of contrast, man-made or created (unnatural) conditions are often used in experiments to measure or simulate a natural environment. These unnatural systems are **dead systems** as they cannot reproduce the natural environmental interactions of a **living water system**.

Measurements taken of living water in a natural environment can change significantly, and often within hours and certainly within 2 days, when removed from the natural flowing (vortices) state. Within hours of the water losing its vortex state, the biology can change and become contaminated with pathogenic microbes. Also, a range of oxidation and reduction actions can commence in the water that changes its chemical state. A similar process can occur with soil and plants that are removed from the natural environment for measurement in a laboratory.

All living systems exhibit a range of self-evident (observable) features, ie. evolution, symbiosis and microbial pleomorphism (ie. *ability of some microbes to alter their shape or size in response to environmental conditions*). These facts can be observed, however, can lack scientific theory or understanding. While this phenomenon resists scientific explanation, and often remains beyond science for long periods of time, these observations are real. In many cases, observations recorded in nature cannot be repeated in experimental or laboratory conditions.

For example, Professor C. Louis Kervran uncovered a process that he called **biological transmutations** whereby minerals can evolve in nature, or minerals can combine to form other minerals (eg. Silica: Atomic No. 14 combines with Carbon: Atomic No. 6 to form Calcium: Atomic No. 20). Firstly, how was calcium formed on Earth? How can cows produce so much calcium in milk and chickens produce so much calcium in eggs (plus the shell) when their intake of calcium is not as high as the output. Also, are there other mineral pathways for calcium to form, including Magnesium (cows) and Potassium, and are there different pathways within the ocean and terrestrial systems.

Similarly, are there biological transmutation pathways in soil and water involving microbial, mineral, light energy (or other subtle energies), enzymes, etc., that create change to enable adaptation, survival, creation, modification (eg. in the case of chemical and radiation wastes), regulation, healing, etc. Clearly, in many of these processes there are influences from hydrogen (including H⁻) and electrical potentials in cellular metabolism. All living systems require a state of homeostasis or equilibrium to reach full survival potential. However, when the cellular negative charge (-) falls towards positive (+) in humans, combined with mineral imbalances (eg. cellular Sodium and Potassium) then a wide range of diseases can occur, including heart, thyroid and hormonal issues.

A major challenge with the creation of a permanent negative charge in water, is that the observed or *felt* differences from either drinking this water or using the water for food production, is providing the scientific proof (measurement) of the change in water structure or

water behaviour, compared with other waters (eg. the unstructured water from an urban tap). There is no definitive answer to this phenomenon, and there is unlikely to be any array of measurements that will satisfy most scientists, sceptics, etc. that structured, hexagonal water exists; and has significant benefits for health of soils, plants, animals and humans. Consequently, the water used in most homeopathic and pharmaceutical formulations will be unstructured, dead water. The question is: what chemical differences (eg. pH, ORP, mineral balances, etc.) occur in non-structured, positively charged, five-sided crystalline structured water compared with structured water? Unless these differences are known, then conclusions about a water's state and value for human health will largely not be addressed. A primary or base issue is the agreed measurement strategy to confirm that the water under testing has either a permanent negative or positive voltage (charge), and currently there is no universally agreed technology (eg. a voltmeter, ORP meter or some other meter) to test the charge in water.

The role of ORP in water measurement

ORP is a term used frequently in the water treatment and food processing industry. ORP is the acronym for **Oxidation Reduction Potential**. In redox reactions, one element or compound is reduced (gains electrons) and another is oxidized (loses electrons). In terms of everyday life, redox reactions occur around us all the time. For example, the metabolism of sugars to CO₂, which stores energy in the form of ATP, is a redox reaction. Another example of redox is fire or combustion, such as in a car engine. In a car engine, hydrocarbons in the fuel are oxidised to carbon dioxide and water, while oxygen is reduced to water. Corrosion (ie. the formation of rust on iron) is a redox reaction involving oxidation of a metal.

There is a false view in the water health market, that ORP is the best measurement to assess the value of a healthy water, eg. that the water is healthiest with a negative (-) ORP value. However, it is correct that natural, pure (unpolluted) water has a positive (+) ORP and that a +ORP value is an indicator of oxygenated (healthy) water.

ORP is a differential measurement of the mV potentials built up when electrodes are exposed to solutions containing oxidants and reductants. ORP describes the net magnitude and direction of the flow of electrons between pairs of chemical species. In effect, ORP is only measuring the potential or capacity of a solution to gain or lose electrons. In this respect, a solution can be electron stable (eg. the Phión structured water) or electron unstable (eg. highly negative ORP water where the ORP value can change significantly within hours or days).

A view in the water sanitising industry is that ORP is a measure of the cleanliness of the water and its ability to break down contaminants (eg. pathogenic microbes) and therefore chlorination is added to urban drinking water in some countries. ORP measurement is a simple method to monitor the effectiveness of a sanitiser or the quantity of antioxidants in a liquid. In generalised terms there is an assumption among *proponents of drinking high negative(-) ORP water for humans, a higher positive ORP is considered better for outside of the body, while a*

lower negative ORP is preferred for consumption due to the claimed high antioxidant value. However, this assumption has no basis in fact or science.

There are numerous applications for ORP, each with its own specific optimum value. For example, the minimum ORP for pool and spa disinfection (set by the World Health Organization) is +650 mV. Although the WHO has not set a standard for ORP in drinking water, anything below -550mV is considered too strong and not recommended for drinking due to its cell degradation effects.

However, more important than the ORP value is the chemical species in the water, and these species are responsible for that ORP value. When water has a low or negative ORP, it does not mean that it has any physiological or biological antioxidant value if consumed internally. Indeed, some waters with a negative ORP could be toxic (eg. swamp water), while others with a positive ORP may be therapeutic (eg. pristine river waters).

For example, in the image below, negative (-) ORP is unstable. Therefore, any process that produces a negative ORP in water will be unstable, and possibly not hold a negative ORP value when exposed to normal air conditions. The negative charge could become positive within hours to several days. By way of contrast, the Phi6n MEA water is stable with a positive ORP, the way that nature intended for natural waters.

