

An Introduction to Ionization

Negative Hydrogen

An ionization footbath passes direct electrical current through water to break apart the H₂O (water) molecule. This releases oxygen, stable hydrogen and the negative hydrogen ion (H⁻). This negative hydrogen ion is a powerful antioxidant and pro-oxidant (in the presence of transitional metals), pH balancer and the catalyst most responsible for ATP (adenosine tri-phosphate) production, our body's greatest energy resource. In the past, we received the negative hydrogen we needed through the consumption of raw vegetables and light proteins but modern processing, storage and handling has virtually stripped the modern diet of this increasingly vital element. Gentle and relaxing footbath sessions allow the body to uptake this "fuel of life", which is essential in balancing and reenergizing the body's natural ability to purge toxins and heal itself.

What is negative hydrogen (-H)?

Everyone knows that the body needs oxygen in order to live. So much emphasis has been placed on oxygen as the essential element allowing us to exist on Earth that we tend to forget the other equally essential element, namely hydrogen. Without hydrogen to combine with oxygen we wouldn't have water. Oxygen burns hydrogen in the living system, releasing the energy that runs our bodies. Hydrogen is "the fuel of life." It is essential to most biological processes in its atomic form, positive proton form or negative ion form. Studies have shown that the human body stores hydrogen in its tissues. As we age, tissue hydrogen-depletion may lead to many of the symptoms of the aging process. This may cause sub-clinical dehydration since it appears that hydrogen may play a role in hydrating our cells. Hydrogen makes up 90% of the matter in the known Universe; helium makes up 9%. All the other elements in the Universe are found in the remaining 1%. Since hydrogen is so abundant, you would think that we know all there is to know about it, but we are just now learning about its importance in the living system.

The word hydrogen comes from the Greek language and it means "water-former". Indeed, we all know that water, the matrix or mother of life, is made from hydrogen and oxygen. In fact, water is formed when hydrogen is burned by oxygen. We create pure water every day as a product of our metabolism. When we burn hydrogen in our cells, the energy that is released is used to run our bodies. Hydrogen is the lightest and smallest element known to science. Due to its small size, hydrogen easily travels throughout the body. It can also loosely hold another electron (in its outer shell), in which case it is called H minus (H⁻) or reduced hydrogen. No electron moves in the living system unless it is accompanied by hydrogen. In the absence of an adequate supply of negative hydrogen ions, intracellular function, intercellular communication and energy production are inhibited, toxins and free radicals accumulate and health deteriorates.

ATP

Inside all cells are varying numbers of small energy factories, known as mitochondria. The more active the tissue, the greater the number of mitochondria. These mitochondria produce the energy currency of the body called ATP (adenosine tri-phosphate). Adenosine tri-phosphate is a biochemical energy battery that supplies almost all the energy needs of the human body. Hydrogen produces ATP molecules by moving electrons along the mitochondrial electron transport chain. Our purpose of eating food is to ultimately create ATP, which could be called the source of life's energy. Hydrogen from food supplies the needed protons and electrons for the mitochondrial electron transport chain to make ATP. We each use about one-half pound of pure hydrogen every day just for the production of ATP. Attaching hydrogen to a molecule means lending energy to it. Since in hydrogen the electron and proton are loosely coupled, by attaching a hydrogen atom we essentially attach an electron.

Free Radicals and Antioxidants

High levels of free radicals are a major cause of aging, as well as many acute and chronic diseases. A free radical is a toxic compound that has lost a negatively charged electron, produced in the body as a by-product of metabolic oxidation. It therefore carries a positive charge and is unstable. It is capable of attracting an electron away from a vital cellular site such as the electron-rich DNA. Loss of an electron can damage a cell and alter its ability to perform its special function or to replicate itself normally. Levels of free radicals are higher in people exposed to air or water pollution, commercial animal products, toxic chemicals, or cigarette smoke. An antioxidant is a compound, which has a weak attraction to one of its electrons. It therefore readily surrenders an electron to a free radical, stabilizing and neutralizing the free radical, which then becomes a stable compound. Having surrendered an electron, the antioxidant itself may temporarily become a free radical, but a less aggressive one until it captures an electron from another antioxidant, to replace the one given up, in a cascade of electron transfers to milder, and milder, and less damaging compounds.

