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IONIZED WATER : WHAT IS IT?

The following is excerpted from an address by Dr Hidemitsu Hayashi Water Institute of Japan.

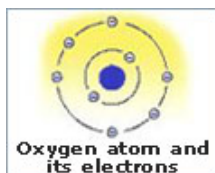
"Whenever we attempt to determine whether there is life as we know it on Mars or other planets, scientists first seek to establish whether or not water is present." Life on earth totally depends on **water**.

A high percentage of living things, both plant and animal are found in water. All life on earth is thought to have arisen from water. The bodies of all living organisms are composed largely of water. About 70 to 90 percent of all organic matter is water.

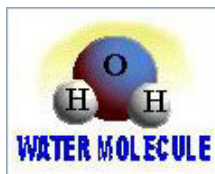


The chemical reactions in all plants and animals that support life take place in an **ionized water** medium. Water not only provides the medium to make these life sustaining reactions possible, but water itself is often an important reactant or product of these reactions. In short, the chemistry of life is water chemistry.

Water, the universal solvent



Water is a universal, superb solvent due to the marked polarity of the water molecule and its tendency to form hydrogen bonds with other molecules. One water molecule, expressed with the chemical symbol H₂O, consists of 2 hydrogen atoms and 1 oxygen atom.



Hydrogen tends to ionize by losing its single electron and form single H⁺ ions which are simply isolated protons since the hydrogen atom contains no neutrons. A hydrogen bond occurs when the electron of a single hydrogen atom is shared with another electronegative atom such as oxygen that lacks an electron.

in the molecule including the shared hydrogen electrons giving the oxygen portion of the molecule a slight electronegative charge.

The shells of the hydrogen atoms, because their electrons are closer to the oxygen, take on a small electropositive charge. This means water molecules have a tendency to form weak bonds with water molecules because the oxygen end of the molecule is negative and the hydrogen ends are positive.

These weak bonds play a crucial role in stabilizing the shape of many of the large molecules found in living matter. Because these bonds are weak, they are readily broken and re-formed during normal physiological reactions. The disassembly and re-arrangement of such weak bonds is in essence the chemistry of life.

As we can see from this simple example, even the delicate configuration of individual water molecules enables them to break relatively stronger bonds by converging on them.

This is why we call water the universal solvent. It is a natural solution that breaks the bonds of larger, more complex molecules.

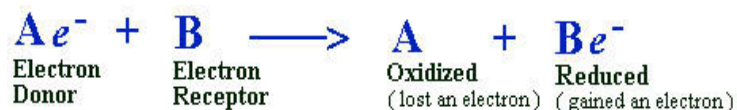


This is the chemistry of life on earth, in water and on land.

Oxidation and Reduction

Basically, reduction means the addition of an electron (e^-), and its converse, oxidation means the removal of an electron. The addition of an electron, reduction, stores energy in the reduced compound. The removal of an electron, oxidation, liberates energy from the oxidized compound. Whenever one substance is reduced, another is oxidized.

Consider any two molecules, A and B, for example.



When molecules A and B come into contact, here is what happens:

1. B grabs an electron from molecule A.
2. Molecule A has been oxidized because it has lost an electron.
3. The net charge of B has been reduced because it has gained a negative electron (e^-).

In biological systems, removal or addition of an electron constitutes the most frequent mechanism of oxidation-reduction reactions. These oxidation-reduction reactions are frequently called redox reactions.

Let's Now Look at Acids and Bases

An acid is a substance that increases the concentration of hydrogen ions (H^+) in ionized water. A base is a substance that decreases the concentration of hydrogen ions, in other words, increasing the concentration of hydroxide ions OH^- .

The degree of acidity or alkalinity of a solution is measured in terms of a value known as pH, which is the negative logarithm of the concentration of hydrogen ions:

$$pH = 1/\log[H^+] = -\log[H^+]$$

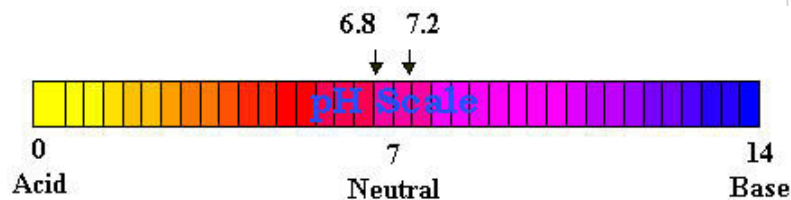
So What is pH?