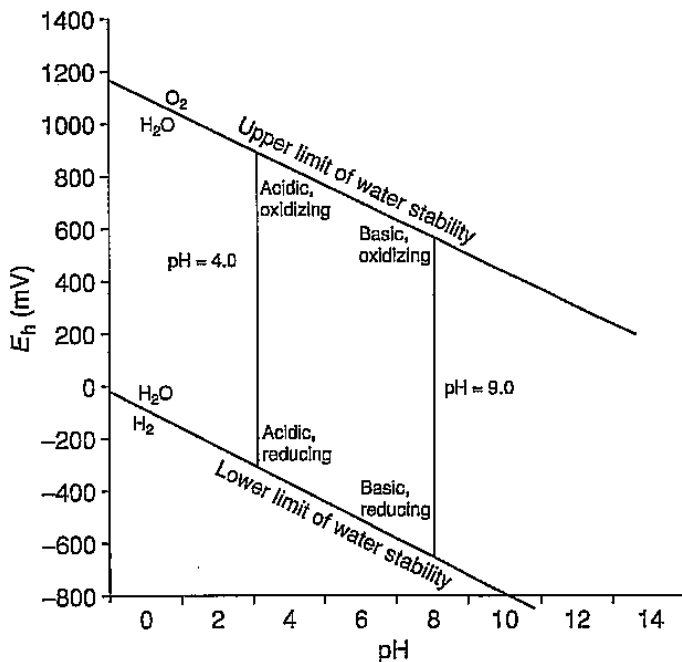
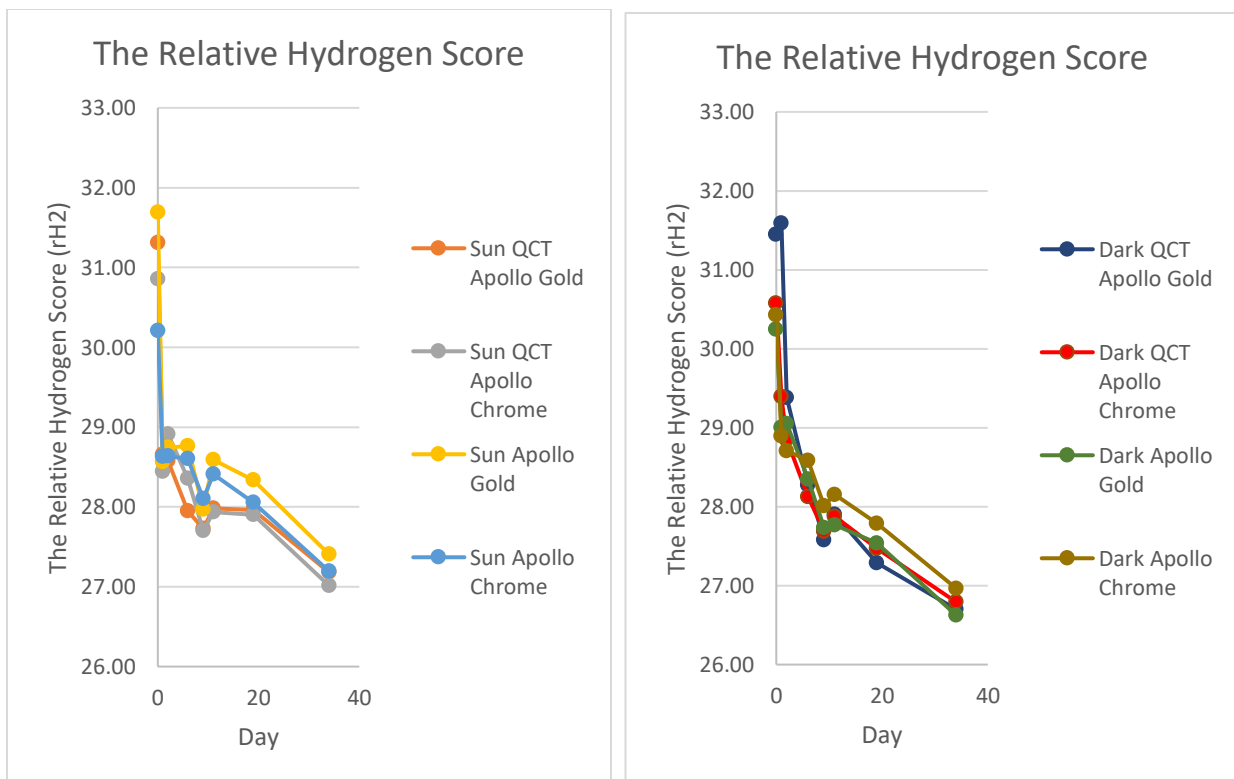


Figure 1 The E_h -pH range found in soil surface environments. Adapted from Krauskopf KB (1967) *Introduction to Geochemistry*. New York, NY: McGraw Hill.

The critical point in the image on page 7 is that positive (+) ORP is in the zone of stability and negative (-) is in the zone of instability. A method of measuring the stability of water is the ration of pe:pH (ORP = Eh and is converted to pe: $Eh + 244 / 59.2$). Therefore, if we assume a drinking water has a ORP value of -400, and therefore the pe value is -2.64; and if the pH value is alkaline at, say 8 the pe:pH is -0.33. On the other hand, if the ORP of a drinking water is say +300 and the pH is 6.5 the pe:pH is 1.67. A value of 1 is the breakeven point or the value between stability and instability. In this example, the negative ORP water is unstable and will tend to move its ORP value back to 1 by gaining oxygen. The positive ORP water is stable and generally does not lose oxygen. It will not lose oxygen (ie. oxidise) if it has a negative charge, ie. the **water is activated with a MEA water device to hold a permanent negative charge.**

Phi'on uses the formula $rH = ((ORP + 210) / 30) + (2 * pH)$ to measure the **stability** of Phi'on structured water and its **Biological Terrain Analysis (BTA)** or rH values. The rH scale runs from 0-42 where 0 is the most reducing and 42 is the most oxidising. While a rH value of 28 is considered optimal for a cell environment, a healthy cell range is 21-24. Below are measurements of rH values on MEA water stored in sunlight and dark spaces:



Note: generally, MEA water is drunk within days of activation where the BTA (rH) values (29-27) are above the healthy cell range (21-24). This water will stabilise in a rH range of between 22-24, and this is the water used in Phi'on liquid products.

Cells require a healthy terrain to grow new cells.

To grow strong healthy cells, the cells need a balanced or healthy terrain range of BTA or rH values. Like a farmer who is concerned with soil conditions to grow seed, *Biological or Natural Medicine* is concerned with cell charge (ie. negative), blood pH balance, balanced urine pH/ORP values, dietary mineral balance, cell hydration levels, and balanced gut microbe environment. Imbalances are reflected in the body's blood, interstitial and intracellular fluids.

If the cell terrain is unbalanced or toxic (ie. below a rH value of 21), cells will be *reducing* and are going to have a much harder time growing strong and healthy. That is, the cells are less likely to function properly (ie. regulation and healing). If the body terrain is nutrient deficient the body will be left with diminished immune function, becoming more susceptible to disease, competing bacteria and parasites in the environment. The need for intervention increases in proportion to the decreasing health of the terrain.

rH in structured water

The results of studies on electromagnetic activation show that the possible degree of increase in the energy of water relative to the average level of the redox potential (ORP) is more than +120mV and voltage values greater than -50mV. The optimal charge is extremely significant for human and animal cell function. Suffice it to say that the optimal energy potential of biochemical processes in a cell does not normally exceed minus (-) 150 mV, with a healthy cell range at or above minus (-) 50mV.

Below are pH, ORP, voltage and rH values for MEA water (activated by a MEA *Apollo* bottle-top device) and measured over 34 days.

Apollo Gold units	pH	ORP mV	charge mV	rH ₂
day 0	8.52	+218	-186	31.31
day 1	8.33	+150	-151	28.66
day 2	8.27	+151	-154	28.57
day 6	8.24	+134	-328	27.95
day 9	8.13	+134	-386	27.73
day 11	8.14	+141	-190	27.98
day 19	8.08	+144	-168	27.96
day 34	7.94	+129	-322	27.18

It should be noted that the organism of animals and humans spends a huge amount of energy on the transformation of aqueous solutions (usually positive charge water and food) into a physiologically active charge rate (-50+ mV) usually supplied with structured water and fresh food.

Without this conversion of positive (+) charge in urban water and most food to a negative (-) charge, no processes, starting with *digestion*, can operate at a functional level within a cell. It follows that about half of the body's energy is wasted on this conversion process (ie, + to -mV) every day to sustain the cell charge in a high negative (-mV) range. This is wasted cell energy that could have been utilised for cell regulation and healing.

Theoretically (and experiments confirm this) it is possible to almost halve the food intake by animals and humans, provided that MEA activated water is consumed instead of normal water.