Negative hydrogen, however, is the one, unique antioxidant that does not become a free radical. The electron it surrenders is an extra electron. The negative hydrogen ion becomes stable hydrogen, balanced with one electron and one proton. Antioxidant compounds are produced by the body, but are also obtained either from food or from dietary supplements. Vitamin C, Beta-carotene, vitamin E, and selenium are well known as water and fat soluble antioxidants, found in fruits, vegetables and phytonutrient supplements such as spirulina plankton. Another antioxidant compound is proanthocyanidins, extracted from grape seeds, or pine bark. It is significant to this discussion to realize that each molecule of an antioxidant compound, no matter how large the molecule, surrenders only one electron. The hydrogen atom is the smallest of all elements and has as much antioxidant power as the large, complex compounds described above. Since the H⁻ form is prevalent in nature it could be called an ever present antioxidant. Hydrogen when in the hydride (H⁻) state is found in most fresh fruits and vegetables, as well as in actively moving water.

Cellular Conductivity

The living system contains numerous chemical messengers that carry information and trigger events in metabolism. Virtually every action that takes place in the body requires communication of chemical messages from one cell to another, conducted by electrons passing through extra cellular fluids. An optimal level of conductivity in these fluids is essential to life and all activity. Albert Szent-Gyorgyi, the Nobel laureate who discovered Vitamin C, found that the tissues of the animal body store hydrogen in vast quantities. Different organ tissues "pool" hydrogen in different amounts. For example, he found that the order of hydrogen-pooling is the following:

Liver > Intestine > Kidney > Heart > Lung > Spleen

Liver tissues store the most hydrogen, while the spleen stores the least. This is interesting in view of the fact that the liver is the body's first line of defense and needs a supply of the most antioxidants in order to do its work of detoxification.

Aging

Transport of hydrogen is the missing factor in the search for the cause of the aging process and the secret to age reversal. As we grow older, our cells become dehydrated and our hydrogen pool becomes depleted. The hydrogen pool protects our cells from free-radical damage. Free radicals are responsible for the aging process. There is a paradox in medicine, and that is the fact that oxygen is the source of all life and is also the major cause of aging. Much effort is being expended to find powerful antioxidants that may control or reverse cell damage by oxidative free-radicals. The single factor that is common to all antioxidants is that they are sources of hydrogen. Hydrogen is the ultimate antioxidant.

Carbon Cycle

We have all heard about the carbon cycle in biology. The carbon cycle is the process by which plants use sunlight and water to create carbohydrates and other food stuffs. These are then used as food by animals that eat the plants. Animals exhale carbon dioxide gas which is then taken up by plants. The plants then use the carbon to make more carbohydrates, proteins and lipids (fats) which then serve as animal food. The carbon cycle could actually be renamed the hydrogen cycle. Plants create carbohydrates, proteins and lipids by attaching hydrogen to carbon atoms like hats on a hat-rack. Carbohydrates contain an equal amount of carbon, hydrogen and oxygen. We can say that all the foods that nourish us are primarily sources of hydrogen. We can see that the life cycle is

really a hydrogen cycle. The "burning of the hydrogen" is a secret of life. Life energy is controlled by burning hydrogen.

Free hydrogen that is released from the carbohydrates, proteins and lipids are carried into the mitochondria (power plant in each cell) by a process known as the hydrogen shuttle where they are used to make ATP. In this process, hydrogen is burned by oxygen, releasing energy. The final product from the burning of hydrogen is water. This extra water is eliminated from the body and is eventually taken up by plants and split by photosynthesis to make more carbohydrates, proteins and lipids. In biological systems, hydrogen and electrons travel together in pairs. When this combination meets up with a positively charged cell-damaging free radical, the hydrogen may react with the free radical and neutralize it so that no further cell damage may occur.

By consuming large quantities every day a new transport system is created that makes hydrogen available to the cells without first having to be attached to food. These electrons are available in the gastrointestinal tract to neutralize free radicals that occur from poor digestion and microbial imbalance.

Since hydrogen bonds are the "glue" that holds together the molecules in the DNA double helix, these bonds can be activated and energized. As we age, the DNA helix coils tighter and tighter, losing flexibility. This contraction of the DNA coil may reduce the number of times that our cells can divide. Normally, our cells can only divide about 50 times before they cease reproduction. If we are able to loosen the DNA helix by activating the DNA hydrogen bonds, it will have a profound effect on our ability to increase the regeneration of our cells. The DNA helix floats in water and is therefore hydrated. The tightening of the helix with aging may be a reflection of the loss of the hydrogen pool with aging. By restoring a plentiful supply of the hydrogen pool, these spirals naturally unwind and regain their ability to stimulate cellular reproduction. Symptoms of hydrogen depletion include chronic fatigue, depression, hormone imbalances and indigestion. As our tissues are depleted of hydrogen, they become stiff and lose flexibility. Dehydrated tendons and muscles tear more easily, and dehydrated bones become brittle. Loss of lung flexibility leads to loss of oxygen. By replenishing our hydrogen stores, we can relieve many of these conditions brought about by hydrogen depletion.

