

# Hydrogen Rich Water Research and Papers

Hydrogen Rich Water Research and Papers by Dr. Hayashi Hidemitsu, M.D and other Hydrogen Rich Water Researchers.

## A New Proposal Of 'Hydrogen-Enriched Water' Based Medicine

### A NEW PROPOSAL OF 'HYDROGEN-ENRICHED WATER' BASED MEDICINE

by Dr. Hidemitsu Hayashi, M.D, Water Institute

Presentation at the 6th Symposium on International Integrative Medicine

#### A FATE OF THE LIVES ON THE EARTH

##### **Oxidative damage**

About 21 % of air is occupied by oxygen which brings every life form, either plant or animal, to oxidative damage more or less, which could be said to be a kind of fate for it.

##### **Production of active oxygens**

At the same time, we are maintaining metabolism using oxygen taken by lungs by oxidizing food taken by mouth, which brings inevitably production of active oxygen species as a result.

In summary, we should keep in mind that we are always under the risk of oxidative damage, both externally and internally.

#### REALITY OF WATER : THE BIRTHPLACE OF LIVES

##### **Characteristic of water on the earth**

The existence of water on the earth has made it possible for living organisms to be born and exist there. It should be noticed that the reality of water on the earth has a common feature, namely water hardly contains hydrogen gas because of its character of being the lightest and the smallest element which results in rapid disappearing. Such kind of water could be called 'hydrogen-deleted or hydrogen-poor water'.

##### **Imperfection of 'hydrogen-deleted water'**

It could be postulated that life forms born in hydrogen-poor water should have faced the fatal risk, which forced them to develop a measure to fight against oxidative damage, namely antioxidative enzyme.

## Hydrogenase

A very important and interesting paper was submitted by R.P.Happe in 'Nature', 385, 126, '97. He says, the oldest life forms 'Desulfovibrio gigas (3.8 billion years old)', had developed an enzyme hydrogenase to activate hydrogen, namely to split molecular hydrogen to atomic or active hydrogen.

## A NEW CONCEPT; 'HYDROGEN-ENRICHED WATER'

Temporary hydrogen-enriched water

In Japan we have water treatment devices to reform water by way of electrolysis. Electrolysis of water produces anodic water with increased oxygen content, and cathodic water with increased hydrogen content which diminishes, however, rapidly because of nature of hydrogen itself.

Constant hydrogen-enriched water

In March 2001 cathodic water has been confirmed to lose its increased hydrogen gas in the first several minutes. So that cathodic water should be called 'temporary hydrogen-rich water'. A new approach was therefore necessary to cover the shortage of cathodic or temporary hydrogen-rich water. The new procedure developed by us is based on the following chemical formula, in which hydrogen gas can be produced when magnesium pellet is thrown into water.



## CLINICAL IMPROVEMENTS OBTAINED FROM INTAKE OF HYDROGEN-ENRICHED WATER (1985-2005)

- Improvement of blood sugar and HbA1c levels in diabetes
- Improvement of liver function in hepatic diseases.
- Improvement of uric acid levels in gout.
- Improvement of cholesterol levels.
- Improvement of gastroduodenal ulcers.
- Improvement of hypertensive or hypotensive disorders
- Improvement of hypersensitive disorders; urticaria etc.
- Improvement of autoimmune disorders; rheumatism, SLE, etc.
- Improvement of dismenorrhea, climacteric disorders.
- Improvement of malignant tumors; hepatoma, cancer, etc.

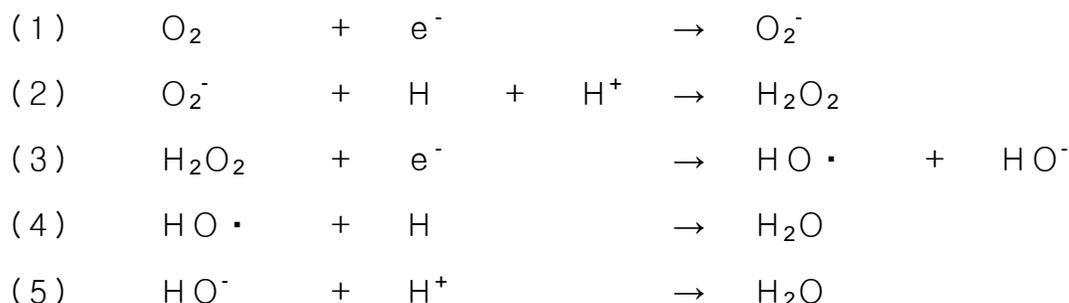
Since 1990, the expression of 'Active oxygen species should be major cause for every disease' has become very popular in medical field. It has become possible, therefore, to postulate that abundant hydrogen in drinking water should have played vital roles in scavenging active oxygen species.

In other words, such postulation only could explain well the reason why various improvements described above could have been obtained from intake of hydrogen-rich water.

## SCAVENGING ACTIVE OXYGENS

Water Regulating Theory (Hayashi's Model)

Molecular hydrogen in our drinking water, when taken into our body, should be splitted to atomic or active hydrogen by help of hydrogenase which should reduce active oxygens resulting in production of H<sub>2</sub>O.



### Reality of antioxidants

Vitamin C or ascorbic acid is known to be antioxidant, which, however, makes dehydroascorbic acid when oxidized by active oxygens, which might damage DNA which can be called as one of unfavorable side effects. It can be said that REDOX reaction is nothing but successive chain reaction, which could give a risk of unexpected production of new chemical compounds with side effects. On the contrary, active hydrogen derived from hydrogen-rich water makes nothing but H<sub>2</sub>O after reduction of active oxygen species as shown in above formula giving no risk of side effect production.

### CONCLUSION

Disease should originally be defined to be contradiction for every living organism, which lives on the principle of living organism, self and family maintenance along with evolution. Why then, has such a big contradiction been disregarded for such a long time, namely since the birth of human medicine? The answer for it should be in water, on which all life forms have been dependent; water poor in hydrogen, and hence being insufficient to reduce or scavenge active oxygen species.

In other words, if they might depend on hydrogen-rich water in their daily lives, they might fulfill health and longevity relatively easily, which means contradiction for them can be conquered in a future, so is my theory and belief.

July 17, 2005

# Active Hydrogen Water Saves Mankind

**Active Hydrogen Water Saves Mankind**  
Hidemitsu Hayashi, M.D., Water Institute

It is reported that 'WUNDERWASSER' or water found in a cavern in Nordenau, Germany, several years ago is very effective in treating a variety of diseases, as well as traumatic injuries. Clinical improvements have been observed in eighty percent of the patients who took wonder water in Nordenau.