On the pH scale, which ranges from 0 on the acidic end to 14 on the alkaline end, a solution is neutral if its pH is 7. At pH 7, water contains equal concentrations of H+ and OH- ions. Substances with a pH less than 7 are acidic because they contain a higher concentration of H+ ions. Substances with a pH higher than 7 are alkaline because they contain a higher concentration of OH- than H+. The pH scale is a log scale so a change of one pH unit means a tenfold change in the concentration of hydrogen ions.

The Importance of balancing pH

Living things are extremely sensitive to pH and function best (with certain exceptions, such as certain portions of the digestive tract) when solutions are nearly neutral. Most interior living matter (excluding the cell nucleus) has a pH of about **6.8**

Blood plasma and other fluids that surround the cells in the body have a pH of **7.2 to 7.3**. Numerous special mechanisms aid in stabilizing these fluids so that cells will not be subject to appreciable fluctuations in pH. Substances which serve as mechanisms to stabilize pH are called buffers. Buffers have the capacity to bond ions and remove them from solution whenever their concentration begins to rise. Conversely, buffers can release ions whenever their concentration begins to fall. Buffers thus help to minimize the fluctuations in pH. This is an important function because many biochemical reactions normally occurring in living organisms either release or use up ions.



Dr. Hayashi is a Heart Specialist and Director of the Water Institute of Japan.
 Dr. Hayashi has no affiliation with Jupiter Science or IonLife USA

Oxygen in the Body

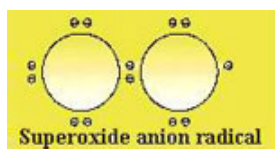
Oxygen is essential to survival. It is relatively stable in the air, but when too much is absorbed into the body it can become 'active oxygen' (distinct from oxygen taken in and combusted through the lungs) and unstable and has a tendency to attach itself to any biological molecule, including molecules of healthy cells. The chemical activity of these free radicals is due to one or more pairs of unpaired electrons.

About 2% of the oxygen we normally breathe becomes active oxygen, and this amount increases to approximately 20% with aerobic exercise.

Active Oxygen in the body :-

Problems arise, however, when too many of these free radicals are turned loose in the body where they can also damage normal tissue.

Putrefaction sets in when microbes in the air invade the proteins, peptides, and amino acids of eggs, fish and meat. The result is an array of unpleasant substances such as :



Hydrogen sulfide, ammonia, histamines, indoles, phenols, and scatoles present in the digestive tract of the human body.

These substances are also produced naturally in the digestive tract when we digest food, resulting in the unpleasant odor evidenced in faeces. Putrefaction of spoiled food is caused by microbes in the air; this natural

process is duplicated in the digestive tract by intestinal microbes. All these waste products of digestion are pathogenic, that is, they can cause disease in the body.

Hydrogen sulfide and ammonia are tissue toxins that can damage the liver. Histamines contribute to allergic disorders such as atopic dermatitis, urticaria (hives) and asthma. Indoles and phenols are considered carcinogenic.

Because waste products such as hydrogen sulfide, ammonia, histamines, phenols and indoles are toxic, the body's defense mechanisms try to eliminate them by releasing neutrophils (a type of leukocyte, or white corpuscle). These neutrophils produce active oxygen, oddball oxygen molecules that are capable of scavenging disintegrating tissues by gathering electrons from the molecules of toxic cells.

Problems arise, however, when too many of these active oxygen molecules, or free radicals, are produced in the body. They are extremely reactive and can also attach themselves to normal, healthy cells and damage them genetically. These active oxygen radicals steal electrons from normal, healthy biological molecules. This electron theft by active oxygen oxidizes tissue and can cause disease.

Effects of Oxidation on Vital Organs	
Oxidized Tissue	Leads to:
Liver	Hepatitis, cirrhosis, cancer
Pancreas	Pancreatitis, diabetes, cancer
Kidney	Nephritis, nephrosis, cancer

Because active oxygen can damage normal tissue, it is essential to scavenge this active oxygen from the body before it can cause disintegration of healthy tissue. If we can find an effective method to block the oxidation of healthy tissue by active oxygen, then we can attempt to prevent disease.