The human body becomes toxic or polluted from both external (exogenous) sources and internal (endogenous) sources. The most common external pathways of toxicity are from inhalation (smoking, air pollution, dental amalgam fillings, sick buildings), ingestion (chemical residues on food, chemicals in water, drugs) injection (vaccinations, flu shots, tattoos), absorption (chemicals from synthetic fabrics, paints, plastics, pesticides and chemical fertilizers sprayed on lawns) and irradiation (medical x-rays, nuclear power plants, bomb testing, uranium mine tailings, cell phones and towers, computer monitors and televisions, microwave ovens, and power grid and radio and satellite transmissions). The internal sources of toxicity are from fermentation, putrefaction, and rancidity from undigested foods consumed, and from dehydration, malnutrition, and toxic thoughts and emotions. This endogenous toxicity can also be caused from the effects of exogenous toxins contributing to malnutrition, and inhibition of digestion through damage to the nervous system, immune system, and enzyme systems.

There are 70,000 chemicals being used in commercial production in the US. The EPA has classified 65,000 of them potentially, if not definitely hazardous to human health. Over 6,000 new chemicals are tested in the US each week! Three thousand chemicals have been identified as intentionally added to food supplies and over 700 in drinking water. During food processing and storage, more than 10,000 other compounds can become an integral part of many commonly used foods. One of the major symptoms of chemical toxicity seems to be a breakdown of the immune function, which encourages all kinds of symptoms in the body. Another major symptom is damage to the nervous system and nervousness. We aren't rewarded immediately with good health and radiant well-being as soon as we change our "evil ways." The vast increase of chemicals in our environment, foods and medicines has greatly altered the body's ability to rid itself of toxins. Often, the recovery of health and improvement of the diet cause unpleasant symptoms. People truly seeking health have to decide to sacrifice their old comfortable diet patterns and habits to be rewarded by good health. It doesn't take long before they discover that after improving their diet, they sometimes feel much worse (temporarily). A common complaint is, "Do I really have to go through that?" They're going through what is called detoxification. Poor health and illness is progressive; it does not occur overnight. Good health and well being is also progressive; it may take weeks, months, or years.

Body Cycles

Life is a series of cycles of energy production, storage, and discharge. This general cycle defines all living organisms, from one-celled algae to man. All of nature follows the 24-hour cycle of a day. All creatures, from the oyster to the elephant, follow a daily pattern of work and rest, sleep and activity. There are biological rhythms within the body that dictate periods of tissue repair, tissue growth, waste elimination, and so forth. Body temperature, blood pressure, brain activity, hormone levels, and a host of other factors obey this rhythm, which scientists call circadian. Circadian rhythms are a blend of interaction of an internal clock and external cues of the earth's

magnetism, electrical fields, gravitational fields and cosmic radiation, even the movement of other planets. Each of our twelve acupuncture meridians in our body has a two-hour period of heightened activity, together, totaling 24-hours--the circadian cycle of the earth's rotation. The body has bio-rhythms of 14-days for the physical, 28-days for the emotional and 33-days for the mental aspects of ourselves. Healing occurs in cycles. Some days the body has a high-energy level and it rebuilds damaged tissues. On such days, we may feel great. On other days, the body must do its detoxification and remove accumulated toxins. When this happens, we may experience low levels of energy or even depression.

Most people lead a lifestyle and follow a diet that inhibits the body in its cyclical work. For instance, when the body is cleansing itself via a cold, people become impatient. They try to suppress the cleansing cycle with drugs or food and the body must abandon its efforts. The body behaves in a sort of roller-coaster fashion as it conducts its detoxification process. One day it may cleanse heavily and we feel like death warmed over. The next day, the toxins have been removed and we feel great. We feel so great, in fact, that the body decides to dig a little deeper and remove some of the older toxins, and then we feel worse. This is a continuing cycle in the process of healing. Once a certain level of health has been reached, we don't notice the cycles as much and they cause progressively less discomfort. The body goes through increased detoxification and healing crisis with every change of season. Notice how people seem to get sick at those particular times of the year. Fasting for 7-10 days with each seasonal change is practiced by those who understand the benefit gained from helping the body during these natural times of cleansing.