Oxygen states

As outlined above, stability or order in cellular function is critical to cell regulation and sustaining a coherent capacity for regeneration. However, **Active Oxygen** is something like the exhaust fumes produced by automobile engines. If we liken fuel to food and air to oxygen, active oxygen would correspond to the exhaust fumes produced after the fuel has combusted. As already mentioned, it is believed that in burning up our food, around two percent of the oxygen we breathe in through our lungs becomes active oxygen. We breathe about twenty times per minute, and active oxygen is being produced in our bodies each time we breathe. Since the volume of air breathed in with each breath is 500 cc, we are breathing in about 10,000 cc of air per minute. As twenty percent of this air, or 2,000 cc, consists of oxygen, two percent of this amount, or 40 cc, becomes active oxygen. Consequently, each minute about 40 cc of active oxygen is being produced in our bodies. This amounts to 24,000 cc per hour and 57,600 cc per day of active oxygen. Considering this moment-by-moment production of large amounts of active oxygen in our bodies, it is no wonder that we tend to fall prey to disease due to poor diet and lifestyle practices.

On the other hand, we have in our bodies several enzymes, such as SOD (superoxide dismutase), catalase and glutathione peroxidase, which remove this active oxygen (this is natural cell regulation). As we get older or sicker, the function of these enzymes becomes insufficient to dispose of the active oxygen effectively. As a result, we fall to prey to various diseases. This means that if we could dispose of the *active oxygen* effectively, we would be able to achieve good health and longevity. The functional mechanism of active oxygen is oxidation. To suppress the (particularly strong) oxidizing function of active oxygen, it follows that we require abundant oxygen and a substance that has the opposite function to oxidation. The opposite function to oxidation is reduction, and reduction originally refers to the function of hydrogen. Oxidising agents give oxygen to another substance or remove hydrogen from it. Reducing agents remove oxygen from another substance or give hydrogen to it.

However, the human body has many regulating processes involving oxygen and hydrogen. For example, the pancreas produces bicarbonate (HCO_3^-) to buffer acid from the stomach before it reaches the small intestine. Also, when the immune system is activated in response to infection, large amounts of hydrogen peroxide (H_2O_2) are produced by certain cells to fight the infection. The cells can also prevent a buildup of hydrogen peroxide by converting it to H_2O and O through electron transfer. This process gets back to one important message of this paper and that is: the body is a self-regulating system, and therefore we should not assume that we must over-ride this regulation system and also assume somehow that negative ORP/alkaline water must be consumed to enhance regulation or provide greater health benefits.

These active oxygen species can lead to DNA strand breakage, mutation and the generation of inflammatory mediators such as cytokines and arachidonic acid metabolites which amplify the irradiation-induced inflammation. Active forms of oxygen are also becoming increasingly implicated in the etiology of numerous disease states and the toxicities of various drugs and chemicals. Among the former are the initiation and promotion of tumors and rheumatoid arthritis, while the latter includes toxicities, often associated with antibiotics. The generation of active oxygen species during normal cellular metabolism is now widely recognised.

Oxidative stress

The diagrams that follow on pages 12-13 illustrate normal regulation functions in the human body that involve active oxygen.

The process of **oxidation** happens as our bodies metabolise (or process) the oxygen that we breathe, intake with food and water; and our cells produce energy from it. Oxygen is the major source of energy production. This process also produces **free radicals** which interact with the molecules within our cells **resulting in damage** (or stress) to nearby cells, mitochondria, and DNA (our genes).

Free radicals are normal and necessary to some degree. In addition to causing some damage, they also stimulate repair. It is only when the number of free radicals produced overwhelms the repair processes that it becomes an issue for health. That is what we call **oxidative stress**.

Oxidation happens under several circumstances including:

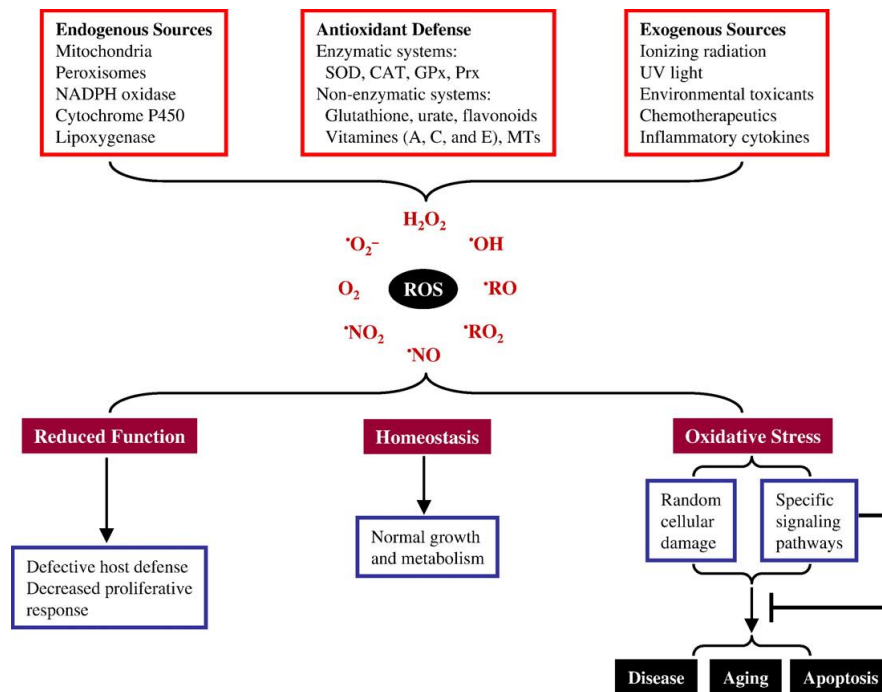
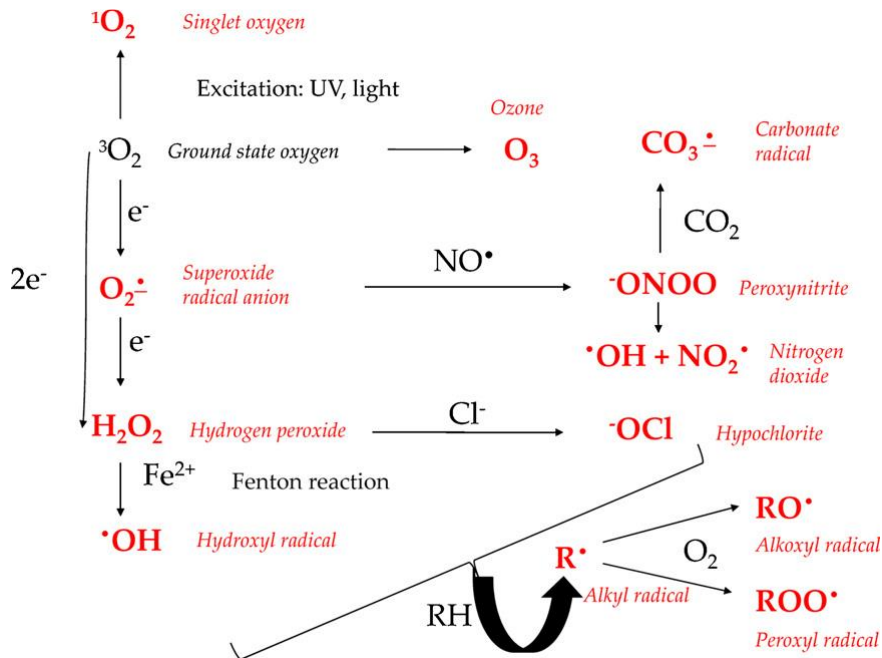
- when our cells use glucose to make energy
- when the immune system is fighting off infection (pathogenic microbes) and creating inflammation
- when our bodies detoxify pollutants, eg. pesticides, other chemicals and radiation.