The Hygienics Institute of Gelsenkirchen, however, cannot elucidate as to why the water can bring such wonderful and rapid recoveries from various disorders.

The water was brought to Prof. Shirahata, of Kyushu University ( Laboratory of Cellular Regulation Technology) for investigation.

Let us discuss why the water in Nordenau can be called 'wonder water'.

**1. Water consists of solvent and solute..** It is important to recognize that water consists of solvent, or H<sub>2</sub>O and solute or minerals dissolved in the solvent, or H<sub>2</sub>O. It should also be noticed that the latter could have no significance in the absence of the former. The former, solvent, is the very prerequisite of the latter : solute.

**2. H<sub>2</sub>O is a compound of reductants and oxidants.** Hydrogen (H) is an essential reductant. While, oxygen (O) is an essential oxidant. Therefore, it should be said that solvent or H<sub>2</sub>O is a compound of reductant and oxidant. This kind of standpoint is imperative in the evaluation of water as a whole.

### **3. Three fundamental conditions of water**

It is important to notice that DO(Dissolved Oxygen), DH(Dissolved Hydrogen) and RP(Redox Potential) are three fundamental conditions in the evaluation of water property. Evaluation of water without consideration of the above three conditions will

be in vain, which has been the most fatal cause of mistakes made in the investigation of property of water in the past.

**4. Characteristics of Reduced Water** Characteristics of Reduced water obtained from electrolysis are as follows : It must be observed that low DO in our drinking water can be expected to produce a lesser amount of active oxygen species when taken by us.

	<b>DO (ppm)</b>	<b>DH (ppb)</b>	<b>RP (mV)</b>	<b>PH</b>
Original water (tap water)	10.0	2.3 – 2.6	+652	7.5
Reduced Water	8.6	690 – 720	-247	10.3

High DH and negative RP of reduced water is the result of production of atomic as well as molecular hydrogen in the cathodic cell.

**5. Active hydrogen in reduced water.** Active oxygen species are reckoned to deactivate enzymes in the cells, damage DNA and destroy lipid membranes, which might cause every possible disease. It could be said that ‘active hydrogen’ should be the ideal antioxidant against active oxygen species.

**The existence of active hydrogen in reduced water was proven by Prof. Shirahata.** (Electrolyzed-Reduced Water Scavenges Active Oxygen Species and Protects DNA from Oxidative Damage, Biochemical and Biophysical Research Communications, 234, 269, 1997.)

**6. Hydrogenase of 3.8 billion years ago** Happe and Bagley reported, ‘Hydrogenases are enzymes that can reversibly split molecular hydrogen...the crystal structure at 2.85 resolution of a Ni/Fe hydrogenase (from the bacterium Desulfovibrio gigas) was reported...Ni/Fe hydrogenases are among the oldest enzymes (3.8 billion years old), demonstrating early life forms had developed an effective way to active molecular hydrogen at ambient temperature and pH...(BIOLOGICAL ACTIVATION OF HYDROGEN, NATURE, 385, 126, 1997)

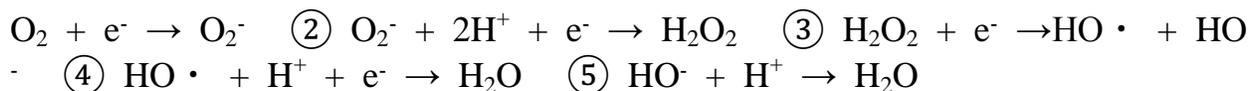
The above paper implies that early life forms should have developed hydrogenases to produce atomic hydrogen or ‘active hydrogen’, in order to scavenge active oxygen species which might threaten their existence.

**7. Active hydrogen found in water in Nordenau.** Active hydrogen was shown to exist in water in Nordenau by Prof. Shirahata. The finding implies that miraculous recovery from a variety of diseases obtained by the intake of water in Nordenau

should be brought about by the scavenging ability of the active hydrogen contained in it.

This fact can be supported by the findings in paper of Happe and Bagley, as well.

**8. Water Regulating Theory.** Living organisms originated in water. This fact implies that necessary conditions for birth and survival of them should exist in water. If not, no living organism could have originated in water. Oxidation by active oxygen species can cause every disease. While, reduction by active hydrogen should bring recovery from it. H<sub>2</sub>O is a compound of redox reaction of H and O, which produces not only H<sub>2</sub>O, O<sub>2</sub>, H<sup>+</sup> and e<sup>-</sup> but also 1O<sub>2</sub>, O<sub>2</sub><sup>-</sup>, H<sub>2</sub>O<sub>2</sub>, HO· which regulate life and death of living organisms. Active oxygen species such as 1O<sub>2</sub>, O<sub>2</sub><sup>-</sup>, H<sub>2</sub>O<sub>2</sub> or HO· can bring them to sickness, which can be, however, scavenged by active hydrogen, H (H<sup>+</sup> + e<sup>-</sup>), as shown below.



I proposed the hypothesis 'Water Regulating Theory (Hayashi's Model)', stating that each living organism is regulated by redox reaction in H<sub>2</sub>O (EXPLORE 6,28-31, 1995).

*Lewis Thomas described, 'For every disease there is a single key mechanism that dominated all others. If one can find it and then think one's way around it, one can control the disorder....'*

We are sure that a single key mechanism for getting sick, and the recovery of living organisms should be hidden in water, the place where they originated.

May 30, 1998

## **Clinical Applications Of Electrolyzed-Reduced Water**

**Clinical Applications Of Electrolyzed-Reduced Water**  
Hidemitsu Hayashi, M.D., Water Institute  
Munenori Kawamura, M.D., Kyowa Medical Clinic

JAACT 2000 FUKUOKA  
Symposium4 “Advanced Functional Foods and Water for Prevention of  
Disease”

1. A very important and interesting paper was submitted by Happe in January '97(1). He says : “ the oldest life forms ‘Desulfovibrio gigas’ 3.8 billion years old, had developed an enzyme ‘hydrogenase’, to activate hydrogen ; namely, to split molecular hydrogen into atomic hydrogen. Here, the question presented to us is why it was necessary for the oldest microbes to develop such an enzyme as hydrogenase “.

