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Essay

Water and Human Health - Insights, Concepts, Hopes, Dreams

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Abstract

Water is essential for life. Its importance for the physical health of the human body is common knowledge. This circumstance was and is one of the major reasons for the studies of the properties of water. During the last two decades, significant progress was made by these studies, and surprising results were reported. New insights were obtained by the discovery of a fourth phase of water (EZ water, high density water and low density water), by studies of the states of water in the biological cell and of so far unknown consequences of these findings, by development of alternative water models (dense water actually heavily discussed) and, as a major aspect, by application of concepts for investigations of the role of water as antioxydant. In this context, an ongoing discussion of hopes and dreams regarding physical and mental health and longevity is on the way.

keywords: water structure, polywater, EZ water, exclusion zone, liquid crysralline water, water cluster, water memory, dense water, less-dense water, reverse micelles, voltage separation, oxydants, antioxydants, antioxydant water, nanocolloids

Introduction

For a long time in history it was a tradition, especially for the upper class, to spend a few weeks per year in one of the famous health spas or in a grandiose seeside health resort. Such a stay was felt to be essential for reputation and social contacts; the healing power of water was a side-effect. The result of this tradition was that water did gain an undisputed recognition as a means for support and maintenance of physical and mental health. Nobody did care about any more information, e.g. the reasons for the good effects of water for health or, even less, the structural properties of water. Tap water (“bulk’’ water) [1] was the standard; waters such as spring water, mineral water and spa water were welcome variations of water.

Over hundreds of years, water did also play an important role in religions. Examples are the christening ritual where water has a symbolic function, or the Rain God in times of drought. In the last century, the situation changed. A stay at a seeside resort lost importance, and instrumentation was developed that allowed scientific approaches regarding answers to questions, e.g. molecular structure of water, the three phases of water known at that time, boiling points and melting points, function of water as solvent, and many more properties important also for industry.

Water Structures

For the following sections, several direct text quotations are used “Polywater’’ (no implications for human health). One of the difficulties in putting forward novel ideas for the structure of water is that the scientific press has been mistaken before and prefers to shuffle forward in the almost known rather than take long strides into less well known.

The first water-related mischance that the scientific literature fell into, concerned “polywater” (originally called anomalous water, modified water or super water), with a wave of 500 publications between 1962 and 1974. The “polywater’’ was reported to be dense, high boiling and viscous “polymeric” water. It was first described by the Russian Fedyakin 1962 [1], to spontaneously form by condensation in narrow sealed glass capillaries even after great care had been made to keep the apparatus very clean and the water very pure. Particulary remarakble properties were that the material was more stable then “normal” water and could be removed from the glass capillaries, and the eccentric properties continued even after boiling and condensation. There were many scientific meetings, great media interest and widely published supporting papers on the phenomenon, including publications in the most prestigious journals Nature and Science in

1969-1970. Also, the ideas had been given momentum from the populist media and continuing support of well-respected, honorable and careful scientists.

As only micrograms of material were available, it was challenging to chemically analyze the "polywater", but when analyses became available it was shown to contain unforseen impurities. The New York Times then made unsubstantiated (and very unlikely concerning the original experiments but possible with later rushed preparations made solely for analysis) claims that human sweat contamination caused the effects. However, some samples contained just silica, dissolution of which was not anticipated at that time as quartz vessels were known to hold water without noticable dissolution [2]. There were also delays in analyzing the „polywater" samples due to the minuscule volumes available and consequently low silica contents. General recognition that the properties of anomalous water were due to impurities (and not a new compound of H and O) was not before it had generated a considerable theoretical literature, both for and, less embarrassingly particularly early on, against. As computers and the theory base became more powerful, it has additionally become clear that there is no theoretical support for a hexagonal structuring proposed for polywater [2]. After it became clear that "polywater" was not a polymer of water alone and also it was not a product of careless experimental work, many scientists, who should have known better, offered their derisive hindsight

There was a positive outcome to this work in that it did stimulate much work at that time and showed the importance of materials dissolved from water containers. However, the episode seems to be usually remembered with discomfiture, and that has probably reduced the publications concerned with water structure over the subsequent years. Since then, high-density liquid water has been verified to exist (s. below), but this is unrelated to any of the "polywater" samples. "Polywater" is still researched but on the basis of the properties of surfaces and concentrated electrolyte silica condensates.