In order to protect the body from damage by hydrogen sulfide, ammonia, histamines, indoles, phenols and scatoles, neutrophils (leukocytes produce active oxygen to oxidize these waste products.

and

Excess production of active oxygen occurs.

so

excess active oxygen can damage normal, healthy biological cell molecules and alter their genetic codes.

Antioxidants block dangerous oxidation

One way to protect healthy tissue from the ravages of oxidation caused by active oxygen is **to provide free electrons to active oxygen radicals, thus neutralizing their high oxidation potential** and preventing them from reacting with healthy tissue.

Research on the link between diet and cancer is far from complete, but substantial evidence indicates that what we eat may affect our susceptibility to cancer. Certainly, some foods seem to help defend against cancer, others appear to promote it.

Much of the damage caused by carcinogenic substances in food may come about because of an oxidation reaction in the cell. In this process, an oddball oxygen molecule may damage the cell's genetic code. Some researchers believe that substances that prevent oxidation -- **called ANTIOXIDANTS** -- can block the damage. This leads naturally to the theory that the intake of natural antioxidants could be an important aspect of the body's defense against cancer. Substances that some believe inhibit cancer include vitamin C, vitamin E, beta-carotene, selenium, and glutathione (an amino acid). These substances are reducing agents. They supply electrons to free radicals and block the interaction of the free radical with normal tissue

How we can avoid illness

As we mentioned earlier, the presence of toxic waste products such as hydrogen sulfide, ammonia, histamines, indoles, phenols and scatoles impart an offensive odor to human feces. In the medical profession, it is well known that patients suffering from hepatitis and cirrhosis pass particularly odoriferous stools.

Excessively offensive stools caused by the presence of toxins are indicators of certain diseases, and the body responds to the presence of these toxins by producing neutrophil leukocytes to release active oxygen in an attempt to neutralize the damage to organs that can be caused by such waste products. But when an excess amount of such active oxygen is produced, it can damage healthy cells as well as neutralize toxins. This leads us to the conclusion that we can minimize the harmful effect of these active oxygen radicals by reducing them with an ample supply of electrons.

Ionized Water . . . the natural solution

There is no substitute for a healthy balanced diet, especially rich in antioxidant materials such as vitamin C, vitamin E, beta-carotene, and other foods that are good for us. However, these substances are not the best source of free electrons that can block the oxidation of healthy tissue by active oxygen.

Ionized water treated by electrolysis to increase its reduction potential is the best solution to the problem of providing a safe source of free electrons to block the oxidation of normal tissue by free oxygen radicals. We believe that reduced water, water with an excess of free electrons to donate to active oxygen, is the best solution because:

1. The reduction potential of water can be dramatically increased over other antioxidants in food or vitamin supplements.
2. The molecule weight of reduced water is low, making it fast acting and able to reach all tissues of the body in a very short time.

How the IONIZING WATER FILTER AND IONIZER works :

The **IONIZED WATER FILTER**, slightly taller and thicker than a large dictionary on end, is an electrical appliance connected to your kitchen water supply to perform electrolysis on tap water before you drink it or use it in the kitchen for cooking or cleaning.

A special attachment re-directs tap water out of the faucet through a plastic hose into the unit. Inside the **IONIZED WATER FILTER**, the water is first filtered through silver activated charcoal. The filtered water then flows into an electrolysis chamber equipped with platinum-coated titanium electrodes where ionization takes place.



Cations, positive ions, gather at the negative electrodes to create cathodic water (reduced water). Anions, negatively charged ions, gather at the positive electrode to make anodic water (oxidized water).

Through electrolysis, reduced water not only gains an excess amount of electrons (e-), but the cluster of H₂O seem to be reduced in size from about 10 to 13 molecules per cluster to 5 to 6 molecules per cluster.

The reduced water comes out of the faucet, and the oxidized water comes out of a separate hose leading into the sink.

This **reduced** ionised water may be used for drinking or cooking. The oxidation potential of the **oxidized** water makes it a good sterilizing agent, ideal for washing hands, bathing skin infections, cleaning food or kitchen utensils, and treating minor wounds.