2. The answer to the question could be found in the paper submitted by Shirahata in May '97(2).

He says that the ideal scavenger for active oxygen should be ‘active hydrogen’. Active hydrogen, or atomic hydrogen, can be produced in reduced water near the cathode during electrolysis of water. Namely, the oldest life forms should have developed ‘hydrogenase’ in order to obtain ‘active hydrogen’, with which they could have succeeded in the fight against ‘active oxygen’ ; which, otherwise, should have had exterminated them. Now we can say that quite a new concept ( ‘active hydrogen’ )

as a scavenger, hardly known in the past, is presented. Every life form was originated in water, or H<sub>2</sub>O, which is produced as a benefit of hydrogen bond energy, a potent energy by which to bind hydrogen with oxygen. Hydrogen bond energy made it possible for hydrogen to bind with oxygen in order to produce H<sub>2</sub>O. According to this line of logic, we can say that the ideal countermeasure against active oxygen should be active hydrogen. Nothing could be a better scavenger than active hydrogen, as far as the principle of hydrogen bonding is concerned. All the discussions on scavengers carried out so far should be reconsidered, and reconstructed from their basic principles from now on.

3. In November '95 I presented a hypothesis known by the title : ‘Water Regulating Theory (Hayashi’s Model)’ in a US health magazine (3). It says that active oxygen could be scavenged or reduced by atomic hydrogen, which results in production of H<sub>2</sub>O to give again a birthplace for every life form (Fig1).

My hypothesis was born from the clinical observation study in our clinic. : Since May '85 we have confirmed thousands of clinical improvements,

obtained solely by exchanging drinking (as well as cooking water) from tap water to reduced water (tab.1). Those improvements were very exciting and some of them were considered to be miraculous at that time, when Shirahata's paper was not yet submitted. It should be remembered that such putrefied metabolites are the same ones which are produced as a result of putrefaction of protein. The difference lies only in the fact that the former putrefaction process is brought about by intestinal microbes, whereas the latter is brought about by airborne microbes (Fig.2, 3). Based on these facts, I proposed a hypothesis 'Pre-and posthepatic Organ Theory' in 1988, 1989 & 1990 at the International Symposium on 'Man and His Environment in Health and Disease' held at Dallas, Texas, USA (Fig.4).

I stated that, as it is impossible to purify the polluted water in the St.Laurence River without purifying the polluted water in Lake Ontario, so it should be impossible to improve the disorders of posthepatic organs, without trying to improve the disorder of prehepatic organs, namely putrefaction in gastrointestinal tract. Such clinical experiences have led us to recognize that reduced water is not only effective for restoration of intestinal flora metabolism, but also could be effective in scavenging active oxygen. Our clinical observation data, and my hypothesis, were delivered to

Prof. Shirahata in April 1996 and his research has since started.

4.Electrolysis means redox reaction, reduction and oxidation (4). Electrolysis of water produces H<sub>2</sub> gas at the cathode and O<sub>2</sub> gas at the anode respectively (Fig.5). When the amount of atomic hydrogen becomes saturated, molecular hydrogen (H<sub>2</sub> gas) is produced. We demonstrated in 1995 that reduced water contains increased molecular hydrogen by up to between 200 and 500 times, compared to that in original water before electrolysis (Tab.2). We can notice that reduced water contains both atomic and molecular hydrogen. Molecular hydrogen in reduced water is proven to be split to atomic hydrogen by Shirahata when it is brought into contact with the minerals in our body. And probably by hydrogenase, which should be inherited from our oldest ancestors, as suggested by Happe. The idea and means to reform water by electrolysis were developed in Japan about half a century ago. Such kinds of devices could be found nowhere but in Japan. The reason why should be found in the difference of water hardness. Japan is a country of soft water of (its hardness being around 50ppm), whereas hardness in London or Dallas is over 130ppm. Electrolysis can be said to be a principle of plating. Electrolysis of soft water brings little plating of cations such as calcium or magnesium on the surfaces of cathodes, whereas electrolysis of hard water

brings significant plating on electrodes, which should have made it possible for hard water countries to develop such devices. The problem of plating in hard water electrolysis has been, however, solved by a new technology 'Autochange-crossline system' developed several years ago in Japan, which was patented in the USA, Canada and Russia. Various types of researches by Shirahata have been made on the basis of these newly patented devices (Fig6).

5. All life forms were born in water. Therefore, it should be a logical to conclude that every necessary condition for birth and existence (as well as health and disease) of them should be hidden in water (Fig.7). Water or H<sub>2</sub>O is a compound of hydrogen, a reductant, and oxygen, an oxidant. Therefore, it can be said that all living organisms are under the control of reductants and oxidants, (i.e.under the control of reduction and oxidation). Redox reaction is the most universal, original and important principle on earth, regardless of its being organic or inorganic. In short, oxidation brings about sickness, and reduction restores us back to health again (Fig.8). It is logical to me that reaction of active hydrogen against active oxygen, although it is invisible to our eyes, must be an underlying principle. Yet the most original and principal reaction. Redox reaction should be hidden behind numerous 'visible' reactions, which we can examine and recognize by so-called clinical exam data (Fig.9). Living organisms originate in water. Unfortunately, however, the water upon which we all depend is nothing but 'hydrogen-poor water' because of potent hydrogen bond energy. And hydrogen-poor water is not sufficient to reduce active oxygen which had compelled *Desulfovibrio gigas* to develop hydrogenase, in order to obtain active hydrogen with which they could have tried to fight against active oxygen. By the same principle, hydrogen-poor water has predisposed us to suffer from various diseases, and has compelled us to develop procedures to fight against active oxygen. So-called a variety of medical procedures, instead of active hydrogen, which was quite a logical procedure developed by our oldest ancestors. It will be impossible to control diseases as long as we depend on hydrogen-poor water, with which we can not take enough advantage by reducing active oxygen to produce H<sub>2</sub>O, which, however, is nothing but hydrogen-poor water having predisposed us to get sick. On the contrary, when we depend on hydrogen-rich water, we can take enough advantage by reducing active oxygen with active hydrogen based on its original potentiality to bind with active oxygen derived from hydrogen bond energy itself.

Shirahata's paper means that cell metabolism, either microbial or cancerous, depends on its intracellular water, namely cell metabolism. This can vary

according to the property of intracellular water, i.e. hydrogen-rich or not.. And even cancer cells might lose their characteristic feature of unlimited proliferation when they are immersed in hydrogen-rich water, originated and developed in Japan, but totally unknown in the past throughout the world. The solution might now be in our hands. Our 'new water' should be the first choice for all of us to take, as has been suggested by Happe, Shirahata and ourselves.

### **Case presentation on improvements of diabetes, hepatoma & atopic dermatitis.**

Now, there could be no wonder why such clinical improvements have been obtained. In short, 'invisible reaction' of active hydrogen against active oxygen was regulated at first. As a result of it, 'visible reaction', so-called clinical exam data as well as clinical symptoms have been improved.