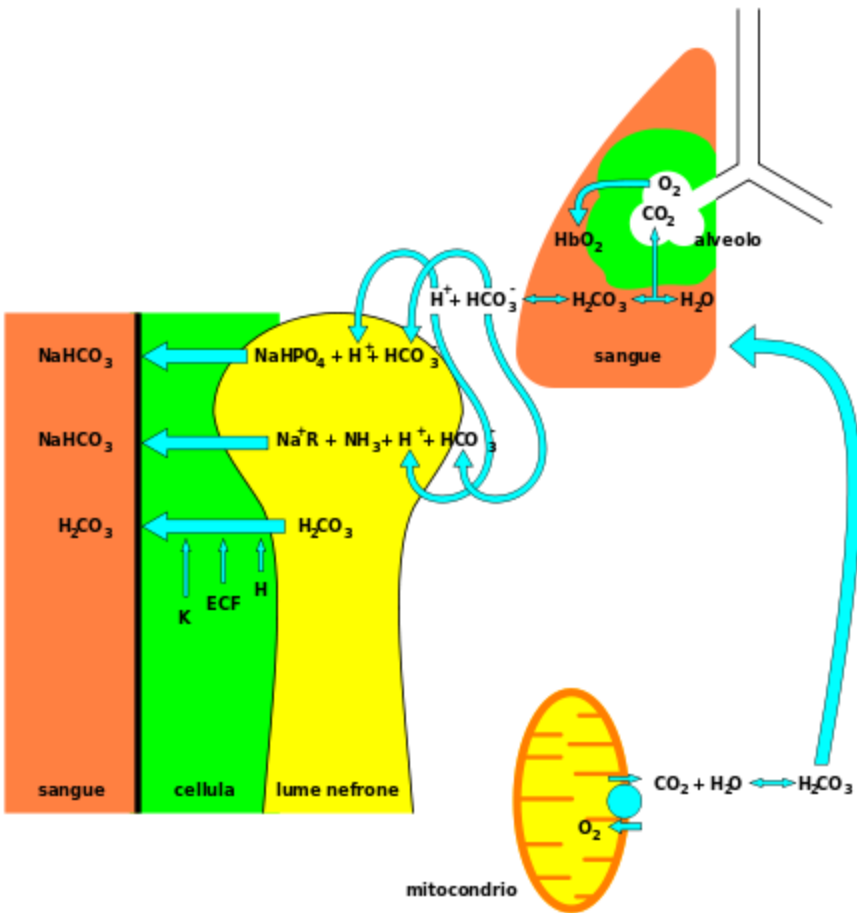
There are millions of processes taking place in our bodies every second that can result in oxidation. **Oxidation increases when we are physically and/or emotionally stressed** and then the number of free radicals exceeds the number of antioxidants. That's when oxidation damages our cells, proteins and our DNA (genes).

The key to addressing oxidative stress is through diet and lifestyle (including destressing activities and environmental changes). When the diet includes sufficient Vitamins A, C, E and D, the cells will have enough antioxidants to sustain an electrical and chemical balance and prevent cell damage. Plant based food contains considerably more antioxidants than meat.

The consumption of negatively charged water either from a pristine flowing water system or water from a device that can induce a permanent negative charge in the water, will reduce oxidative stress due to the ability of this water to sustain negative charge of cell and supply additional oxygen for energy production processes.

The following images illustrate natural active oxygen pathways in the body and how oxidative stress can lead to disease.





In the diagram above, CO_2 produced as a waste product of the oxidation of sugars in the mitochondria, reacts with water in a reaction catalysed by carbonic anhydrase to form H_2CO_3 , which is in equilibrium with the Hydrogen cation H^+ and bicarbonate anion HCO_3^- . It is then carried to the lung, where the reverse reaction occurs, and CO_2 gas is released. In the kidney (left: sangue), cells (green: cellula) lining the proximal tubule conserve bicarbonate by transporting it from the glomerular filtrate in the lumen (yellow: lume nefrone) of the nephron back into the blood (red).

Why is there a focus on negative ORP water?

Engineers and scientists have worked for decades on trying to find ways to prevent oxidation in sewage water, etc. and eliminate pathogens in water. Consequently, the ORP meter has become the paramount measure of determining healthy (stable) versus unhealthy (unstable) water. It has been **assumed** that ORP would measure positive and negative charge in water. The idea that negative charge is an inherent regulator in pristine flowing water to control oxidation and the balance of beneficial and pathogenic microbes in water, is a relatively new concept in science. This process also occurs naturally in the human body through the cells use of structured or negatively charged water. Similarly, issues with polluted or contaminated water can be resolved if the principles of natural systems using structured or negatively charged

water were applied. Simply, this means changing the charge in the water to a negative charge using a Phi'on water conditioning device (www.meawater.com) that can enable the water to hold a **permanent negative (-mV) charge**.

Currently, and standard practice, is to have a high positive (+) **ORP** in sewage treatments, swimming pools and spas, because the higher the + ORP, then a more oxidation state (less oxidative stress and more stability) will occur. This process enables the killing of unwanted pathogens (gram negative microbes, eg. E. Coli), by stealing electrons from the microbe's DNA, cell membranes and proteins. Chlorine is added to water because it has a high ORP and is an effective disinfectant. It is the high ORP of **electrolysed oxidising water** that makes it effective against pathogenic microbes. However, there is also the view that oxygen has a high (+) ORP and can damage DNA and proteins. Conversely, **molecular hydrogen** exhibits a very low (-) ORP and is a reducing agent or antioxidant. Consequently, a focus (for marketing water) has swung to the perceived values of negative ORP water. However, it is the **rH value in water** that is critical (see pages 8-9)

Also, a low ORP is seen with certain human biological fluids (albeit a natural system function as described in the diagrams above). Okouchi (*Department of Materials Chemistry, Faculty of Engineering, Hosei University, Koganei, Tokyo*) and colleagues measured the ORP of an assortment of physiological samples of healthy individuals including skin, blood plasma, amniotic fluid, saliva and urine. They found that these had reductive characteristics. They also measured a variety of fresh foodstuffs and an assortment of fruits and vegetables and noted that they all exhibited reductive characteristics (albeit when exposed to changed environmental conditions). The researchers also noted that an ORP measurement could suggest the degree of freshness by comparing the value to its known value when fresh.

They also observed that many commercial beverages and tap water all exhibited oxidative characteristics. Consequently, the authors proposed a functional type of water having reductive characteristics that can be classified as *vital water* because it would be analogous to physiological and biological fluids, as well as the many foodstuffs that are required for growth and development. In conclusion, these authors recommended that water should have reductive characteristics, which is *less stimulating to the human body*.

However, as outlined earlier the chemical species in the water are responsible for that ORP value. Just because water has a low or negative ORP, does not mean that it has any physiological or biological antioxidant value if consumed internally. Indeed, water and food with a negative ORP could be toxic, and therapeutic with a positive ORP.

Against this background, various waters, in terms of ORP (oxidation-reduction potential), have a degree of oxidation or reduction in each kind of water. This is largely due to the mineral components, light absorption, biological composition of the water and whether the water has a positive or negative charge. However, most (if not all) studies of water have not considered the interactions in water between minerals, biology, light and charge. A value of ORP does not

necessarily indicate an accurate degree of active oxygen elimination ability. For example, Vitamin C has a reductive characteristic and can cancel active oxygen, whereas sulfite used as an antioxidant for wine cannot cancel active oxygen but has a reductive characteristic. However, since an ORP value represents an activity level of electrons, it is applicable to determining the degree of oxidation or reduction, however an ORP meter is **not appropriate for measuring charge (current) in water**. Charge in water can only be measured with a **voltmeter**.