The Body's Infinite Wisdom

Your body wants to live forever; it wants to be free from all pain and illness; it actively desires complete healing to take place within it at all times. Your body is your friend and partner in your effort to regain health. The body has the innate capacity, knowledge, and wisdom to heal itself at any time--if it is allowed to do so. The body possesses its own healing ability and the wisdom to direct this ability. The only thing we must do is let the body conduct its work with as little interference as possible. We can furnish it with the highest-quality raw foods when it needs it or abstain from food when it doesn't desire it. We can exercise and rest the body, and give it fresh air and sunshine. Other than that, all we can really do is wait patiently and intelligently and not become alarmed by the symptoms of its healing or try to suppress those symptoms--even if we are healing heart disease, cancer, AIDS, or any other degenerative condition. If you have faith and trust in your body's ability to heal itself, the unpleasant symptoms, which may accompany this healing, become more bearable and are not a source of fear or misgiving. Ultimately, we must let our body perform its health-restoring work at its own pace. The real doctor is within--the body alone is capable of performing all the needed healing functions. The cellular intelligence driving the body is infinite in its capacity. We need not have any fears about its wisdom or ability to restore itself to the highest-possible level of health and well-being.

The Liver

The liver is one of the most important organs in the body when it comes to detoxifying or getting rid of foreign substances or toxins. Glutathione, the most abundant sulfhydryl in the body, functions to chelate and detoxify heavy metals; mercury and lead have also been shown to combine or complex with glutathione. Once complexed together, the bile becomes a major route used by the body to excrete the complex, thereby reducing the amount of glutathione available. The primary source of the sulfur portion of cysteine is methionine. Cysteine cannot be taken up by hepatocytes (liver cells) easily, whereas methionine is taken up more readily, and is then metabolized into S-adenosylmethionine, homocysteine, cystathione, and cysteine. Cancer cells utilize methionine in order to grow and proliferate.

Cancer or tumor dependence on methionine for growth is an artificial condition, brought about by some earlier failure in the transsulfuration and transmethylation pathways. Therefore, if the availability of methionine is reduced, not only will the capability of the liver to detoxify be impaired, but there will also be less glutathione available to complex with foreign substances. Studies have demonstrated that a deficiency of methionine can, in itself, cause liver cancer without the presence of a carcinogen, and also that the deficiency of methionine can permit a heavy metal to cause toxic effects.

The Colon

The colon is the sewer of your body. If it's not cleansed, the waste from head to toes can't get out. According to some estimates, about 70 million Americans suffer from bowel problems. These statistics cover only those people whose problems are severe enough to cause them to consult a medical doctor. The body's tissues won't eliminate wastes unless the colon is working. The bodily systems are connected. When the colon is cleaned out, the body will

start pulling poisons out from everywhere, because it can. Wastes from the colon can leak out and pollute other organs. Other organs can be treated with natural methods--with only partial results--because these organs keep getting re-infected or re-irritated by poisons from the colon. The impacted colon creates diverticulosis which are herniations or pockets in the wall of the colon that contain fecal matter. If it stays in there long enough, it will leak into your body and cause what is called auto-intoxication. These diverticula cannot usually be detected inside the colon with colonoscopy, but on the outside of the colon where you can't see. The bowel pockets leak pus, blood, and fecal matter back into the bloodstream.

When the body is toxic, the cells cannot receive nutrients from the blood because the interstitial fluid surrounding the cells is plugged-up with wastes from sluggish lymphatics. This internal poisoning also causes mental depression and morbid thoughts. It's a vicious cycle--one condition feeding the other like a dog chasing its tail. Most people, instead of cleaning out their colons use incense, air wicks, underarm deodorants, foot powder, mouthwash, toothpaste, breath fresheners, perfumed sprays and colognes to cover up their stink because they are filled with impacted fecal matter. If the colon doesn't get cleansed, the other organs can't cleanse their waste. If a person can't get the bowels cleaned out, even if they clean the plaque out of the arteries--it's going to go back into the body. They'll just re-absorb it. Unless they clean out the colon, they will never regain vibrant health.

The Kidneys

The principle task of the kidney is to preserve the volume and composition of the extracellular fluid constant. This it must do despite a varying outside environment, and varying input. A part of this task--but only a part--is to remove from the body some of the waste by-products of metabolism which the cells cannot break down further. Thus the principal function of the kidney is not excretion, but regulation. We can move and live on dry land, even though we are three-quarters water, and survive; our cells tucked away in a carefully preserved ocean of extracellular fluid, whose composition is guarded with exquisite accuracy by the kidneys, a major part of our life-support system in this hostile environment. We can roam into deserts, and (usually) survive, or drink a six-pack of beer, or starve, or gorge, but essentially the extracellular soup remains of a constant composition, and because of this, the composition of the cells themselves is constant.