Horses with horses: Redox Potential Comparison

Why you can't compare non-electronic water filters with Ionizing Water Filters.

After electrolysis of the water inside the unit, reduced water comes out of the cathodic side and oxidized water comes out of the anodic side. Note the variations in measurements of these three types of water: tap water before electrolysis, the reduced water, and the oxidized water.

Water ORP (Redox potential) pH Comments:

TAP WATER: +400 to +500 mV pH6-5-7.5 Minimal oxidation potential

REDUCED WATER: -100 to -350 mV, pH8 to 8.5 Good reduction potential, containing a large mass of electrons available for neutralization of free oxygen radicals.

OXIDIZED WATER: +700 to +800 mV, pH3.5 to 4.5 Strong oxidation potential, a reduced supply of electrons, causing sterilization and oxidation abilities.

So we can begin to understand why many scientists are saying that Redox potential, not pH, is the crucial health factor.

Traditionally we have judged the properties of water from the standpoint of pH, in other words whether water is acidic or alkaline. According to Dr. Yoshiaki Matsuo PhD., one contributor to the modern domestic ionizer, "In my opinion, redox potential is more important than pH. The importance of pH is over emphasized. For example, the average pH of blood is 7.4 and acidosis or alkalosis are defined according to deviation within the range of 7.4 +/- 0.005. But nothing has been discussed about ORP, or oxidation-reduction potential."

The pH of tap water is about pH **7**, or neutral. When tap water is ionized, output reduced water has a pH of about **8.5** and the oxidized water a pH of about **4**. Even if you were to make alkaline water of pH **9** by adding sodium hydroxide or make acidic water of pH **3** by adding hydrogen chloride, you would find little change in the ORP values of the two waters.

On the other hand, when you divide tap water with electrolysis you can see the ORP fluctuate by as much as +/- **1,000 mV**. This is how we obtain ionized water with 'negative ion potential' that is good for the body, and this is also why any device that **claims** to provide antioxidant effect but does not show ORP figures, is probably not doing it.

Summarizing, The unit produces two kinds of water with different redox potentials, one with a high reduction potential and the other with a high oxidation potential.

Reduced Water

When taken internally, the reduced water with its redox potential of -250 to -350 mV readily donates its electrons to oddball oxygen radicals and blocks the interaction of the active oxygen with normal molecules.



A biological molecule (BM) remains intact and undamaged

Undamaged biological molecules are less susceptible to infection and disease. The WATER IONIZER gives up an extra electron and reduces the active oxygen (AO), thus rendering it harmless. The AO is reduced without damaging surrounding biological molecules. Substances which have the ability to counteract active oxygen by supplying electrons are called scavengers. Reduced ionized water, therefore, can be called scavenging water.

When taken internally, the effects of reduced water are immediate.

Japanese scientists claim ionized water inhibits excessive fermentation in the digestive tract by reducing indirectly metabolites such as hydrogen sulfide, ammonia, histamines, indoles, phenols and scatoles, resulting in a cleaner stool within days after reduced water is taken on a regular basis. (See our Clinical studies Pages) **In 1965 the Ministry of Welfare of Japan confirmed that reduced water obtained from electrolysis can prevent abnormal fermentation of intestinal microbes.**

Oxidized Water

Oxidized water with its redox potential of +1100 mV is an oxidizing agent that can withdraw electrons from bacteria and kill them. The oxidized water from the **WATER IONIZER** can be used to clean hands, kitchen utensils, fresh vegetables and fruits, and to sterilize cutting boards and minor wounds. Tests have shown that oxidized water can be used effectively to treat athlete's foot, minor burns, insect bites, scratches, and so on.

Other apparatus are capable of producing super oxide water with a redox potential of +1,100 mV or more, and a pH lower than 2.7. Tests have shown that this superoxide water can quickly destroy MRSA (Methicillin Resistant Staphylococcus Aureus).

Although super oxide water is a powerful sterilizing agent, it won't harm the skin. In fact, it can be used to heal. Superoxide water has proven effective in American and Japanese hospitals in the treatment of bedsores and operative wounds with complicated infections.