### REFERENCES

1. Happe B.P. et al, (1997) Nature,385, 126
2. Shirahata S. et al, (1997) Biochem.Biophys.Res.Comm., 234, 269-274
3. Hayashi,H., (1995) Explore,6,28-31
4. Electrolysis, A Concise Dictionary of Chemistry, page 106,Oxford University Press

## **Clinical Improvements Obtained From The Intake Of Reduced Water**

### **Clinical Improvements Obtained From The Intake Of Reduced Water** (Clinical studies from 1985 to 2000)

Hidemitsu Hayashi, M.D.,Water Institute  
Munenori Kawamura, M.D.,Kyowa Medical Clinic

1. Improvement of blood glucose and HbA1C levels in diabetes mellitus.
2. Improvement of peripheral circulation in diabetic gangrene.

3. Improvement of uric acid levels in gout.
4. Improvement of liver function in hepatic disease, cirrhosis of liver, hepatitis.
5. Improvement of gastroduodenal ulcers and prevention of recurrences.
6. Improvement of cholesterol level; hypertension, angina, myocardial infarction.
7. Improvement of hypersensitive disorders; atopic dermatitis, asthma, urticaria.
8. Improvement of autoimmune disorders; rheumatism, collagen disease, SLE.
9. Improvement of so called specific diseases; Behcet' syndrome, Crohn disease, ulcerative colitis, Kawasaki's disease.
10. Improvement of malignant tumors of liver; hepatoma, metastatic tumors.
11. Improvement of general malaise, chronic constipation & diarrhea as well as persistent diarrhea occurred after gastric resection.
12. Improvement of dehydration in infants with vomiting and diarrhea caused by viral infection
13. Improvement of hyperbilirubinemia in newborns
14. Experiences of pregnant women who took reduced water during their pregnancy; almost no emesis, smooth delivery, slight jaundice, enough lactation, smooth and satisfactory growth of newborns.

Devices to produce reduced water were introduced into our clinic in May 1985. Based on the clinical experiences obtained in the past 15 years, it can be said that introduction of electrolyzed-reduced water for drinking and cooking purpose for in-patients should be the very prerequisite in our daily medical practices.

It is because any dietary recipe cannot be a scientific one if property of water taken by the patients is not taken into consideration.

The Ministry of Health and Welfare in Japan announced in 1965 that the intake of reduced water is effective for restoration of intestinal flora metabolism.

# **Hydrogen+: The Key to Longevity and Wellness**

**Hydrogen+: The Key to Longevity and Wellness**  
**by Ralph Suddath**

**What causes disease to occur?**

Dr. Theodore A. Baroody reported that more than 2 million Americans die from physical illnesses each year, such as cardiovascular disease, cancer, respiratory diseases, diabetes and liver or kidney disease. What do these diseases have in common? In Dr. Baroody's opinion, your body was designed to be slightly alkaline - diseases are caused by and/or only thrive in a state of acidosis.

### **The Amazing Breakthrough**

In 1992, Russian medical doctor and researcher, Vladimir Volkov, claims that the cause of disease and aging is the absence of Hydrogen (H proton). Dr. Volkov is head of the Laboratory of Biorhythmic Researches of the Russian National Institute of Health. He believes that illnesses have a common phase: the blood becomes acidic or acidosis occurs. Dr. Volkov believes that the acidosis is a natural, necessary healing process. He feels that there is no recovery without acidosis.

The body's intelligence creates this acidosis condition in order to attempt to eliminate the toxins. Therefore, the acidosis is the main medical remedy against everything, and is prompted by the nature of the body. The majority of human diseases are accompanied by the acidation of an organism (acidosis).

An acidation is carried out by the proton (hydrogen). According to Dr. Volkov, if there is no proton, then there is no acidation, and thus, no recovery. He has conducted extensive research studies using proton (hydrogen) water on both animals and people and has had incredibly positive results. *More information about his work on Hydrogen (H Proton) can be found on his web site at <http://www.h-longevity.net>.*

### **What makes us age?**

Dr. Patrick Flanagan, a world famous health researcher, says: "All the symptoms of aging are in one way or another accompanied by a slow dehydration of our vital tissues associated with free radical oxidative damage." Drs. Patrick and Gale Flanagan developed a powder containing an abundance of negative hydrogen (H-) stabilized with colloidal silica. By dissolving a capsule in water, it acquires a high antioxidant or reducing quality.

The Flanagans' discovery, which has been submitted to the Nobel committee, was based on a tribe that lives in the Hunza valley in Pakistan. Not only does this tribe have average life duration of 110-120 years, they also never get sick, look young and have a much slower process of aging than that of other people. Thus, the Hunza valley has been called "an oasis of youth."

It was assumed that the secret of their longevity was due to the extraordinary physical properties of the local water. Based upon their research, the Flanagans made the conclusion that "the structure of water has a secret knowing which [allows us] to turn back the process of aging...The tissues of a human organism contain a large reserve of hydrogen. The depletion of this reserve with age results in the development of aging process signs...The hydrogen transport can be a missed factor in the search of the reason of the aging process... During the process of aging, the cells of our organism lose water, and a hydrogen pool, protecting the cells from [the] harmful actions of the free radicals, becomes exhausted. As a matter of fact, all researchers of the longevity phenomenon agree that the free radicals bear the responsibility for aging."

"We can assert," said the Flanagans, "that life actually is a turnover of hydrogen, and the riddle of life is in 'the burning of hydrogen'."

While the Flannagans believe that an H<sup>-</sup> product, an alkaline supplement, is important; Dr. Volkov states that the positive charges of a naked hydrogen ion, H<sup>+</sup>, which is a proton, is the strongest antioxidant. Dr. Volkov believes an acid belongs to the protons (H<sup>+</sup>) and no way to the negative ion of hydrogen (H<sup>-</sup>)."

Dr. Volkov believes that the fact that the most aggressive free radicals, which are the main destroyers of the cells, the hydroxyl radical [OH] and oxygen [O] radical, have a negative charge is largely ignored. The need for antioxidants is proven. In addition, according to Dr. Volkov, "The basic mass of antioxidants are acids (vitamin C, lactic acid, hemoglobin acid, amino acids, fatty acids, bile acids, all endogenic acids of an organism and exogenous acids from the food). Dr. Volkov's research suggests that the hydrogen proton is the premier antioxidant.

Another important role of H<sup>+</sup>, the Proton, is the production of ATP. Peter Mitchel, Ph.D. was given the Nobel Prize in 1978 for proving that positively charged hydrogen ions (protons) have the main role in cell adenosine triphosphoric acid (ATP) production. For normal functioning to occur, each cell of an organism should produce an energy and use it. There are no cells that work without ATP.