Water Clusters

In chemistry a water cluster is a discrete hydrogen bonded assembly or cluster of molecules of water [3]. These clusters have been found experimentally, also in bulk water. Little is understood about water clusters in bulk water that it is considered one of the unsolved problems in chemistry. Experimental study of any supramolecular structures in bulk water is difficult because of the short lifetime of clusters: the hydrogen bonds are continually breaking and reforming at the timescales faster than 200 femtoseconds.

Water Memory?

Water memory is the purported ability of water to retain a memory of substances previously dissolved in it even after an arbitrary number of serial dilutions. It has been claimed to be a mechanism by which homeopathic remedies work, even when they are diluted to the point that no molecule of the original substance remains. Water memory defies conventional scientific understanding of physical chemistry knowledge and is not accepted by the scientific community [4]. In 1988, *Beneviste* published a study supporting a water memory effect amid controversy in *Nature*, accompanied by an editorial by*Nature´s* editor *John Maddox* urging readers to „suspend jugement" until the results can be replicated. In the years following publication, multiple supervised experiments were run by *Beneviste´s* team, the United States Department of Defense, BBC´s *Horizon programme*, and other researchers, but no team has ever reproduced *Beneviste´*s results in controlled conditions

Beneviste´s team had diluted a solution of human antibodies in water to such a degree that there was virtually no possibility that a single molecule of the antibody remained in the water solution. Nevertheless, they reported, human basophils responded to the solutions just as though they had encountered the original antibody (part of the allergic reaction). The effect was reported only when the solution was shaken violently during dilution. *Beneviste* stated: "It is like agitating a car key in the river, going miles downstream, extracting a few drops of water, and then starting one´s car with the water". At the time, *Beneviste* offered no theoretical explanation for the effect, which was later called "Water memory" by a Journalist reporting on the study.

Dense Water and Less Dense Water

A first piece of advice for tests of specific enzyme activities in water similar to the states of water in the living cell came in 1988 in a publication of Luisi et al. [5,6] with the interesting title "Reverse micelles as hosts for proteins and small molecules" [6]. Reverse micelles are spherical droplets of water in a polar solvent, 2 to more than 20 nm in size, surrounded by a monolayer of surfactant molecules arranged with their polar heads towards the water pool. A pioneer of this field was also Philipa Wiggins [7]. She proposed that in such a reverse micelle water close to the hydrophilic (inner) surface of the reverse micelle is structurally different from the water in the center. In a row of experiments carried out in other labs it turned out that the specific activity of various enzymes, especially „membrane-bound" enzymes, did depend on their location within the interior of the reverse micelles. As a rule measurements of the specific enzyme activity revealed much higher specific activities as those measured in conventional buffer/water systems [8]. These observations confirmed that water close to the inner (hydrophilic) surface of the surfactant is different from the water in the center of the reverse micelle [8,9].

Furthermore, it was assumed that, due to the much higher specificity of the enzymes in the center of the reverse micelles that the properties of water located

there may be much closer to the situation in the living cell as "bulk" water. After all, these much higher specific activities can be expected to represent the "true" specific activities of these enzymes *in vivo*. Wiggins proposed that the water close to the hydrophilic inside of a reverse micelle is "dense", and the central water portion is "less dense", to balance out the different water densities. In addition she proposed that both kinds of water are different from "bulk" water, simply on the basis of the finding that specific activities in buffer/bulk water did not show the high specific activities as those of enzymes in the center of reverse micelles.

EZ Water (Exclusion Zone Water)

EZ water was discovered and described by G.Pollack and his group (a research group specialized in water research). Pollack published his ideas in 2013 in the book *"The Fourth Phase of Water: Beyond Solid, Liquid and Vapor* [10]. Critics were enthusiastic about the book; after all, Pollack describes and explains a huge number of phenomena where water is involved. The main topic, however, is the description of a phenomenon not known before: water close to hydrophilic surfaces in water-containing objects exhibits a water-lining of various depth (up to 1 mm) and long-range impact that excludes any solutes, in size from emulsified objects down to molecules. He named this water "Exclusion Zone water" (EZ). He speculated that this water has a liquid crysatalline order, due to the assumption that it is layered, thousands of layers thick, with each layer consisting of $(H_3O_2^-)n$, proposed as linked by (fanciful) multiple triply-bonded hydrogen atoms between the layers.