The kidney is less in control of the intracellular water, since if the kidneys do their job adequately, each cell is largely autonomous, and will extract and eject what it needs or does not need from the extracellular fluid. The kidney conserves what we need, but even more, it permits us the freedom of excess. That is, it allows us to take in more than we need of many necessities--water and salt for example--and excretes exactly what is not required. This is essential, since neither our ancestors nor we, animal or human know the composition of the foods we eat, and the only way to ensure a sufficiency of everything is to eat an excess of at least some. Finally, the kidneys preserve the volume of our body fluids as well as their composition. Given that we're almost $\frac{3}{4}$ water, quite simply weighing yourself each day can assess the precision with which the kidney achieves this.

Despite variations in diet, exercise or fluid intake, the figures remain constant. The kidney performs its tasks, with a precision of as good as 1% and never worse than 5%, under extremely varying circumstances. If the kidneys fail suddenly, death occurs after a few days, partly because some of the accumulated metabolic waste products are toxic to the heart, which stops. More interesting, is the way in which the kidney can adapt to slow destruction by dysfunction, so that one can survive on as little as 5% of overall kidney function. The kidney has greater reserve capacity in the face of disorder than (for example) the heart or the lungs.

Lymphatic System

Nearly 80% of your total body weight is water. One-third of your body fluid is extracellular, meaning that it's outside the cells. But only 12% of your body fluid is blood and 62% of your bodily fluid is inside the cells. What that means is that 36% of your fluid is lymph. Lymph is the fluid that surrounds all the cells. It is the cell's environment. There's 3-times more lymph fluid in the body than blood. Not all cells are surrounded by water. Bone minerals surround the bone cells. But all cells depend directly on extracellular water for food. The lymph fluid through minute channels feeds even bone cells. When waste material leaves the body cells, the two circulating body fluids, the blood and the lymph carry it away. The lymph is formed out of the blood but contains no red blood cells. Each cell in the body is bathed by the interstitial fluid, which consists of material from the bloodstream together with substances passed out of the cells. About 90% of the water and small molecules entering the interstitial fluid from the bloodstream are reabsorbed by local blood vessels. The remaining 10% of the water and small molecules plus the protein, other large molecules, and particles in the interstitial fluid collect in a network of tiny vessels.

The lymph vessels combine into larger ducts that eventually empty back into the blood stream. The lymph vessels contain one-way valves and are lined with muscle tissue that pumps the lymph through these valves. Because the lymphatic system carries away toxins from all body cells, its proper functioning is important to the health of the

entire body. Lymph is filled with nutrients on their way to the cells, waste products thrown off by the cells hormones, and enzymes. Leukocytes, lymphocytes, monocytes, antibodies and other white blood cells are able to travel wherever water exists. Just as the air around your body is in motion constantly, the lymph fluid that surrounds the cells is also in constant motion. Cells are able to function better with fresh lymph fluid filled with the proper concentrations of hydrogen, oxygen, glucose and all other nutrients. Valves exist in all lymph channels. In the large lymphatics, valves exist every few millimeters, and in the smaller lymphatics, the valves are much closer than this. Motion pictures of exposed lymph vessels show that when a lymph vessel becomes stretched with fluid, the smooth muscles in the wall of the vessel automatically contract.

Furthermore, each segment of the lymph vessel between successive valves functions as a separate automatic pump. That is, the filling of a segment causes it to contract and the fluid is pumped through the valve to the next lymph segment. This fills the subsequent segment and a few seconds later, it too contracts. The process continues all along the lymphatic system until the fluid is finally emptied back into the blood stream from the thoracic duct into the vena cava right underneath the collarbones. When fresh supplies replace the waste products of cells--the toxins, bacteria viruses, poisons, trash and debris--cells are healthier, and so are you. The removal of proteins from the interstitial spaces is an absolutely essential function, without which we would die within 24 hours. The colon is the principal organ through which mucoid matter from the lymph is eliminated.

When the lymphatic system becomes extremely full of mucoid material, a pressure is created that is felt all over the body. It starts as a tension in the muscles that becomes an aching of the muscles as the pressure increases. One function of a fever is to thin the lymph mucoid, improving its ability to flow and to pass through the walls of the colon. All lymph-purifying influences reduce fever by lessening the necessity for using fever to thin the lymph. If the colon cannot perform the necessary rate of purification of the lymph, then the body uses the liver to do the work instead. The toxins taken up by the liver are excreted as part of the bile. When the flow of bile becomes excessive, bile backs up into the stomach, and the result is nausea. Most grasses are lymph purifiers, which is why animals eat grass when sick. Now we can see how problems can originate when the colon becomes clogged. When this happens, waste material gets backed up into the lymphatic system. As this process continues, waste material backs up into the body tissues and disease can result. This process can affect any body part because the lymphatic system serves all body cells.