As we age our body contains less water. Dr. Volkov states that the water loss of an organism results from the organism's attempt to produce protons (H<sup>+</sup>): to take them from the water. He believes this shortage of hydrogen is the reason for human aging and illness.

Dr. Volkov asserts that carbonic acid is the best donor of protons in the organism. Dr. Volkov believes that carbonic acid is also the best antioxidant for an organism. The main carriers of hydrogen protons in the best periods of our life are Donors -- water and carbonic acid. Other hydrogen donors are amino acids and lactic acid.

## **Experiments with Mice by Russian Doctor Kostenko**

Dr. Kostenko has had surprising results that support Dr. Volkov's viewpoints. In discussing his experiments with one-year-old mice, Dr. Kostenko notes, "I was periodically making the acid washing of the mice...in the medium enriched with CO<sub>2</sub> (Carbonic Acid). The condition of their eyes, hair has improved, improvement of the DNA condition in comparison with the control group, i.e., the quantity of defects accumulating with age have decreased. The gain of average life duration was 131 percent, and four mice are in good health for the fifth year, that corresponds to 220 human years approximately."

Dr. Kostenko also conducted the experiments on himself. He asserts that he has recovered from chronic illnesses, that he looks younger, and that he has improved his physical parameters. Dr. Volkov has a very simple explanation for Dr. Kostenko's surprising results. He believes that "the acidation of [a] living organism with CO<sub>2</sub> promotes the carbonic acid production by an organism. Therefore, blood acidation by a carbon dioxide results in the filling up of the hydrogen deficiency of an organism - And in the prolongation of life!"

Additional support for Dr. Volkov's theory comes from the work of Jonathan V. Wright, M.D., who is the Medical Director at Tahoma Clinic in Kent, Washington. Dr. Wright says, "...when you get past 35, 40, 45, and start to develop indigestion, it's highly likely that the indigestion is due to a weaker stomach, not a stronger one, a stomach making less acid, less pepsin." He notes that since 1976 he has used "a commercially available, extremely precise, research-verified procedure" to literally check the stomach acid production of thousands of people, who had complaints of "heartburn" and indigestion. He found that the majority of people did indeed have under acidity in their stomachs.

### **What makes your body alkaline or acidic?**

In my opinion, your body's pH is determined by two things:

- 1) What you put into your body (food, beverages, drugs, etc.)
- 2) What you eliminate or withhold inside your body (removal or harboring of acidic waste).

I personally believe Dr. Volkov's claims, and am presently beginning research to verify the hypothesis that increased acid in the gut will help to restore and maintain the body's natural pH balance through a process called homeostasis. I am of the opinion that at birth the pH of our gut is generally around 1.0. As we get older, our gut

pH may rise to 2.0 or more. This is an astronomical difference and at this higher level the stomach may have trouble breaking down the foods we consume.

I am working to prove that disease comes from the same root cause-an increase of the pH of the gut, which can cause a massive overload of undigested food to build up in the intestines, eventually turning into putrefied acid waste (toxins). The body would then have no choice but to store this acid waste in its own tissues and stored fat, thus creating a more friendly environment for disease.

I want to prove that the countless names attached to illnesses do not really matter. What does matter is that they all come from the same root cause- too much tissue acid waste in the body!

### **What is H+Plus™ Hydrogen Concentrate?**

During the past year, I have found a simple and stable source of the Hydrogen Proton. An American scientist has developed an electrically-charged water concentrate, a stabilized form of carbonic acid. This water is similar to the ionized acid water made by the water ionizer machines. I have applied a special "patent pending" process to produce H+Plus Hydrogen Beverage Concentrate.

One ounce of this product, added to 8 ounces of water, will produce a beverage that provides the Hydrogen proton Dr. Volkov recommends. According to Dr. Volkov, one glass a day will clean the systems throughout the body. He believes that carbonic acid is the premiere hydrogen donor. Although many people, such as Dr. Baroody, believe that people should drink alkaline water in order for the body to maintain its natural pH balance, Dr. Volkov asserts that it is the proton that balances the pH level of the gut. In this way, our body is able once again to efficiently digest food, thus allowing our body to eliminate its waste, which prevents acid build-up from occurring.

Dr. Volkov further suggests that the proton H+ water should be used for a period of time, and then stopped for a short period to bring the body in balance. I am presently drinking the water for three weeks, with a one week break. Due to the lack of current data, it is recommended that the Beverage not be consumed by pregnant or nursing mothers or during times of severe illness.

For thousands of years, vinegar has been used to aide digestion. In Apple Cider Vinegar - Miracle Health System, Patricia Bragg states the secret of health lies in internal cleanliness. She states "Apple Cider Vinegar is a powerful cleansing and healing elixir for a healthier, stronger, longer life!" H+Plus Beverage Concentrate provides the acidity found in vinegar, but tastes like water, and is easy to drink.

It has often been found to be the case in science that the simplest explanations and theories that account for the data are usually correct. I believe that Dr. Volkov's theory and research findings could lead to an impact upon our civilization that will be incalculable. A breakthrough of this magnitude can often be discounted by others. Even Sigmund Freud commented on the suppression of innovation by science, in these words: "There are three steps in the history of a great discovery. First, its opponents say that the discoverer is crazy; later that he is sane but that his discovery is of no real importance; and last, that the discovery is important but everybody has known it right along." Of course, "time will tell" and it appears that time may well be on Dr. Volkov's side.

*Ralph Suddath has been involved in comprehensive studies of water, energy, medical and agricultural technologies since 1989. His company has obtained the Carbonic Acid formulas and is extensively researching its effectiveness.*

# **Reduced Water For Prevention Of Diseases**

## **Reduced Water For Prevention Of Diseases**

by Sanetaka Shirahata

Graduate school of Genetic Resources Technology, Kyushu University,  
6-10-1 Hakozaki, Higashi-ku, Fukuoka 812-8581, Japan.

It has long been established that reactive oxygen species (ROS) cause many types of damage to biomolecules and cellular structures, that, in turn result in the development of a variety of pathologic states such as diabetes, cancer and aging. Reduced water is defined as anti-oxidative water produced by reduction of water. Electrolyzed reduced water (ERW) has been demonstrated to be hydrogen-rich water and can scavenge ROS in vitro (Shirahata et al., 1997).

The reduction of proton in water to active hydrogen (atomic hydrogen, hydrogen radical) that can scavenge ROS is very easily caused by a weak current, compared to oxidation of hydroxyl ion to oxygen molecule. Activation of water by magnetic field, collision, minerals etc. will also produce reduced water containing active hydrogen and/or hydrogen molecule. Several natural waters such as Hita Tenryosui water drawn from deep underground in Hita

city in Japan, Nordenau water in Germany and Tlacote water in Mexico are known to alleviate various diseases.