At the beginning of following experimentation it was believed that EZ water formation is a spontaneous process. Measurements of the pH values for EZ water and normal water showed that the pH of EZ water is high (basic), whereas the pH value for normal water in the boundary layer is low (acid). This indicates that EZ water loses hydrogen ions during its formation. According to these data, it is supposed that these free hydrogen ions move into the surrounding "normal" water. It is assumed that they undergo weak associations with H_2O. This surplus of hydrogen ions provides to the water specific properties, and their presence in the living biological cell is assumed to be of major importance for health (s. below; oxidants and antioxdants). Later it turned out that infrared light induces a substantial increase in formation of this water phase. In addition, it could be shown and measured that a voltage separation between EZ water and the main amount in the cell, the "normal" water, exists. It was concluded that the voltage separation (which, in fact, represents energy) helps to support the energy balance of a living organism (s. below).

Sophisticated *in vitro* experiments with artificial sytem components (e.g. development of procedures for the production of major amounts of EZ water, for further measurements of voltage separation and the effects of infrared light of various wavelengths) allowed collection of further data. By the way: Pollack´s interpretations for the molecular structuring of EZ water and the ordered layers of this kind of water believed to be formed, to give rather thick stacks of layers, are heavily discussed [2].

Here is the argumention: Pollack`s proposal for the structuring for EZ water appears even more unlikely than the refuted structure for polywater (s. above). Pollack disregards many current basic and well accepted scientific conceps to invent a structuring without any theoretical, thermodynamic or experimental rationale. His comment: "If our interpretation is to be taken seriously, it must remain robust to challenge"In fact, the details of the structural organization of EZ water are not jet clear. However, this topic does not interfere with the existence of the EZ water and implications thereof. EZ water forms a liquid "phase" that can be legitimately treated as different from "bulk" water. Brian Josephson, Nobel Laureate, Cambridge University did state in a review of Pollack`s book mentioned above: "Dr.Pollack is one of the pioneers of this field, and his discoveries can be expected to have important implications".

The Liquid Crystalline Organism?

About more then 20 years before Pollack published his book mentioned above and discussed crystallinity of EZ water (s. above), Wae Wan Ho and her coworkers pulished an article with a speech--taking light microscopy photograph. It did show a freshly hatched fruitty fly larva, with brillant dynamic colours of the rainbow (Figure 1) [11]. The imaging technique that was used was very similar to the technique which is used to demonstrate crystallinity in rock samples (e.g. quartz samples). The very first interpretation was a sensation: the body of this animal did contain a lot of material that appeared to be crystalline. From the amount of material with crystallinity in the animal body it was concluded to be water. Hence, this finding was interpreted to indicate that the water inside the animal is a liquid crystal (s. below). Such colours depend on the coherent alignment of molecular dipoles in liquid crystal mesophases. Mae Wan Ho`s question was: "How can a living, breathing and squirming worm appear crystalline? Here is a short version of her ideas regarding her question.

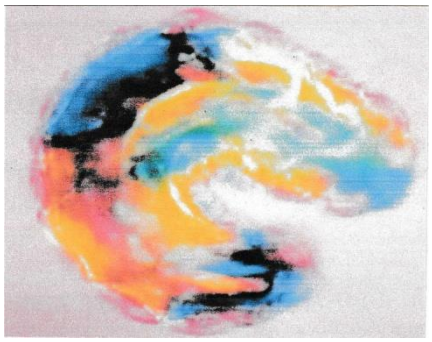

Figure 1. The rainbow worm: a freshly hatched fruitty

larva. The colours demonstrate the presence of liquid crytalline water in the organism. (From11)