Structured water and its role in health

Perhaps it is time to consider health in the context of the role of structured water as described by Pollack, Mae-Wan Ho, Chaplin, the other multiple properties of water in nature, as described by Schauburger, Benveniste, Kervran, Cowan, etc.

There are things in the water that we are meant to use. Most things that we are designed to use, are created by nature (ie. in food and water). When we *tinker* with the natural process (eg. pharmaceutical medications), then we pay a price with our health. In this day of Genetically Engineered/modified foods, over-medication, and chemicals everywhere, the human body is accumulating toxic compounds in cells at an alarming rate. Pesticides, artificial fertilisers, heavy anti-biotic and steroids used in agriculture, and other common practices are destroying the integrity of food. Our bodies are designed to make nutrients (eg. vitamin B12) from the food we eat, and water we drink. Some minerals, omegas and other nutrients (eg. the negative charge in water) are essential, and mostly taken into the body with food and water. The ideas about the health benefits of water are embedded into the new science of **structured water**.

Natural, structured water has all sorts of natural things bonded to it, and the molecules themselves bond to each other in a different way than processed (urban water and most bottled waters). It is bonded in such a way that free oxygen atoms are also present in larger numbers. Oxygen is one of the body's main catalysts. Nature creates this with moving water, such as streams moving over rocks, that clean the water, and enrich it with minerals and free oxygen. This is natural, negatively charged structured water. It is what we are designed to use from a flowing pristine water system, and our cells are designed to utilise this water. Effectively, **we have primal cells that require primal (natural, unprocessed) water**.

This is a very simplified explanation, but technically, our **cells** are designed to use a form of structured water, referred to chemically as H_3O_2 (Pollack). There are different types of water and they differ by the way the molecules are bonded. It would be more accurate to call the structured water in cells, **oxygen and hydrogen enhanced water**. It is a new concept, and still being studied, and the **Phi'on** water restructuring device is already on the market to convert water to the more beneficial and natural form to hold a permanent negative charge.

There are many benefits to consuming structured water. Experiments by Phi'ón resulted in

significant increase in the size of vegetables and grains that used a combination of negatively charged water and a diverse and abundant microbial formulation, compared to those watered with standard, positively charged (urban) water. There are also some preliminary studies that show measurable improvements in body functions, and overall health by drinking negatively charged water.

The only way that many of the properties of water can be explained is by understanding that water has a unique molecular structure. Certain circumstances encourage water to form a repeating, geometric, molecular pattern where water becomes a liquid crystal (six-sided, hexagonal, crystalline structure as opposed to the five-sided, pentagonal, crystalline structure; as in all urban water).

Each of the Earth's minerals has a crystalline form. Diamonds are crystalline carbon; emeralds are crystalline beryllium; and rubies are crystalline corundum. Each crystal has a specific structural pattern. Minerals form crystals when circumstances (for example: heat and/or pressure) cause the molecules to form a repeating pattern. Most people know that extreme pressure is required to form a diamond. Pressure forces molecules to arrange themselves in a different configuration to withstand the pressure. Structural organisation changes the characteristics of the substance. Some of these changes are obvious, like the visible difference between carbon and a diamond. It's all a matter of organisation.

Liquid crystals are a special phase of matter. Like solid crystals, they can transmit signals: the repeating pattern provides an efficient pathway for the smooth flow of energetic information. Liquid crystals are flexible and many times more responsive than solid crystals.

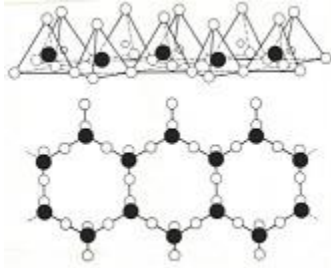
Dr. Gerald Pollack, professor of bioengineering at the University of Washington, has provided significant evidence for water's liquid crystalline structure. His research has demonstrated water's capacity in natural systems (eg. human cells) to form large zones of structured water. He has shown that this water has measurably different characteristics including, molecular stability, a negative electrical charge, greater viscosity, molecular alignment, and an enhanced ability to absorb certain spectra of light. He and others have provided evidence that the liquid crystalline phase of water is intimately connected with the sustained generation of cell life.

Much of the water in a healthy human body is in a liquid crystalline/structured state. Many components of the body are also considered to be liquid crystals, including collagen and cell membranes. These tissues work cooperatively with structured water to create an informational network that reaches to every cell. The liquid crystalline organization of the human body accounts for the instantaneous transfer of signals and other biological information.

Healthy DNA is surrounded by structured water. This water is responsible for the DNA's stability. Structured water is also responsible for supporting the electromagnetic field surrounding DNA. As water loses its crystalline structure (because of poor diet and lifestyle practices that lead to aging and disease), the integrity of the DNA is often

compromised. Youthful DNA, surrounded by crystalline/structured water, has a much stronger electromagnetic field than DNA from older individuals.

Water's crystalline structure is based on tetrahedral geometry where oxygen atoms form the center of each tetrahedron. Under ideal circumstances, as water tetrahedra join, a repeating hexagonal pattern is generated with oxygen atoms forming the vortices of each hexagon. This is the reason liquid crystalline water has also been referred to as hexagonal (six-sided) water.



Top: The tetrahedral molecular structure of water as viewed from the side.

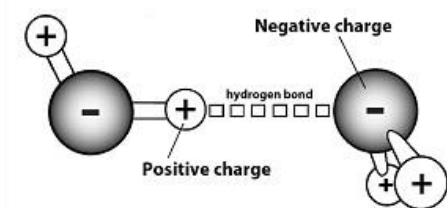
Bottom: The hexagonal pattern as viewed from the top.

Black dots represent oxygen atoms; white dots indicate hydrogen atoms.

Quartz crystals exhibit the same molecular geometry as structured water. Quartz is a network of interconnected SiO_4 tetrahedra. Structured water is a network of OH_4 tetrahedra. This is one reason water has the capacity to store and transfer information. The image above shows the geometric pattern in quartz. It identifies the tetrahedral arrangement as well as the hexagonal channels created by the repeating geometry.

Hydrogen bonding

Water's liquid crystalline structure is made possible, in part, by electrostatic forces called hydrogen bonds. Hydrogen bonds are formed by the attraction of positive and negative charges. In the water molecule, the oxygen atom maintains a slightly negative charge while the hydrogen atoms maintain a slightly positive charge. These charges attract each other and link water molecules to form an interconnected, crystalline network.



The Hydrogen Bond (right)

The positively charged hydrogen atom is electrostatically attracted to the negatively charged

oxygen atom to form a hydrogen bond. This is the foundation for the development of the liquid crystalline water matrix.

Hydrogen bonding in most water is random. There is no long-term pattern to the way the water molecules become interconnected. However, many natural forces can influence the degree and the stability of hydrogen bonding. The electromagnetic forces inherent in the Earth play a role. Organisation itself provides a degree of stability, like the way interlocking bricks create a sturdy framework, so that hydrogen bonds are not as easily broken. A structured water network is said to be coherent when it can maintain a degree of molecular stability while in motion, as it is with the Phión, MEA water.

