Low Resonant Frequency Storage and Transfer in Structured Water Cluster

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Abstract-*It is well known that electromagnetic fields play a critical role in all biological evolutionary processes. The natural low resonant frequency may interact with the biological signaling pathway through liquid, especially water. Our hypothesis is that the structured water cluster may be not only an excellent carrier for nutrition and energy, but also an excellent carrier for low frequency information. Our preliminary study has shown that low frequency electromagnetic radiation treated clustered water has many attractive biological functions. It is thus important to understand how to modify the structure of water clusters, and store and transfer the low resonant frequency to living cells. This paper presents some related results.*

Keywords

Bio-signal network, Water memory, Water wire, Nano-water cluster, and bio-cluster.

1. Introduction

1.1 Meridian: an ancient and novel signaling transduction system

There are two major theories related to the biological signal transduction pathways in humans:

A. The conventional theory: nervous system or ligand-receptor model
B. The oriental theory: the Meridian system.

Ancient Chinese theory believed that a fine needle in certain locations would generate biological signals which travel along the meridian system to certain target organs to balance the "qi" in whole the body. For thousands of years the meridian system has been postulated to exist even though no one has verified this system morphologically. However, in recent decades, acupuncture, has become more popular in the world due to its great effect in medical disorders. According to the Standard Acupuncture Nomenclature proposed by the World Health Organization (WHO) in 1991, the meridian system in acupuncture consists of about 400 acupuncture points and 20 meridians connecting most of the points.

The Chinese ancient philosophy proposed that meridians are "wires", twelve main meridians composing an independent network, controlling all the "qi", "blood" and consciousness. Modern science also indicates that the meridian system seems to be a distinct signal transduction system which can be measured by instruments such as Superconducting Quantum Interference Devices (SQUID). It overlaps and interacts with other systems but is not simply part of the nervous system or circulatory system. It seems there are invisible "soft wires", which possess high electrical conductance, responsive to non-specific stimuli and polarity of electric stimulation. The high skin conductance of the meridian system is further supported by the finding of high density of gap junctions at the epithelia of the acupuncture points [1-5]. However, we are not yet clear about what kind of "wire" forms the meridian signaling transduction network. A recent simulation study of biophysical features along meridians on a gel model suggests that the specific biophysical feature along meridians may be caused by a continuous rich distribution of interstitial fluid [6]. We are interested in exploring the nature of the "interstitial fluid". Water constitutes a larger fraction (over 60%) of the human body, especially the brain and neural system. It is reasonable to hypothesize that it might be the water associated with proteins which creates cluster wire networks such as a meridian system for the transduction of bio-signals.

1.2 Water cluster and Clustered water wire

Water is fundamental for virtually all life forms, however, the structure and function of water, especially water in the cells, is still not clear. Dr. Linus Pauling, Nobel prize laureate indicated that "the water molecules in the human body are not present as isolated water molecules or as ice; they are present as liquid water, containing various substances in solution. We are still largely ignorant about the structure of liquid water and

the structure of aqueous solutions in general". In the past years, extensive terahertz laser vibration-rotation-tunneling spectra and mid-IR laser spectra were used for water structure research. As a dipole, water would constitute a series of clusters such as micro-clustered water (e.g., stable hexamer) and macro-clustered water (e.g., icosahedral water or buckey balls) [7-17]. Water is also a key component of bio-clusters with protein and DNA which form biological hydrogen networks. The Lawrence Berkeley National Laboratory was the first institution to obtain the photo of water hexamers, a particularly stable form of water cluster, using scanning tunneling microscopy [15]. Indeed, there are five isomers of water hexamers: the planar hexamers (cyclic and boat) appear to be more stable than the other three-dimensional hexamers (cage and prism).

Water, being dipolar, can be partly aligned by an electric field, which can be shown by the movement of a stream of water past an electrostatic source. Water is diamagnetic and may be levitated in magnetic fields. It is also known that resonant intermolecular transfer of vibrational energy is possible in liquid water [18-19].