"It is because all the molecular dipoles in the tissues are not only aligned, but also moving coherently together. Visible light vibrates at 10^{14} cycles per second, much faster than the coherent molecular motions in the organism, which is why the molecules look statistically aligned and ordered to the light passing through. Not only are the molecular dipoles in the tissues aligned. They are aligned in *all* the tissues, and aligned globally from head to tail. The antero-posterior axis is the optic axis, so when that axis is laid out straight at the correct angle (45^o) to the optics, each tissue takes on a more or less uniform colour: blue, orange, red or green. But when this axis is rotated, blue changes to red, green to orange and *vice versa*, as characteristic for interference colours.The most active parts of the organism have the brightest colours, the brighter the colours, the more coherent the molecular motions. One more thing about the rainbow worm: the colours are not just a function of the coherent motions of all the molecules in the tissues; they are the result of the accompanying coherent motions of the 70 percent by weight of biological water that enables the molecules to be mobile and flexible, this is why the worm, and we too, are flexible and mobile". At the time of writing this article by Mae Wan Ho and coworkers, Pollack and his team had not yet discovered the EZ water. For Pollack and his interpretations and ideas regarding the proposed property of EZ water to be a liquid crystal, Wae Wan Ho´s findings might have been a great help.

Now it appears plausible to consider Pollack´s work on EZ water and Mae Wan Ho´s work on the „liquid crystalline organism" in a comparison. The mass of EZ water in an organism is very low compared to the other kind of water ("protonized" water) in the biological cell. A first look on the photograph in Figure 1 could give the impression that the major mass inside the cell is crystalline. This is not the case. Mae Wan Ho´s view that the whole living organisms, including all the water therein, has a crystalline organization, is greatly exaggregated. Metabolism in the cell is restricted to take place only in the "protonized" water which is not crystalline (not within the EZ water due to exclusion of enzyme substrates and reaction products). The water where metabolism takes place is not visible on the photograph, though it is present as the major part of water in the cell. The EZ water is visibly overrepresented in such a photograph. It would be interesting to know the minimal amount of liquid crystalline water that can be observed as a colour by light microscopy.

A solution for membrane-bound enzymes? Transport through the EZ water lining?

According to Pollack`s findings [10], membrane-bound enzymes will not have access to their substrates and they would not manage to get rid of the reaction products. This would be a consequence of the existence of EZ water ("Exclusion Zone water") close to the hydrophilic surface of biological membranes where the membrane-bound enzymes are located. Figure 2 depicts a number of membrane-bound enzyme complexes with a specific property: the protein complexes are placed at the tip of "stalks", and their subunits carrying the catalytic sites are placed at a certain distance from the membrane surface and, so one could belief, outside the EZ water. This could be a way out for the functioning of membrane-bound enzymes [12]. An *in vitro* experiment (Figure 3) supports this principle [13].

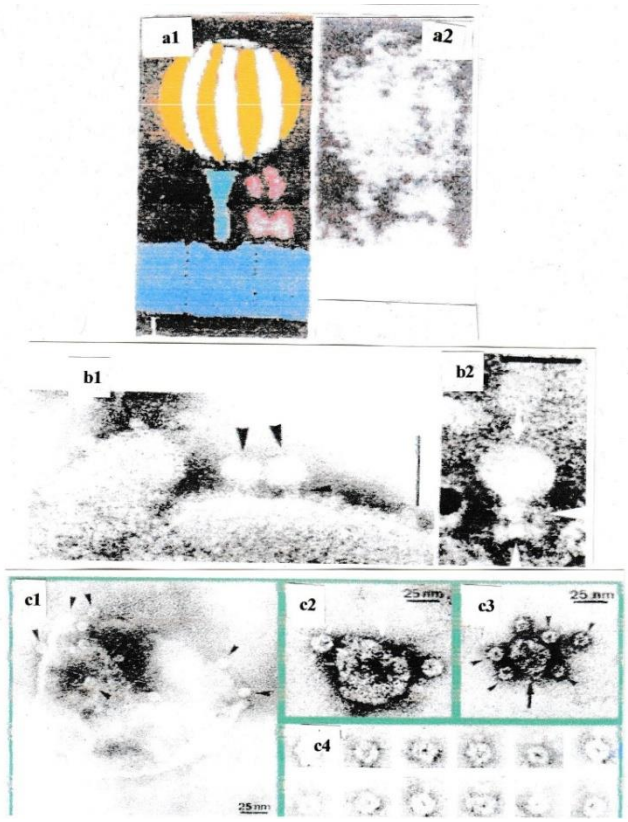

Figure 2. Examples for enzyme complexes that carry their catalytically active protein subunits on a „stalk". It is assumed that the stalks have a length sufficient to place these subunits outside the EZ water covering, as a lining, the (hydrophilic) face of the biological membranes to which the enzyme complexes are attached.
a1 and a2: FoF1 ATPase, b1 and b2: Methano-Reductosome, c1, c2, c3, c4: F-420 hydrogenase. (From 12)