We have developed a sensitive method by which we can detect active hydrogen existing in reduced water, and have demonstrated that not only ERW but also natural reduced waters described above contain active hydrogen and scavenge ROS in cultured cells. ROS is known to cause reduction of glucose uptake by inhibiting the insulin-signaling pathway in cultured cells. Reduced water scavenged intracellular ROS and stimulated glucose uptake in the presence or absence of insulin in both rat L6 skeletal muscle cells and mouse 3T3/L1 adipocytes. This insulin-like activity of reduced water was inhibited by wortmannin that is specific inhibitor of PI-3 kinase, a key molecule in insulin signaling pathways. Reduced water protected insulin-responsive cells from sugar toxicity and improved the damaged sugar tolerance of type 2 diabetes model mice, suggesting that reduced water may improve insulin-independent diabetes mellitus.

Cancer cells are generally exposed to high oxidative stress. Reduced water cause impaired tumor phenotypes of human cancer cells, such as reduced growth rate, morphological changes, reduced colony formation ability in soft agar, passage number-dependent telomere shortening, reduced binding abilities of telomere binding proteins and suppressed metastasis. Reduced water suppressed the growth of cancer cells transplanted into mice, demonstrating their anti-cancer effects in vivo. Reduced water will be applicable to not only medicine but also food industries, agriculture, and manufacturing industries.

Shirahata, S. et al.: Electrolyzed reduced water scavenges active oxygen species and protects DNA from oxidative damage. *Biochem. Biophys. Res. Commun.*, 234, 269-274, 1997.

## **Clinical test results by Dr. Kawamura Munenori**

### **Clinical test results by Dr. Kawamura Munenori**

The title of the book The effectiveness of hydrogen-rich water  
(active hydrogen water, anti-oxidant water)?

## **Author Dr. Kawamura Munenori and Dr. Shirahata Sanetaka**

The first book was published on June 1, 2003.

By just changing water from tap water to hydrogen-rich water, a great number of people have recovered from serious diseases and many regained their health. Let me introduce the five patients who recovered from serious diseases after drinking hydrogen-rich water (active hydrogen water, anti-oxidant water). The five cases were chosen from a great number of our medical treatment records.

All five patients who had serious diseases were completely cleared without any relapse, some time after they started drinking hydrogen-rich water.

**NOTE:** The below case studies reference images, the images can be found in the book as mentioned above.

---

### **(1) The first case for Mr. I (a 53 years old male suffering from gangrene caused by diabetes)**

In page 179, 180, 181 and 182

Gangrene is necrosis and subsequent decay of body tissues caused by infection or thrombosis or lack of blood flow. It is usually the result of critically insufficient blood supply sometimes caused by injury and subsequent contamination with bacteria. This condition is most common in the extremities.

Mr. I was a 53 years old male suffering from gangrene caused by diabetes.

He was diagnosed with diabetes about 30 years ago. He had suffered from diabetes for most of his adult life. He started insulin treatment 6 years ago, which was in 1997. However, his diabetic symptoms became exacerbated and got aggravated. He became fundal hemorrhage of the left-eye in November 2001, his right fourth toe developed into gangrene in December 2001 and symptoms of gangrene were aggravated and spread into whole right leg.

When he visited our clinic in March 2002, pus were spurted from all over the feet and legs.

Dr. Kawamura could clearly see toe's bone of Mr. I is melting with X-ray

exam.

About one month ago before visiting Dr. Kawamura's clinic, Mr. I went to other hospital. He was pronounced in this hospital that he had no choice but to amputate his below-knee in order to save his life. Because Mr. I did not want to amputate his feet, he started searching an alternative medicine soon after he was diagnosed as being indispensable to amputate his below-knee. He finally found hydrogen-rich water treatment.

That was the main reason for Mr. I to visit Dr. Kawamura's clinic in March 2002.

Dr. Kawamura started making him drink hydrogen-rich water (active hydrogen water). Soon after, Dr. Kawamura started making him drink hydrogen-rich water, melting of his bone in toe halted and shape of the toe's bone started coming in sight. Swelling of feet, legs and toe started to reduce and disappeared completely in 9 months after started drinking hydrogen-rich water. Mr. I had completely recovered from extremely serious gangrene in 9 months after he started drinking hydrogen-rich water.

In page 181, there are (6) pictures of gangrenous patient of Mr. I on conditions of toe and toe's bone. Top picture : at the first medical examination with swollen toe and melted toe's bone

Middle picture : 4 months after started drinking hydrogen-rich water - On the road to recovery

Bottom picture : 9 months after started drinking hydrogen-rich water

Mr. I had completely recovered from extremely serious gangrene 9 months after he started drinking hydrogen-rich water

Dr. Kawamura started using hydrogen-rich water for treatment of diabetic and gangrenous patients in around 1985. Even Dr. Kawamura, before he started using hydrogen-rich water for treatment, in some cases, he had no choice but to amputate toe, feet or legs of gangrenous patients.

---

## **(2) The second case for Mr. N (a 60 years old male suffering from Hepatitis C)**

In page 182, 183, 184 and 185

Mr. N was a 60 years old male suffering from Hepatitis C .

Let me introduce a patient – Mr. N who recovered from Hepatitis C in one and half year after he started drinking hydrogen-rich water.

Mr. N have visited our clinic one year after I started using hydrogen-rich water for treatment of diseases. When he visited our clinic at the first time, he got depressed mentally since he underwent a visceral cleft operation due to encountering an accident 8 years ago. He was infected with Hepatitis C virus from virus-tainted blood transfusion. Before visiting our clinic, he was told by a large hospital in Kobe that his suffering from Hepatitis C could not be cured for the rest of his life and ensuring chronic hepatitis C can result later in cirrhosis and liver cancer.

Treatment for a disease of Hepatitis C usually involves the intravenous and internal medicine. Before starting such common treatment, I made him drink hydrogen-rich water although I thought it is no better than a placebo since I just started using hydrogen-rich water for treatment only from one year and I didn't have any confidence in hydrogen-rich water treatment at that time.

6 months after we started hydrogen-rich water treatment, Mr. N requested us to stop the intravenous treatment. Although value of his liver function test at that time showed beyond normal value, we accepted him to put an end to the intravenous treatment. Further 6 months after, he requested to halt the internal medicine treatment. At that time almost all values of his liver function test showed within normal value. He looked happier and had a clear complexion, and also looks physically healthy.

One and half year after he started drinking hydrogen-rich water, value of his liver function test showed within normal value. He had completely recovered his health.