Water can form many structural patterns depending on its vibrational environment (ie. a six-sided crystalline structure in a pristine flowing river). When there is a high degree of hydrogen bonding (no matter the pattern) then water behaves differently and takes on different characteristics. Water's capacity to store and to transmit information is directly proportional to structure and coherence. The greater the structure (characterized by increased hydrogen bonding), and the greater the coherence (characterized by the degree to which the water can maintain its structure), the greater its capacity to store and deliver signals and other information. That is why the Phión, MEA water is the liquid crystalline/structured/ living water required, and inherent in living cells.

Electrolytes in water

Naturally sourced electrolytes in water are some of the most complex and misunderstood nutrients. Electrolytes are positively or negatively charged ions that conduct electrical activity. In the human body electrolytes must be present in proper concentrations to maintain heart rhythm, blood pH balance, fluid balance, muscle contraction and neural activity.

In physiology, the primary ions of electrolytes are sodium (Na^+), potassium (K^+), calcium (Ca^{2+}), magnesium (Mg^{2+}), chloride (Cl^-), hydrogen phosphate (HPO_4^{2-}), and hydrogen carbonate (HCO_3^-). One of the most important electrolytes in drinking water, along with Magnesium, is the bicarbonate ion (hydrogen carbonate ion) The electric charge symbols of plus (+) and minus (-) indicate that the substance is ionic in nature and has an imbalanced distribution of electrons, the result of chemical dissociation.

The electrolytes carry electrical charges that are responsible for stimulating muscles and nerves. They also regulate the amount of fluids throughout your body, which affects cellular function, blood volume and blood pressure. Sodium plays the primary role in water regulation, but they all help keep body fluids balanced. Your body maintains a specific amount of each electrolyte because a precise proportion of each one is needed for all of them to work properly.

The kidneys work to maintain electrolyte balance by conserving or excreting electrolytes. Water follows the movement of electrolytes, particularly sodium and chloride, meaning that water is drawn to locations where electrolytes are most concentrated.

The presence of electrolytes in drinking water plays a critical role in maintaining equilibrium of water throughout the body. Therefore, judgements about water quality would need to include the presence or absence (balance) of electrolytes. Any time you lose fluids, you also lose electrolytes, especially sodium. Under normal circumstances, healthy adults get plenty of electrolytes from eating a balanced daily diet (eg. leafy green vegetables). However, excessive sweating, vomiting and diarrhea result in a larger than normal loss of electrolytes. Drinking electrolyte water helps restore the minerals. Each person loses a different amount of sodium and electrolytes when he sweats. As a general guideline, an electrolyte balance can be achieved by dissolving ¼ to ½ teaspoon of a complex salt in ½ litre of hot water, then mixing it with ½ litre of coconut water to reach 1 litre.

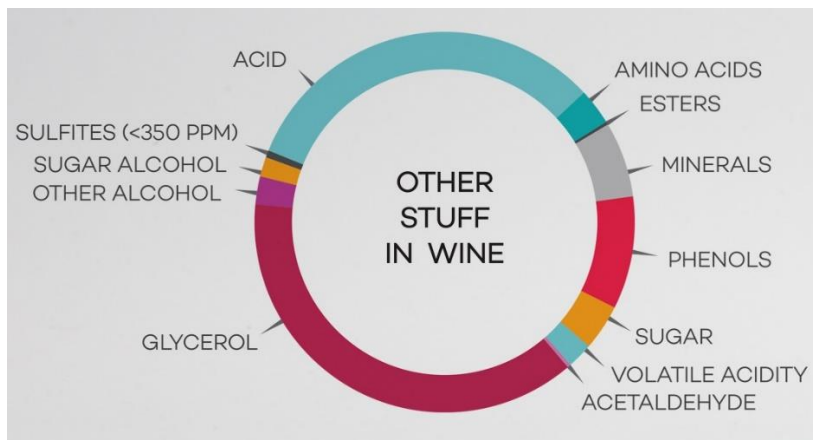
Water and stability in wine

The Phión bottle top device can be used to condition wine, as wine is 80-85% water. The other components of wine (excluding preservatives) are described in the image below. A major advantage of using a Phión bottle top device to condition wine is that if the wine is left open to the air (ie. exposed to microbes and oxygen) the wine will not spoil or oxidise and turn to vinegar.

There are several notable and positive outcomes from using the Phión bottle top device to condition wine. For example, trials with wine have produced significant results that include:

1. Greater balance in wine structure
2. Increased sense of flavours and aroma is intensified
3. Considerably less tannin taste and sharpness (acidity) taste
4. Potentially enhances the beneficial aspects of polyphenols
5. **The wine does not oxidise and turn to vinegar when left open to the air for up to 12 months.**

The image below illustrates the non-water composition of wine, including the sulfite preservatives that have a capacity to form free radicals through oxidation.



In wine, the emergence or presence of acetic acid is an indicator of wine spoilage. If wine is infected with acetobacter bacteria, and other conditions are right, then acetic acid will be produced in the wine, along with lots of other bacteria (eg. the gram-positive, lactic acid bacteria, *Pediococcus*). These bacteria are everywhere: in the air, on fruit, etc. When acetobacter gets into your wine it can slowly turn the alcohol into acetic acid, if left unhindered. Consequently, wine can turn into vinegar when it is exposed to a lot of oxygen and microbes in the air for a long time (within weeks, or months at most).

Also, the microbes that tend to infect wine can quickly turn acetic acid to acetone. Small amounts of acetone are produced in the body by the decarboxylation of ketone bodies. **Ketone bodies** are three water-soluble molecules (acetoacetate, beta-hydroxybutyrate, and their spontaneous breakdown product, acetone) that are produced by the liver from fatty acids. Certain dietary patterns, including prolonged fasting and high saturated fat, and low-carbohydrate vegetable dieting, can produce ketosis, in which acetone is formed in body tissue. Certain health conditions, such as alcoholism and diabetes, can produce ketoacidosis and uncontrollable ketosis that leads to a sharp, and potentially fatal, increase in the acidity of the blood. Since acetone is a byproduct of fermentation, it is a byproduct of distillery.

Research by Phión has demonstrated that when wine is processed through the MEA water bottle top device and the inline devices the wine produced significant results, including:

1. Greater balance in wine structure
2. Increased sense of flavours and aroma is intensified
3. Considerably less tannin taste and sharpness (acidity) taste
4. Potentially enhances the beneficial aspects of polyphenols
5. Wine does not oxidise and has been tested to last in high quality when open to the air for greater than 12 months



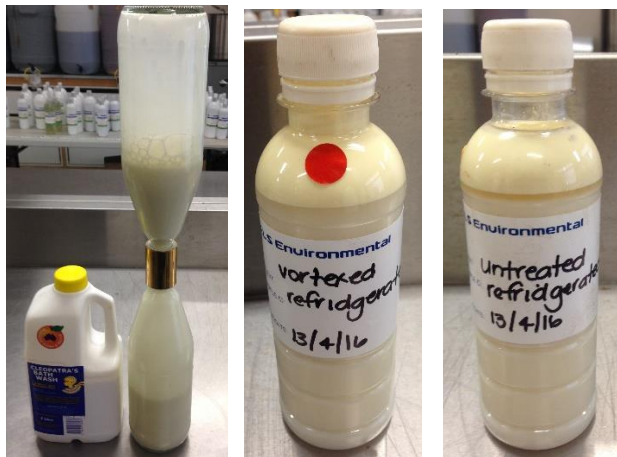
Therefore, the Phión MEA water conditioning devices will become increasingly used to condition wine before bottling. The value to the wine producers and makers, is the wines will

not spoil, storage will not adversely affect the wine and flavours will be enhanced. The value for the wine consumer is that the wine alcohol will be more effectively processed by the liver to minimise ketosis and blood acidity.