Another application of superoxide water is in the field of agriculture where it has been used effectively on plants to kill fungi and other plant diseases. Superoxide water is non-toxic, so agricultural workers can apply it without wearing special protective equipment because there is no danger of skin or respiratory damage. An added benefit of using superoxide water to spray plants is that there is no danger to the environment caused by the accumulation of toxic chemicals in the ground.

THE WATER IONIZER: is it superior to an antioxidant diet?

It is surprising that many of us don't realize that the bulk of what we eat is composed of water. Vegetables and fruits are 90% water; fish and meat are about 70% water as well.

Even advocates of the importance of vitamin C in diet admit that its potency, (*the redox potential*) of this important vitamin, rapidly diminishes with age and preparation for the dining table.

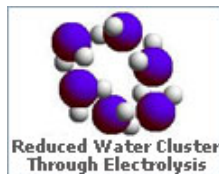
Carbohydrates, the main consistent of vegetables and fruit, has a molecular weight of 180. Water has a much lower molecular weight of 18.

IONIZED WATER, therefore, with its low molecular weight and high reduction potential, makes a superior scavenging agent of active oxygen. It not only charges the reduced water with electrons, it also reduces the size of reduced water molecule clusters.

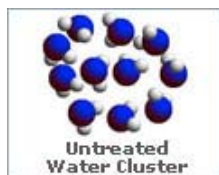
Molecular Weight Compared	
Substances	Molecular Weight
Ionized Water	18
Beta-carotene	150
Vitamin E	153
Vitamin C	176

NMR (Nuclear Magnetic Resonance) analysis reveals that tap water and well water consists of clusters of 10 to 13 H₂O molecules. Electrolysis of water in the **IONIZER** unit reduces these clusters to about half their normal size -- 5 to 6 water molecules per cluster.

IONIZED WATER is more readily absorbed by the body than tap water, filtered, distilled, Reverse Osmosis or even rain water. Japanese and Korean scientists claim Ionized water quickly permeates the

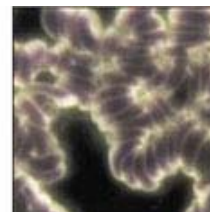
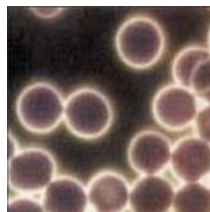


body and blocks the oxidation of biological molecules by donating its abundant electrons to active oxygen.



Enabling biological molecules to replace themselves naturally without damage caused by oxidation that can cause diseases.

Blood sample of Ionized water user



Blood sample of non-user. Note clumped cells.

SUMMARY : Upstream and downstream theory

Can we prevent disease at the source?

According to Dr. Hidemitsu Hayashi, Director of the Water Institute of Japan, "To eliminate the pollutants in a large stream that is contaminated at its source, we must work on the problems upstream at the headwaters -- the source of the pollution -- not downstream where we can only try to treat the evidence of damage caused by the pollution. The contribution of Ionized Water to preventive medicine is essentially upstream treatment."

UPSTREAM

According to our model, we consider the digestive tract upstream where we intake water and food. Although many people today in developed countries are growing more skeptical about what they eat, they tend to concentrate more on what the food contains rather than the metabolized products of foods in the digestive tract.

DOWNSTREAM

Downstream from the digestive tract, starting at the liver, reduced ionized water quickly enters the liver and other organs due to, first, its lower molecular weight, and, secondly, the size of its clusters. At tissue sites throughout the body, reduced ionized water with its safe, yet potent reduction potential readily donates its passenger electrons freely to active oxygen and neutralizes them so they cannot damage the molecules of healthy cells. Normal cells are protected from the electron thievery of active oxygen and allowed to grow, mature, function and regenerate without interference from rogue, oddball oxygen radicals which tend to steal the electrons from the molecules of normal, healthy biological molecules.

The statements enclosed herein have not been evaluated by the Food and Drug Administration. The products mentioned on this site are not intended to diagnose, treat, cure, or prevent any disease. Information and statements made are for education purposes and are not intended to replace the advice of your family doctor.

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[Water Ionizer Comparison Chart](#)

[Special Report -- Balancing Your Body With Alkaline Water](#)

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Alkaline ionized water is an effective tool to help your body achieve balance and right now with the KYK Harmony, the technology is better than ever.