He visit us twice a year for regular medical examination after discharge from the clinic.

He became now 70 years old. Value of his liver function test has been showing below normal value all the time after he left hospital 17 years ago.

17 years ago, he was told in a large hospital that he could end up with cancer. After seeing him walk proudly today, his depressed appearance 17 years ago

was as if nothing happened.

In page 185, there is a diagram of the result of Mr. N's liver function test from 1886 to 2002.

Standard value AST (aspartate aminotransferase)

ALT (alanine aminotransferase)

?-GTP (?-glutamyl transpeptidase)

ChE (cholinesterase)

You will see from a diagram in page 185, one year after Mr. N started drinking hydrogen-rich water, the result of almost all liver function test was normalized.

---

### **(3) The third case of Mr. S (a 44 years old male suffered from ulcerative colitis) :**

In page 186, 187 and 188

Ulcerative colitis is a form of inflammatory bowel disease. Ulcerative colitis is a form of colitis, a disease of the intestine, specially the large intestine or colon, that includes characteristic ulcers, or open sores, in the colon. The main symptom of active disease is usually diarrhea mixed with blood and mucus, of gradual onset. They also may have signs of weight loss, and blood on rectal examination. The disease is usually accompanied with different degrees of abdominal pain, from mild discomfort to severely painful cramps. Ulcerative colitis is an intermittent disease, with periods of exacerbated symptoms, and periods that are relatively symptom-free. Although the symptoms of ulcerative colitis can sometimes diminish on their own, the disease usually requires treatment to go into remission. Ulcerative colitis is a rare disease.

Treatment is with anti-inflammatory drugs, immunosuppression (suppressing the immune system), and biological therapy targeting specific components of the immune response. Colectomy (partial or total removal of the large bowel through surgery) is occasionally necessary, and is considered to be a cure for the disease.

Mr. S was a 44 years old male suffering from ulcerative colitis.

Ulcerative colitis is Ministry of Health, Labour and Welfare certified specified diseases and is also regarded as one of the life-threatening illnesses. The chances of getting Ulcerative colitis is more in 20s. Steroid drug and others are used for treatment. It is regarded as serious disease which is extremely difficult to cure.

It is a disease which has the risky possibility of in association with cancer of colon and rectum. He was diagnosed with ulcerative colitis at the age of 29 years old in 1987.

One year ago in 1986, after bleeding during a bowel movement, he went to nearby hospital and was diagnosed with hemorrhoid. Even after two months, there was no sign of improvement. He then went to another large hospital two months after initial medical examination in December 1986. He was diagnosed with proctitis and the doctor prescribed medicine for him.

With the time passing on, his sickness was deteriorating. Not only he had bleeding but also had mucous and bloody stool. Diarrhea was getting worse and he had more than ten bowel movements daily, all day long. As the results of such unpleasant continuous symptoms, he was depressed mentally. Having had such a severe worsening symptoms, he underwent an endoscopic examination and he was diagnosed with ulcerative colitis.

He visited our clinic in October 1988 which was the following year he was diagnosed as having an ulcerative colitis. Soon after his hospitalization, we told him to halt taking steroid drug. We made him drink hydrogen-rich water instead of steroid drug, along with medicine. Distinguishing characteristics of this disease is an intermittent disease and it alternates during exacerbations and during symptoms-free period. Usually every period of exacerbated symptoms, the disease is aggravated and progressed.

In case of Mr. S, he had never experienced during exacerbations after his admission in our clinic. Initially he suffered from mucous and bloody stool. However symptoms have never been deteriorated but have been improved gradually after he began hydrogen-rich water treatment.

We began hydrogen-rich water treatment on Mr. S 17 years ago. At that time, we have not had

much experience in hydrogen-rich water treatment. Mr. S drank 3-4 litres of

hydrogen-rich water per day and he was eager to learn more about the effectiveness of hydrogen-rich water. We taught him every knowledge about the effectiveness of hydrogen-rich water.

It took him 8 years before we allowed him to stop taking sovereign remedy for ulcerative colitis

because of his suffering from incurable, and a life-threatening disease. As the result of 8 years efforts, it became unnecessary to take magic bullet for ulcerative colitis.

He is now drinking hydrogen-rich water only. He has a regular medical checkup yearly.

He is cured effectively as the result of hydrogen-rich water treatment.

He has completely recovered from incurable disease of ulcerative colitis.

He has been leading a normal life, thanks to complete recovery from incurable disease.

---

**(4) The forth case of Ms. M (a 18 years old female suffering from atopic dermatitis) :**

In page 188, 189, 190 and 191

Ms. M was a 18 years old female suffering from atopic dermatitis .

She suffered for the long time since childhood from atopic dermatitis and could not be cured effectively even under specialist treatment.

She first visited our clinic in November 1994. When I first examined her, the disease was spreading to face and extend to sides of arms, showing extensive oozing and crusting. Later on, the typical preferential pattern with eczematous skin lesions of flexures, neck and hands develops, accompanied by dry skin. As a result of scratching and rubbing, her new exacerbations are followed by erythema, papules and infiltration. She suffered from hardening skin as a result of her taking steroid drug for the long time. Steroid drug used for treatment of atopic dermatitis, it initially uses lower-potency drug. However, it will be switched to use strong-potency drug for the time to pass.

When you keep using steroid drug for treatment of atopic dermatitis for a long period, there are always side-effect, like deposit of pigment and hardening skin. As a result of side-effect, skin will become stiff like crocodile skin. There will be no effectiveness when one put medicine on top of stiff skin.

She visited our clinic in her worst condition. We admitted her to our clinic and we told her to halt taking steroid drug. We made her drink hydrogen-rich water instead of steroid drug.

It was said generally that curing atopic dermatitis without steroid drug is extremely difficult. However, we had a great number of cases for curing atopic dermatitis by making patients drink hydrogen-rich water at that time. We therefore took hydrogen-rich water treatment without hesitation. There was no rebound after halting steroid drug. The patient was doing well after she started drinking hydrogen-rich water and halted steroid drug.

She was dedicated to cure atopic dermatitis and she was drinking 4-5 litres daily of hydrogen-rich water. 4 months after she began drinking hydrogen-rich water, her hardened skin became soft. As a result of full recovery, she was discharged from our clinic 4 months after she began hydrogen-rich water treatment.

It used to be said that it is extremely difficult for deposit of pigment and hardening skin to be cured.

Before she visited our clinic in 1994, she consulted and sought treatment from many good doctors.

However, her illness has not cured well and has relapsed. The attack seemed to be even more severe. In October, 1994, her parents were in despair and feared she could not be cured effectively for the rest of her life.