Returning raw milk to its natural state and with integrity

Research undertaken by Phi6n during 2016 demonstrated that raw milk processed through a MEA water device could potentially replace pasteurization and homogenization. This would enable raw milk to be consumed with integrity in its natural biological and enzymatic state. This research also demonstrated that the MEA device will eliminate pathogenic microbes (eg. the harmful gram-negative species like E. Coli) and increase storage time in a bottle by 1-2 weeks.

The results also demonstrated that oils do not separate from the cream (fats) after the milk has been processed by a MEA device (as shown in the images below where the right-hand image of **untreated raw milk** has separation of oils and fats after 4 days in refrigeration)



These results show that there is a pathway to restore all forms of milk (including stored breast milk) to its natural healthy state with integrity (ie. retaining its natural biological and enzymatic conditions for life).

Milk is also rich in endocannabinoids, and particularly in breast milk where it protects the infant against disease, stimulates suckling response and helps to regulate appetite. If your organ and system cells are functioning at an optimal level, then the **body's natural endocannabinoid system** will use Omega 3 fatty acids to repair and grow the cannabinoid receptors. Milk that is obtained from organic, grassed pasture and is consumed in its raw form has the highest levels of Omega 3 fatty acids. The Omega 3 is also readily available from Hemp Seed Oil and it is known to boost brain function, balance cholesterol, support fertility, heart function, joints, skin, vision, and is critical in anti-aging and anti-inflammatory regulation. We should not lose sight of the fact that we have a natural in-built endocannabinoid system, and a diet rich in Omega 3 is critical to sustain this system, particularly in pregnant and breast-feeding women.

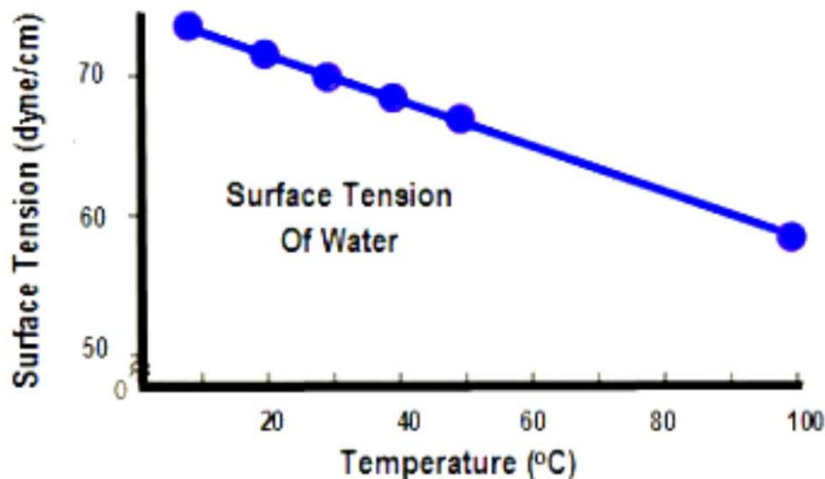
Surface tension of Structured Water

Students of structured water science may be confused with statements on the Internet about the surface tension of structured water. Some companies that manufacture water devices claim a lower surface tension of their structured water, while others claim an increased surface tension.

Phi'on has measured its structured water and it has an increased surface tension, and this increased surface tension is sustained in the water because the Phi'on structured water devices create a permanent negative charge in the water.

Dr. Mu Shik Jhon who published nearly 300 scientific papers and was the leading researcher of Structured Water for over 30 years, says *research clearly demonstrates that temperature directly impacts the level of structural organization of the water. **The colder the temperature the higher the percentage of hexagonally structured water.***

It is also commonly known that surface tension is temperature dependent. The surface tension decreases linearly with an increasing temperature, reaching zero at the boiling point. **The hotter the temperature the lower the surface tension will be.**



Therefore, we can conclude, that when the surface tension **decreases** the percentage of hexagonally structured water also **decreases**. **When surface tension increases the level of hexagonal structural organisation also increases in the water. That is, when the negative charge (-mV) in the water increases the surface tension increases.**

The **water** molecules attract one another **due to** the **water's** polar property. The hydrogen ends, which are positive in comparison to the negative ends of the oxygen **cause water** to *stick* together. Therefore, there is **surface tension** and it takes a certain amount of energy to break these intermolecular bonds.

The reason that water droplets form beads rather than spreading out evenly over a surface is because water molecules form relatively strong hydrogen bonds. This creates what is known as a high degree of surface tension and allows water to rise easily in small areas (capillaries). It accounts for the enhanced ability of water to move inside plants, within the soil matrix and into the interstitial space of the body (ie. narrow *spaces* between tissues, cells or parts of an organ where extracellular fluid flows)



Therefore, it is the surface tension of the water which impacts the capillary effect or the movement of water throughout any given matrix, and **the higher the surface tension** (with a greater percentage of hexagonally structured water) **the greater this movement will take place.**

This information is consistent with the Jhon laboratory test results that took 30 samples of various types of water, for example, a sample of city water as is, well water as is, and then having these waters to go through Hexahedron 999 Units. These samples were sent to General Electric Laboratory in Montreal Canada to perform surface tension testing (DYNE). The results clearly showed that the Structured Water samples through the Hexahedron 999 units yielded a higher surface tension from 10 to 20%.

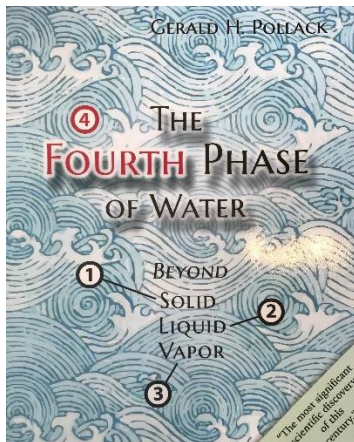
To visually verify these laboratory results, Jhon decided to do a few simple at-home tests which anyone can duplicate. Jhon took a sample of well water and placed one inch of water in an 8 oz glass (Glass No. 1). He then took another sample of the same water after it had passed through the Hexahedron 999 Whole House Unit and placed one inch of water into another 8 oz glass (Glass No. 2). He cut two strips of paper towel, 2 inches wide by 10 inches long, and inserted one into each glass of water just enough to touch the water surface and watch the capillarity effect (water rising into the paper towel). The strip touching the Hexahedron 999 water sample had the water rising into the paper at least 20% faster. He left the two glasses of sample waters sitting on the windowsill, side by side, and allowed the water to evaporate totally. The first glass to evaporate its water was Glass No. 1, the well water sample, which totally evaporated 36 hours sooner than Glass No. 2.