In the context with the existence of EZ water, further questions arise: individual cells (e.g. microorganisms) have to communicate with the outside; cells in the organs of the body are not isolated; transport of material and of information into and out of the cells must be possible, a way through the cell membranes and the EZ water lining present on all hydrophilic surfaces including cell membranes is indispensable. Pores in the cell membranes were postulated and, in some cases, also shown to exist.

However, this question is not at all sufficiently answered.

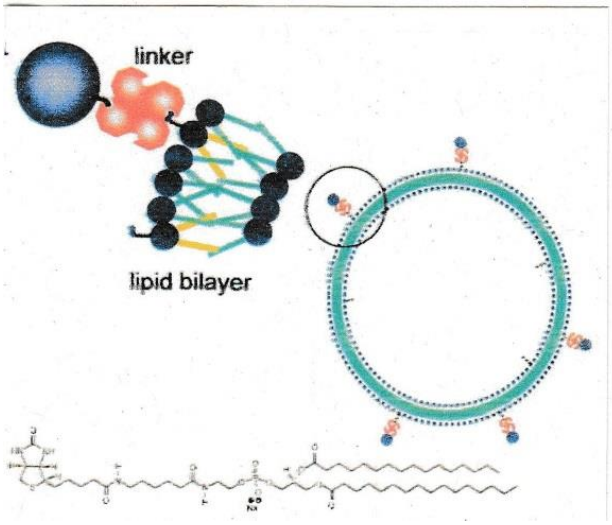

Figure 3. Assembly of enzyme - liposome complexes. At the right-hand side, a schematically drawn liposome with attached enzymes is depicted. Part of the diagram (circeled) is drawn, at the left-hand side, with more details: a Streptavidin linker connects an enzyme complex with the (hydrophilic) surface of the liposome. The size of the linker system (one or two coupled linkers) determines the distance of the enzyme from the liposome. A biotin tag binding the linker to the liposome is also shown. At the bottom of the figure a chemical formula is shown as an example of the compounds (Phosphocholines) used for the construction of the bilayers of liposomes. Enzyme-liposome complexes with linkers between enzyme and (hydrophilic) surface of the liposome were constructed because we had found optimal values for the specific activities of enzymes in solutions where the enzymes were not immediately in contact with the (hydrophilic) surface of membranes or other hydrophilic surfaces, e.g. the inner surfaces of reverse micelles. Later, the discovery of the existence of EZ water close to hydrophilic surfaces was the explanation for our findings. (From 13)

Antioxydant Water?

As descried above, water at the interface of a hydrophilic thin film forms an exclusion zone which has a higher density than ordinary water. A similar phenomenon was observed for a hydrated hydrophilic ceramic powder, and water turns into a three-dimensional structure composed of high density water and low density water [14]. A report outlines a study of antioxydant properties of this “structured” water and on its effect on cell bioactivities. In a series of experiments, culturing media which were prepared utilizing this structured water promoted the viability of macrophage cells by up to three times. The same tendency was observed also for other cell lines. Also the cytokine expression of the splenocytes taken from a mouse spleen increased in the same manner. The water also appears to supress the viability of certain cancer cells.

These results strongly suggest that the structured water helps the activities of normal cells, while suppressing those of malignant cells. In this study, structured water was discovered to have an antioxydant property. Experimental approach [14]: Water as solvent, mixed with the ceramic powder, QUELBY, with particle sizes ranging from 40 nm to 1 micrometer. It was produced by finely grinding natural clay minerals of the Feldspat family, with silica as the main component.