Her parent happened to know our clinic and when given hydrogen-rich water to her, the results are most significant. During my long years of servicing atopic dermatitis cases, I found that the people with atopic dermatitis who consumed hydrogen-rich water tend to have responded well and completely cured without any relapse after one to four months.

In page 191, there are (4) pictures of atopic dermatitis patient of Ms. M on conditions of face and back.

Top picture : at the first medical examination with face and back

Bottom picture : 4 months after started drinking hydrogen-rich water

---

**(5) The fifth case for Mr. E (a 49 years old male suffering from gangrene caused by diabetes) :**

In page 192, 193 and 194

Mr. E was a 49 years old male suffering from gangrene caused by diabetes.

Mr. E was diagnosed with diabetes first in 1997. However, he had left diabetes untreated for the time being. While he had left diabetes untreated, his diabetic case had been becoming exacerbated and in 2000 he started an internal medicine treatment. In September 2002, his left fifth toe developed into swollen with severe pain and it was matured and pus was spurted from his toe. Pain got aggravated. He was obliged to visit a hospital. He was pronounced in the hospital that his lower left ankle must amputate in order to avoid further exacerbation. It was a tremendous blow to him like a person struck by lightning. As a taxi driver, for him it was a matter of life and death.

Soon after he was pronounced by the other hospital that amputation of foot was indispensable,

he started searching an alternative medicine because he did not want to amputate his ankle.

He had finally reached to hydrogen-rich water treatment.

He visited Dr. Kawamura's clinic on October 8, 2002 as a last straw . It was just 10 days after he was pronounced that he must have his ankle amputated.

Dr. Kawamura started making him drink hydrogen-rich water along with an internal medicine treatment.

He was drinking 5-6 litres per day of hydrogen-rich water in order to recover from serious gangrene as early as possible.

As a result of drinking 5-6 litres of hydrogen-rich water daily, the sugar in the

blood dropped from over 200mg/dl to 140-150mg/dl. Hemoglobin AC also dropped from 8.2 to 6.0.

Three months after hospitalization, his gangrenous parts started shrinking in its size greatly. Consequently, he discharged from the clinic and switched to attend the clinic as an outpatient.

Just after hospitalization he was walking on his unaccustomed crutch at the clinic corridor. Being discharging from a clinic, it was as if nothing had occurred three months ago.

Mr. E. once gave up being integrated into society due to serious gangrene.

He felt happy after returning to a normal life. One month after discharge from the clinic, he had X-ray exam. A once melting bone, now the shape of toe's bone is clearly seen. He was completely recovered from gangrene.

In page 193, there are (5) pictures of gangrenous patient of Mr. E on conditions of toe and toe's bone.

Top picture : at the first medical examination with swollen toe and melted toe's bone

Middle picture : 4 months after started drinking hydrogen-rich water

Bottom picture : 6 months after started drinking hydrogen-rich water

**NOTE:** The below case studies reference images, the images can be found in the book as mentioned above.

## **Electrolyzed-reduced (hydrogen rich) water protects**

**Electrolyzed-reduced (hydrogen rich) water protects against oxidative damage to DNA, RNA and protein.**

by Lee MY, Kim YK, Ryoo KK, Lee YB, Park EJ.

Department of Genetic Engineering, Soonchunhyang University,  
Asan, Chungnam 336-600, Korea. [miyoung@sch.ac.kr](mailto:miyoung@sch.ac.kr)

The generation of reactive oxygen species is thought to cause extensive oxidative damage to various biomolecules such as DNA, RNA, and protein. In this study, the preventive, suppressive, and protective effects of in vitro supplementation with electrolyzed-reduced water on H<sub>2</sub>O<sub>2</sub>-induced DNA damage in human lymphocytes were examined using a comet assay.

Pretreatment, cotreatment, and posttreatment with electrolyzed-reduced water enhanced human lymphocyte resistance to the DNA strand breaks induced by H<sub>2</sub>O<sub>2</sub> in vitro. Moreover, electrolyzed-reduced water was much more effective than diethylpyrocarbonate-treated water in preventing total RNA degradation at 4 and 25 degrees

C. In addition, electrolyzed-reduced water completely prevented the oxidative cleavage of horseradish peroxidase, as determined using sodium dodecyl sulfate-polyacrylamide gels.

Enhancement of the antioxidant activity of ascorbic acid dissolved in electrolyzed-reduced water was about threefold that of ascorbic acid dissolved in nonelectrolyzed deionized water, as measured by a xanthine-xanthine oxidase superoxide scavenging assay system, suggesting an inhibitory effect of electrolyzed-reduced water on the oxidation of ascorbic acid.

PMID: 17159237 [PubMed - indexed for MEDLINE]

1: Appl Biochem Biotechnol. 2006  
Nov;135(2):133-44.

## Free Radicals, Aging- DNA Study

**Free Radicals, Aging- DNA Study: Abstract.**  
by Dr. Denham Harman

NLM database Document

Title : The Aging process.

Author: Dr. Denham Harman

Source Proc National Academy of Science U.S.A, 1981 Nov, 78:11, 7124-8

## Abstract

Aging is the progressive accumulation of changes with time that are associated with or responsible for the ever-increasing susceptibility to disease and death which accompanies advancing age. These time-related changes are attributed to the aging process. The nature of the aging process has been the subject of considerable speculation.

Accumulating evidence now indicates that the sum of the deleterious free radical reactions going on continuously throughout the cells and tissues constitutes the aging process or is a major contributor to it. In mammalian systems the free radical reactions are largely those involving oxygen.

Dietary manipulations expected to lower the rate of production of free radical reaction damage have been shown

(i) to increase the life span of mice, rats, fruit flies, nematodes, and rotifers, as well as the "life span" of neurospor

(ii) to inhibit development of some forms of cancer

(iii) to enhance humoral and cell-mediated immune responses; and

(iv) to slow development of amyloidosis and the autoimmune disorders of NZB and NZB/NZW mice.

In addition, studies strongly suggest that free radical reactions play a significant role in the deterioration of the cardiovascular and central nervous systems with age. The free radical theory of aging provides reasonable explanations for age-associated phenomena, including

(i) the relationship of the average life spans of mammalian species to their basal metabolic rates

(ii) the clustering of degenerative diseases in the terminal part of the life span

(iii) the beneficial effect of food restriction on life span

(iv) the greater longevity of females

(v) the increase in autoimmune manifestations with age.

It is not unreasonable to expect on the basis of present data that the healthy life span can be increased by 5-10 or more years by keeping body weight down, at a level compatible with a sense of well-being, while ingesting diets adequate in essential nutrients but designed to minimize random free radical reactions in the body.