Just as Dr. Mu Shik Jhon mentioned in his book *The Water Puzzle and the Hexagonal Key*, Hexagonally Structured Water with a higher surface tension has a stronger capillarity effect

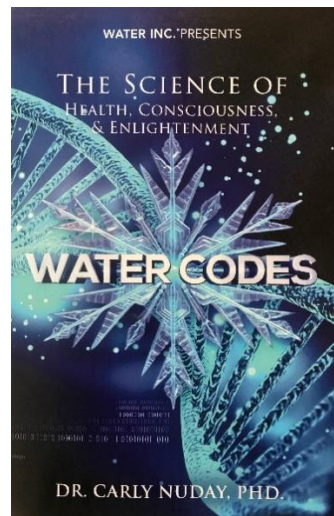
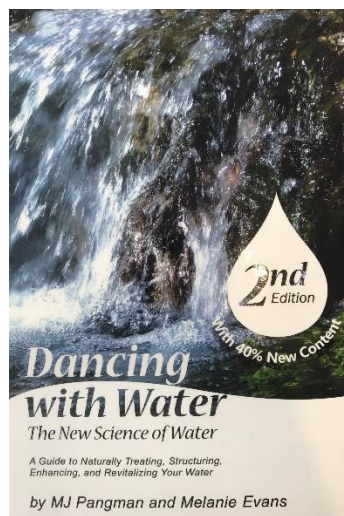
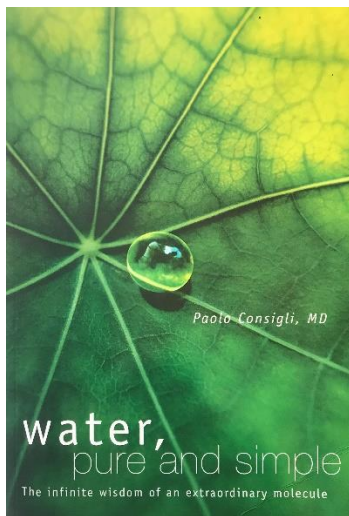
because of the stronger hydrogen bonding. This is also why the well water evaporated sooner than the Hexahedron 999 Structured Water sample, because the well water had a lower surface tension, and therefore a weaker hydrogen bonding.

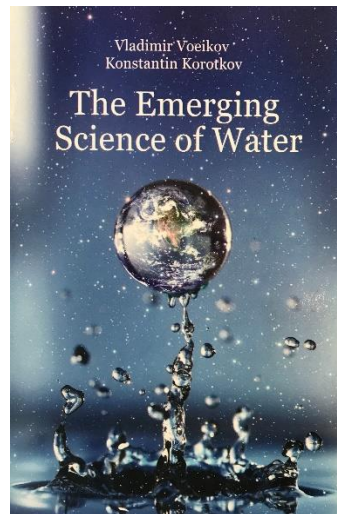
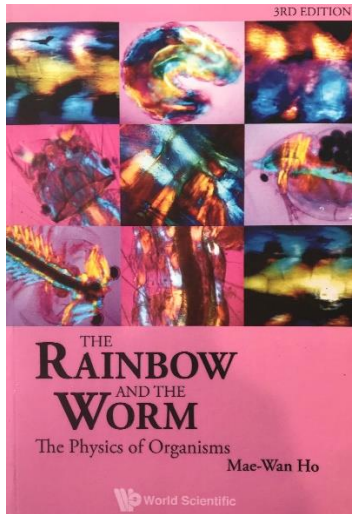
This all seems straight forward, so why is there so much confusion about the surface tension of structured water? Perhaps it is because hexagonally, structured water feels soft, tastes soft, and behaves like soft water, without changing the mineral content of the water. Also, any manufacturer of water devices that claims that the lower surface tension is a property of structured water, is clearly not producing structured water from the device.

In 2013 Gerald H. Pollack published his book *The Fourth Phase of Water* which he calls EZ Water (Exclusion Zone Water). This book is a must read for anyone interested in structured water science. The subject of surface tension and EZ can be found in Chapter 16, starting on page 283.



Other books of interest for information on the properties and structure of water are:





Returning water to its natural, unique state

The discussion above has addressed a wide range of issues associated with water and cellular health. In many respects, scientific belief systems have skewed water measurement and the appreciation of water's unique quality away from reality.

Water in a natural system will resonate and communicate with the local environment through the influences of nature's vibrations, light, biology, movement (vortices), minerals, etc.

Humans destroy the resonate vibration of water by:

- Storing water in unnatural environments (eg. tanks, pipes, etc.) where it turns to a five-sided crystalline structure which is not the natural state of water
- Processing water through reverse osmosis and ionising technologies that renders the water dead (ie. no living or natural resonance and therefore the ability to attract and hold **only** natural, resonate energies from nature)
- Contaminating the water with pollutants and chemicals (eg. chemical run-off from water catchments and adding fluoridation and chlorination to water supply systems) This water takes on the energies of these chemicals due to the changed structure of the water to a five-sided crystalline structure that is unstable.

Water can be restored to its natural, stable state by:

- Processing the water through a device that permanently restores the negative charge in the water
- Restoring the natural resonance of water molecules through embedding nature's harmonic energies into the water. This can only be done when the water is negatively charged and using the vibrations captured from natures, eg. Quantum Code Technology developed by Dr. Robert Williams or similar vibrational or healing frequency technologies.

- The combination of a negative charge and the restoration of the nature resonance of water molecules can effectively exclude the energies of unnatural energies. This is how the qi (Chi) of water is restored.

These technologies can potentially change the health and wellbeing of all living systems, including the restoration of molecular balance in water, microbes, plants, animals and humans.

For example, this quantum cohesion phenomenon occurs in cell nerves. The nerve axon is a long, slender projection of a nerve cell, or neuron, that typically conducts electrical impulses away from the neuron's cell body. Axons are also known as nerve fibers. The function of the axon is to transmit information to different neurons, muscles and glands. These axons are hydrophilic tubes well suited to structuring the water inside nerve cells. Structured water creates electrical charge that creates movement. Electricity carries impulses (vibration) instantaneously over long distances. This is what creates blood circulation or movement (the heart is not a pump) and this electron flow is the force behind nerve transmission.

In many respects, life is the transformation of a substance (created by energy) to a quantum coherent super-conducting phenomenon, where life is more than the sum of the parts, and cannot be reduced to the parts, as it is in a medical system.

Where to from here

There are many issues to be addressed by science and technology. For example:

1. What is natural or pure drinking water, and therefore what are the best qualities for drinking water, including the resonate state of water molecules to attract life-affirming energies from nature?
2. What measurement technologies are required and scientifically accepted, to define water as either structured (pure and natural as in nature, six-sided crystalline structure and negatively charged) or unstructured (water stored out of its natural flowing environment, five-sided crystalline structure and positively charged)
3. What factors are critical in measurement to better understand the differences of using either structured or unstructured waters? For example, the different roles of Active and Inactive oxygen in cells. Also, the oxygen in structured water with a permanent negative charge (eg. waters produced by Phión MEA water devices) (eg. non-reducing/non-reactive) and an Inactive Oxygen (eg. oxidizing/reactive forms of oxygen)
4. The need to define the state of waters in experiments or applications (eg. drinking, washing, homeopathic and pharmaceutical formulations) as either structured or unstructured water
5. What are the claimed health benefits of structured water versus the claims of high negative ORP (Oxidation Reduction Potential) and alkaline water?
6. What are the market discriminators between Phión MEA (structured) water devices and the water ioniser devices that produce high negative ORP and alkaline water? For

example, the MEA water device has been proven to eliminate pathogenic microbes (eg. E. Coli) from water and significantly increase food production quantities and quality.

The ideas that life should follow the rules of nature have been in cultures for 1000's of years (see image below of a Chinese Tao saying: **follow the rules or ways of nature**: Tao is signifying the way, path, route, key, doctrine or principle).



The pathway to a high standard of living with less disease, malnutrition, poverty and environmental catastrophes is to embrace nature's ways, and specifically using or restoring water to its natural, harmonic (vibrational) state.

We embrace wellbeing when we consume water and food in their most *natural state*. This dynamic process of consuming nature's life energies ensure that our cells are coherent, electrically charged (negative), super-conducting and light filled to resonate in harmony. Healthy cells optimise the attraction of natural wave energies from the environment. This cellular transformation of energy is the basis of all life: and we can achieve this life-affirming pathway if we **follow the rules or way of nature**.