For the evaluation of the antioxydant property, an ultra-weak photon emission was measured using a photomultiplier under total darkness. The number of photon emissions per one second was measured for 8 minutes and an average value was calculated. Measured were viability of Magrophage Cells, phagocytic activity of Magrophage Cells, Natural Killer Cell activities. Splenocyte and Cytokine expression, and Breast Cancer Cells. Statistical analysis was performed. It has been reported that the increase of the ultra-weak photon emission is associated with an oxidation reaction. The number of photon emission is reduced when an antioxydant component is added to water, while it increases under an oxidative atmosphere. Therefore, the number of photon emissions is expected to decrease for water with an antioxydant property. In this study it was clearly demonstrated that the structured water exhibits an antioxydant property. Antioxydants inhibit the oxidation of lipids, proteins and other molecular components in the cell. Generation of an ultra-weak photon emission is also associated with the oxidation of proteins and amino acids.This indicates not only that there is a variation of water, but also that an electric property can be a critical factor in the role of water. Actually it has been confirmed that an electric potential as high as -200 mV (s. above) exists across the boundary between the exclusion zone and the cellular water outside of this region. in addition to the difference in density. Under these conditions, a large amount of protons is generated and present in the cytoplasma. This means that the supply of protons can be enhanced when the water is structured. Considering the fact that the mitochondrial membrane potential is composed of potentials from ion and proton gradients, the increased amount of protons may contribute to the mitochondrial membrane potential.The increased membrane potential may contribute to the increased viablity and increased ATP production [14].

Hopes and Dreams

Some examples of proposed properties of water speculated to improve human health and longevity can be obtained commercially [15]. Botteled “magic” water is offered at outrageous prices. Often the effectivity of the water is promised but without scientific

documentation. Instead, testimonials from customers are used as confirmation of a overwhelming effect on physical and mental health. „Eminent" scientists are cited; in one case the founder of such a company claimed that God has given him the idea. His company currently earns many millions of € per year. In several cases Government institutions got involved in the analyses of promised effectivity, and it happened that these institutions threatened a company with a substantial monetary fine for willful deception. Consequence: be careful, exercise caution. By doing so, stirred up big hopes and dreams, e.g. for a happy longer life, can be avoided.

A Case to Think about

Keyword: Hunza Water [16], The inhabitants in the Hunza valley in the Himalayas have long been known for their high number of centenarians. The population is largely free of disease and chronic illness, thus prospering well into their later years without huge health complications. In fact, they have the longest lifespan in the world, including ages well into the 120. After performing a medical check-up on the inhabitants of this valley, physician Robert MacCarrison (1936) reported on their extraordinary fitness and longevity. A study by a group of cardiologists (1984) found the condition of the cardiovascular system in the centenarians from this valley to be extraordinary, and the group pointed this fact out as the possible key factor in their longevity. A comparative analysis of lifestyles of longevous mountain people around the world (2014) has shown that in addition to the fresh-altitude air, the qualities they all share are a modest diet containing lots of seasonal fruit and vegetables, high physical activity, a stress-free life with pronounced social awareness, an unpolluted environment, and potable water rich with minerals. These factors undisputedly contribute to living healthily, but there are many people in the Himalayans and other parts in the world leading a similar lifestyle, yet with much fewer centenarians living in their midst. As it turned out, the water flowing from the Ultar glacier raising above the Hunza valley, has particular qualities. In the Hunza valley minerals, contained in the water of the melting glacier, are produced by the glacier which flows slowly to the lowlands and in the process grinds flint sand into very fine powder containing high amounts of silica.The water is exceptionally rich in minerals and elements in traces, which are not decomposed; they exist in the form of stable, very small minerals – colloids – suspended in the liquid. The water is cloudy and for this reason called "glacial milk". Further research is claimed to have led to the discovery of two intertwined key characteristics: the water contains quartz (silica) minerals in particularly small, colloidale form, and the water has antioxydative properties. Colloids are small solid parts of matter that do not dissolve in water (i.e. they do not decompose into ions), ranging from 10 to 10,000 nm in size. Nanocolloids are even smaller.

