

CLINICAL APPLICATIONS OF ELECTROLYZED-REDUCED WATER

Hidemitsu HAYASHI, M.D., Water Institute,
Munenori KAWAMURA, M.D., Kyowa Medical Clinic.

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 H₂O, 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 H₂O. 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 H₂O 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 post hepatic 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 post hepatic 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 H₂ gas at the cathode and O₂ gas at the anode respectively (Fig.5). When the amount of atomic hydrogen becomes saturated, molecular hydrogen (H₂ 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 H₂O 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 H₂O, 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