Theoretically, hydrogen-bond connectivity of water molecules could control the progress of ionic translocation in these systems. More and more reports indicate that positive ions, such as protons (H^+), or negative ions, such as hydroxide ions (OH^-) can be transported via the "clustered water wires". The water wire system may be a one-dimensional head-tail water chain or a three dimensional hydrogen-bound water networks [20-26]. The dipole reorientation and geometry of water molecules in electron tunneling could be studied using scanning tunneling microscopy (STM) [27]. Electron transport in Molecular Wire Junctions was also observed [28]. An excess proton injected into the water wire is found to be significantly stabilized, relative to the gas phase, due to the high polarizability of the carbon nanotube [29]. From the viewpoint of electrical engineering, it may be the mechanism of the biological electromagnetic field. We hypothesize that the Clustered water wire network may provide a biophysical and biochemical base for understanding the Meridian signaling transduction system.

1.3 Clustered water memory

According to ancient Chinese philosophy, water may contain seasonal messages, such as bio-clock information. Natural snow water, spring rain and dew were recognized to promote human health for thousands of years. Homeopathy, the western traditional medicine, also indicates that ultra-diluted water may remember the bioactivity from naturally occurring substances, such as botanicals, influencing cell signaling. However, a prolonged dispute of "water memory" has been carrying on since 1988, when the article "Human basophil degranulation triggered by very dilute antiserum against IgE" was published in "Nature" by Dr. Jacques Benveniste, a French biological scientist, and other 12 scientists from Canada, France, Israel and Italy [30]. They claimed that vigorously shaking water solutions of an antibody could evoke a biological response, even when that antibody was diluted out of theoretical existence. However, Benveniste's revolutionary ideas of "water memory" were criticized as heretical or misguided.

In 1999, a pan-European team of four independent research laboratories in France, Italy, Belgium, and Holland, led by Professor M. Roberfroid at Belgium's Catholic University of Louvain designed "blinded" experiments, using a refinement of Benveniste's original experimental model that examined another aspect of basophil activation with "ghost" dilutions of histamine against control solutions of pure water [31]. Three of the four labs involved in the trial reported a statistically significant inhibition of the basophil degranulation reaction by the ghost histamine solutions compared with the controls. The fourth lab reported results that were "almost" significant. Hence, the total results over all four laboratories were positive for the ghost histamine solutions. In the last five years, more and more ultra-diluted water research indicate that certain structured waters might store physical, chemical and biological information [32-36].

1.4 Objective

In reviewing the current knowledge of the meridian bio-signaling transduction system, the clustered water wire hydrogen bound network provides a physical base. However, the theory of "water memory" seems to be a significantly difficult chasm to overcome. This article intends to provide some preliminary laboratory and clinic results for understanding the storage of low frequencies in clustered water. This work was a cooperative effort of an international Clustered Water and Health Research Groups in the United States, Japan, Mexico and China.

2. Experiment

2.1 Materials

Clustered water was provided by the inventor, Lee H. Lorenzen (Cluster Solutions Inc., Rancho Santa Margarita, CA 92688 (csibeverages.com), based on the patented Microcluster Template Induction Process [9-10]. The starting water vapor is passed across a magnetic field, treated by laser, stabilized in a special ceramic unit which yields microclustered water (5, 6, and 7 membered rings) that are collapsed around organic or inorganic complexes such as proteins, amino

acids and other biological molecules. Prior to the end of the process the protein base is removed. The product is a nano-size liquid crystal that resonates at a designed and predictable low frequency. The specific frequencies of each crystalline Clustered Water solution are designed to be amplified by the cells of the human body. The original clustered water is diluted with distilled water about 10^{6-20} times. However, unlike homeopathy, there is no "biological reversal" of function. In order to determine the optimal dilution for therapeutic applications, a magnetic resonance analyzer can be used. Based on the quality analysis report from Shin Etsu Chemical Inc. (Japan) and Associated Laboratories (USA), the testing clustered water is "extremely pure" using various analysis methods such as atomic absorption, flame photometry analysis, ion chromatography, high pressure liquid chromatography, and gas chromatography analysis. ^{17}O-NMR analysis indicates that clustered water has a relative narrow half value of resonance frequency (74-98 HZ), comparable to melting snow water. It has a conductivity of at least 3.7 mu.s/cm, and has a surface tension of less than 61 dynes/cm. According to Laser Raman Spectra studies conducted by Laboratoire Forte Pharma (France), an interesting behavior of Clustered Water is observed that in all the studied spectral fields (Low frequency, Intermediate frequency, High frequency), the intensity of Raman Diffusion was much lower than that of Ultrapure water (18.2 M ohms) which was the selected reference. The testing water was always kept in 4^{o}C before using.