Here, an attempt is described that was proposed to explain the situation in the water containing nanocolloids (Figure 4). Proposal: In such small dimensions, matter displays distinctive properties: in colloids and particularly in nanocolloids. The electrons, which usually circle an individual molecule, begin moving around the entire „mineral". This causes a veritable crowd of electrons on the surface of the nanocolloid, and thereby a strong negative energy or anionic charge. The smaler the mineral, the greater its negative energy charge. Colloids act on water molecules like tiny magnets. Water molecules arrange themselves around them into spherical structures and do not float freely as they do in ordinary water. Also, since they are attracted by the colloids, they do not `bump` against the water surface as forcibly as they normally would; with its surface tension thus reduced, the water becomes more hydrophilic and substances dissolve in it more easily.

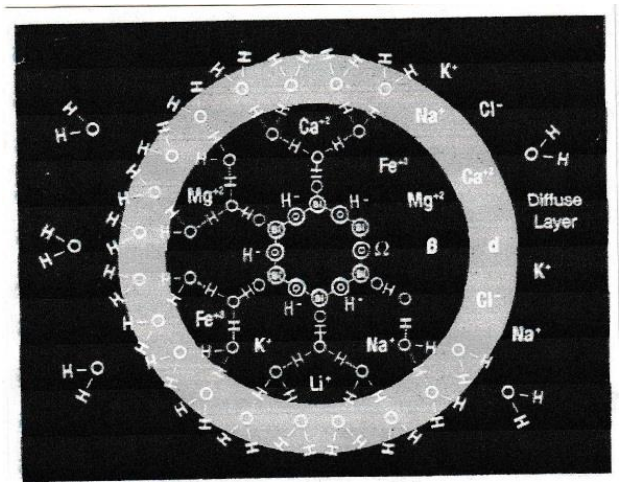

Figure 4. Silica colloid – the essence of Hunza water. The silica colloid mineral (the circle in the center, composed of silica and oxygen atoms) acts in water like a magnet. It attracts water molecules, thus making the liquid more hydrophilic and allowing it to carry nutrients (the image shows iron, magnesium, calcium and other ions, as well as water molecules) into the cells and toxins out of them more easily. Next to the colloid there are also hydrogen ions. These are essential to the production of energy in the cells and to protection of the cell against harmful effects (source of the image: Dove, Rimstid 1994). (From 16)

The human body produces such colloids in the process of metabolism when it breaks down food into smaller parts. During this same process, it also turns the tap water that we drink and which has a high surface tension (between 72 dyn/cm and 78 dyn/cm) into "living" water. The surface tension of blood in healthy and fit people is 45 dyn/cm. Only such water can efficiently carry nutrients into cells and toxins out of them. Colloids are thus essential to ensuring the transport ability of body fluids. In the Hunza valley such minerals are produced by the glacier (s. above).

The second key characteristic is the antioxydant property. Chemists classify substances into oxidants and reductants. While oxidants are the substrates that gain electrons, reductants are those to donate them. The latter can also be called antioxydants. In living beings, the level of antioxydants depends on the available amount of hydrogen, for electrons are borne around the organism together with hydrogen. Antioxydants such as thiols or ascorbic acid terminate chain reactions caused by oxidants that may damage the cells of organisms. To the group of antioxydants belong also naturally occurring compounds that are present in food and tissues. To balance the oxidative stress, plants and animals maintain complex systems of overlapping antioxydants, produced internally.

Antioxydant dietry supplements have not been shown to improve health in humans, or to be effective at preventing disease. On contrary, common supplements with antioxydant properties may interfere with the efficience of certain anticancer medication and radiation therapy. High doses of some antioxydants may have harmful long-term effects., e.g. increased rates of lung cancer. In addition to colloids, Hunza water contains quite a large amount of hydrogen in its anionic form (H^-). Thus, this situation allows favourable oxidant-antioxydant levels.The state of the body fluids can be measured by means of an rH indicator (hydrogen partial pressure). rH values over 28 denote oxidation, values under 28 denote reduction. Plain water is oxidized, its rH value is customarily 28 or higher. To functioning properly, the cells of a human organism need an antioxidant environment; rH values of the blood of young athletes range between 21.5 and 23.5. With age, the antioxydant level of blood changes; in healthy individuals aged between 40 and 50 years values of rH 25 are common. The higher the rH values of body fluids, the poorer the antioxydant protection and the greater the danger of degeneration and early aging. The rH value of Hunza water ranges between 18 and 20. This value is even lower than that of the blood of young and healthy individuals-good for health.