2.3 Laboratory studies

Effect of clustered water on microorganisms

Using an in vitro testing system, results showed that clustered water significantly inhibited the growth of several infectious bacterial strains, over a broad range of pH values (similar to those found within the human body). Among the bacterial populations showing positive inhibition were: *E. coli, Staphylococcus aureus* and *Candida albicans* - some very serious disease-causing organisms. No inhibition was found with *Penicillium* and *Aspergillus*.

Effect of clustered water on immune function.

We used two typical *in vitro* and *in vivo* Con-A Stimulated spleen lymphocyte proliferation models to evaluate the immune modulatory effect of clustered water.

In an *in vivo* model, twenty mice were given only clustered water, while 20 mice in the control group were given only de-ionized water. After 2 weeks, there was an approximate 60% increase in lymphocyte production measured in the clustered water group, indicating a significant increase in immune function ($p<0.05$). Using an *in vitro* spleen cell culture system, a similar immune stimulation effect was observed.

Effect of clustered water on alloxan-induced diabetes in mice

Mice were given alloxan (40 mg/kg, bw) by i.v. injection. Five days after alloxan treatment, 40 mice with blood sugar (180-400mg/dL) were divided equally into control and testing groups, and then treated by gavage of 0.5 ml distilled water and clustered water twice daily for 3 weeks, respectively. Blood sugar level was measured weekly. After three weeks, the control group (fed distilled water) showed a gradual increase in blood sugar levels. However, those fed clustered water showed a marked and continued decline in blood sugar levels during the same period of time. (Fig. 1) Additionally, microscopic evaluation of damaged islet cells (pancreatic cells that produce insulin) revealed that there was significant structure and function recovery in the clustered water group.

2.4. Clinic studies

Effect of clustered water on bio-phase angle in humans

This study used the Bioelectric Impedance Analyzer (BIA, Made by RJL Inc., USA), to measure phase angle and measure hydration and cellular water movement. Phase angle is an established method to measure general cell function. Bioimpedance research has established that as we age, the ratio of intracellular to extracellular water changes dramatically (intracellular water levels drop with age accompanied by a reduction in cell water mobility). Low intracellular water compromises cell waste removal, nutrient absorption and protein structure. Recently, phase angle was accepted as an important marker to evaluate general health in clinical studies [37, 38].

This was a self-control study. All 31 subjects (average age 55) were cared by hospital physicians. Subjects were given 250 ml 30 min before breakfast and lunch. BIA measurements and related clinic examinations were conducted at days 1, 3, 6, 9, 12, 15 and 37, respectively. Over half of the patients noticed initial (2-3 day) subjective increases in urine output and an increased frequency in bowel movements. Some noticed headaches and itching (all signs of detoxification). Over 50% noted improved sleep, vision and an increased thirst. Phase angle measurements showed significant increases in 55% of those studied (Fig. 2), indicating improved overall health.

Effect of clustered water on blood sugar level in diabetes

Another clinical study was conducted on 57 diabetic patients. The average age was 59.52 ± 0.87. Patients were selected for treatment, who had been using consistent medication and normal water for at least 3 months and the blood sugar level was kept steady at 8.92 ± 0.21mMol/L. Each individual drank a 250 ml serving of clustered water twice a day, while no other variations in their medical treatments were made. The blood sugar level was examined once per week for 4 weeks. Out of the 57 participating patients, 68.4% showed reductions in blood sugar levels, and only 5.3% showed an increase. The summary results as shown in Figure 3 indicate that clustered water may have a function in anti-diabetic therapy.

3. Discussions

Based on conventional theory it is very difficult to explain the above laboratory and clinical studies of clustered water. Indeed the testing water is an ultra-diluted "water", using distilled water to dilute the "original microclustered water". Compared to distilled water, this "extremely pure" clustered water possesses many beneficial functions, such as anti-bacteria, anti-oxidant, immune stimulation, balancing of intra- and extra-cellular water metabolism, and stabilization of blood sugar level activity. The impressive characteristics of this clustered water is that the starting water vapor is passed across a magnetic field, treated by laser, stabilized with certain trace metals and templated with a low resonant frequency [9,10]. It leads us to hypothesize that clustered water may store and hold for long periods of time the frequencies needed to induce biological change. It may be this resonant frequency, which exhibits resonance with cytoplasmic water, which induces accelerated cellular water turn-over, resulting in improved intracellar water levels, contributing to bio-signaling transduction functions.