This is probably one of the important reasons why there are so few degenerative diseases among the inhabitants of the Hunza valley and so many hale and hearty centenarians. Regarding the validity of these interpretations of measured values: these interpr-etations are made more valid due to the fact that participation of colloids containing quartz is described above: a comparison with details given in the section „Antioxydant water?" (14 and this article) reveals that, also there, it are colloids, produced by finely grinding natural clay mineral of the Feldspat family, with silica as the main component and the key function in "structured" water.

The term „Cohort study" could actually be used to describe the situation in the Hunza valley. A "Cohort study" is a particular type of panel study where the individuals in the panel share a common characteristic [17]. Here, the individuals are the individuals making up the population in the valley, the common characteristic is that they use water with a special property, the presence of silica in the nanocolloids enriched, with a natural origin. Alltogether this is a natural system. One could even see that this study is a historical and current cohort study. There is something very special in this situation: Both for many years and today the study „takes place", and it is, in part, controlled by medical staff. Nowhere in the world does this situation exist for a study of any „magic" water that is on the market and sold for immense amounts of money. In the case of Hunza water, the positive outcome of the study is obvious: health and longevity are the benefits, and they are caused by the capacity of Hunza water as an antioxydant. What could be the consequences for us of all these new facts and interpretations? How could we use them for improved physical and mental health? Read the following episode! By the way: There was a clever person who did found a company and decided to selling botteled Hunza water – for about 50 US $ for 120 (!) ml. Hopes and dreams?

Conclusion

Research on water structure reveals that water is not just „H_2O". Depending on its location in a biological cell, various structures have been observed with very specific properties and implications for internal cell structure and cell function. A major aspect appears to be the balancing between oxidants and antioxydants in the cell. A high level of antioxydants is important. This aspect appears to be the main feature to keeping a living organism healthy both physically and mentally. Though the human body is able to take care of such a balancing effort, there are obvious means to support it. A main function in this effort have various water structures and natural ingredients in the water that have an influence on special properties of the water in the body. What about hopes and dreams? Long and healthy life? If you manage to consequently adopt the Hunza valley people´s lifestyle (s. above) - very important: no stress – you might, lucky enough, come close to your goal, and your hopes and dreams might come true. Bad enough: most of us will never have access to „glacier milk", but an appropriate lifestyle may very well take care of a favourable level of antioxydants. Read the Episode below and follow the father´s advice to his son!

An Episode

I will end this article with a short story that was told to me during a discussion on water and human health by a good friend of mine, a wise man from Iran.

Imagine: a father with his son.
The son is thirsty
Father: get a glass of water
The son does it
Father: what can you see when you inspect the water?
Son: I cannot see anything special

Father: I can see many interesting things – look more careful
Son: which kind of things?
Father: you will find out later – now drink the water
Son does it
Father: now get another glass of water and make sure that it is filled up to the brim
Son does it
Father: now we don´t touch it anymore
After two days:
Father: dear son, what can you see when you inspect the water?
Son: nothing really special, there is a slight loss of water
Father: I can see much more, I can see very interesting things
After additional three days:
Father: dear son, what can you see when you inspect the water?
Son: nothing really special, more loss of water
Father: I can see much more, I can see very special and interesting things
Son: what kind of things?
Father: I can see much more, and I expect that you could also see many interesting things. Have a closer look
After additional two days:
Father: dear son, what can you see when you inspect the water?
Son: nothing really special, just less water
Father: now drink the water
The son starts to drink the water, but...brrr, the water smells terrible and tasts scruffy
Father: dear son, your body contains 70 percent water. You should always keep your body and your thinking active and fresh, and by doing so you will also keep the water in your body active, fresh, dynamic, vivid and alive. Keep in mind: also the water in your body needs a lot of attention, and the water will then thank you and keep you healthy and happy for a long life!

References

Note: for some parts of the Essay, original texts of the authors are used to simplify and make sure that the immediate ideas and interpretations of the authors were presented correctly.

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