There is a trend that more scientists cluster to cluster science research. In 1999, Nobel Prize laureate Dr. Brian D. Josephson addressed the hypothesis of "Molecular memory" [39]. This year, a Science paper from Department of Physics, Harvard University proposed another theory of "atomic memory" for promotion of "quantum communication" techniques [40].

Quantum communication is an attractive concept for life scientists, especially for brain signal transduction researchers. In 1995 Jibu and Yasue [41] have specified "Quantum Brain Dynamics" (QBD) in which the quantized electromagnetic field interacts with the rotational field of water molecule dipoles within neural dendrites and glia. Lowest energy eigenstates ("ground," or "vacuum" states) of the water dipole field are memory states in QBD. Hameroff, the pioneer of quantum brain theory also pointed out that ordered water might play an important role in biological quantum coherence essential for living systems and consciousness. He also emphasized that Cytoplasmic water has unique characteristics related to being a major component of a living organism - the water is somehow alive. But how? Layers of ordered water coupled to cytoskeletal surfaces may enable quantum coherence in cytoplasm - a phenomenon closely related to life, and consciousness [41-44]. In the 70s, the relation between cerebral cortex and acupuncture alteration of visceral function was explored by examining the cortical evoked potentials, single unit discharges and neurochemistry associated with acupuncture. These studies brought forth the Meridian-Cortex-Viscera correlation hypothesis [45]. Meridian signaling systems may be also one of a quantum communication via conjugation of clustered water (ordered water) with the gap-junction proteins which provide the physical basis for the meridian. It is well established in cell biology that gap junctions facilitate intercellular communication and increase electric conductivity. Gap junctions are known hexagonal protein complexes that form a nano-size channel between adjacent cells. Our tested clustered water was claimed to have a six-ring shape by the inventor, Lorenzen [9,10]. Furthermore he cooperated with Masaru Emoto to obtain six-ring macrocrystal photos similar to the shape of organized snowflakes under a microscope at magnifications between 2000 and 5000 times. It may be evidence to reflect the hexagonal shape of the individual clusters (*not single water molecules*) [46]. It may also help us to understand that clustered water may more easily penetrate hexagonal gap-junction channels to promote cell-cell communication.

In the summary, our studies have further confirmed that structured clustered water can hold low frequency information. It may provide a platform to explore the mysteries of meridian signaling transduction networks.

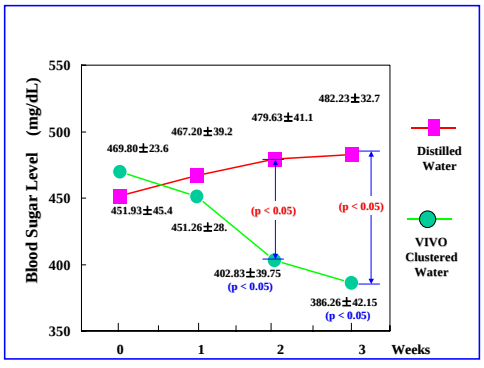

Figure1. Effect of Clustered Water on Alloxan-induced Diabetes in Mice

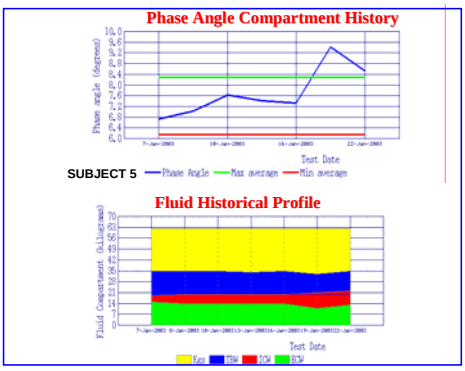

Figure 2. A Phase Angle and Fluid Profile Measured from a Typical Subject.

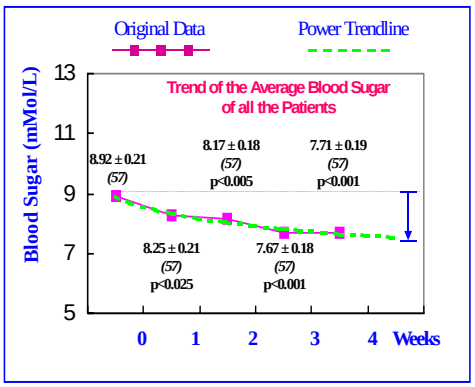

Figure 3. Effect of Cluster Water on Blood Sugar in Humans

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