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Review Article

Electrization of the Body as a Factor Determining Human Health

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Abstract

Considering that the electric charge (potential) of water, the main component of the human body, largely determines its properties, it is shown here that the electrization of the human body can affect human health. In particular, it is shown that it is the negative electrization of the human body that can actually underlie the therapeutic effects of a number of therapeutic means, including such promising ones as hydrogen inhalations and pulsed electromagnetic fields (PEMFs).

Keywords: hydrogen therapy; PEMF; electrotherapy; acupuncture; cancer; thrombosis

Introduction

It has been shown previously that the electric charge (potential) of water largely determines its properties. In particular, it has been shown that positive electrization of water increases its surface tension and hydrating capacity, while negative electrization of water reduces both (Figures 1 – 5).

It is probably worth adding here that both of these dependencies determine the form-forming abilities of water, which most convincingly supports the difference in the shapes of salt crystals formed in oppositely charged waters (Figure 6).

So, taking into account both the results presented here (Figures 1 – 6) and those obtained previously [1 – 5], and also considering that water is the main component of the human body [6, 7], it is worth discussing the consequences of electrization of both the entire human body and its individual parts for human health, including mental health. It is thought that this discussion may help to realize that excessive positive electrization of the human body often contributes to the emergence of human diseases; at the same time, this same discussion may help to realize that it is precisely the negative electrization of the human body that actually underlies the healing action of a number of medical remedies.

Figure 1: Left: The low surface tension of negatively charged water does not limit its spreading and allows it to completely cover the bottom of the Petri dish. Right: The high surface tension of positively charged water causes it to be compressed and therefore prevents it from spreading [1, 2].

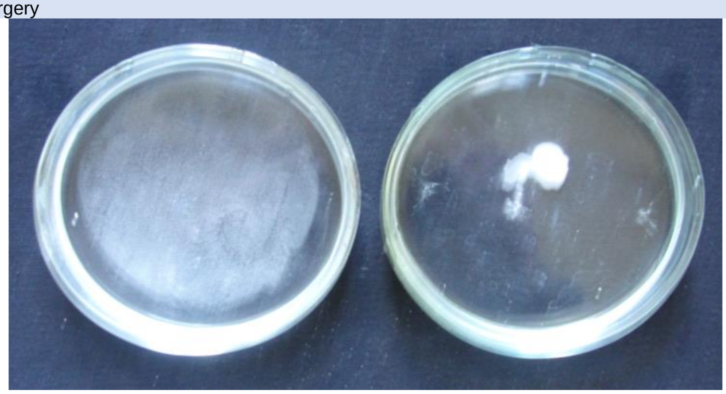

Figure 2: Left: The high surface tension of positively charged water allows it to distribute starch powder over its entire surface. Right: The low surface tension of negatively charged water does not allow it to distribute starch powder over its surface [1, 3].

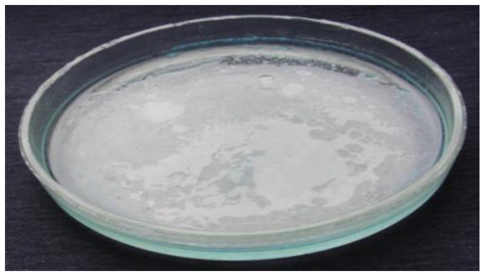

Figure 3: It is a film formed from a drop of oil on the surface of water with a positive potential [4].

Figure 4: Left: A small drop of oil on the surface of water with a negative potential looks like this. Right: A spot of oil on the surface of water with the same negative potential looks like this; the shape of this spot remains unchanged due to the lack of interaction between the oil and the negatively charged water [4].

Figure 5: Suspensions formed by intensive mixing of oils with positively charged water do not stratify for hours and, accordingly, retain their milky white or yellowish colour (left), unlike suspensions formed by intensive mixing of the same oils with negatively charged water, which stratify within minutes (right) [4].

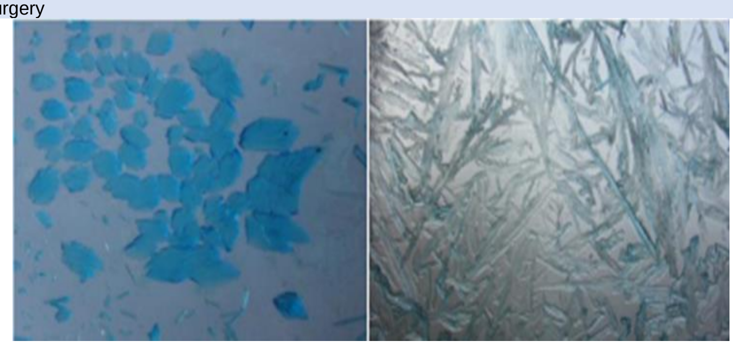

Figure 6. Left: Intensely blue (because more hydrated [8]) prismatic crystals formed in $CuSO_4$ solution prepared using positively charged water. Right: Pale blue or colourless (because less hydrated or completely dehydrated [8]) plant crystals formed in $CuSO_4$ solution prepared using negatively charged water.

Discussion

At the outset of the discussion, it should be accepted that there are a number of factors, both natural and artificial, that contribute to the positive electrization of the human body. To make this acceptance fully justified, some of these sources should be mentioned.

Air. So, given the ability of molecular oxygen to attach electrons, thereby turning into superoxide anions, O_2^- ($O_2 + e \rightarrow O_2^-$ [9 – 11]), it is easy to understand that air is a source of constant positive electrization of both the skin and the lungs of a person; it is perhaps appropriate to add here that it is precisely this transformation of molecular oxygen that is used in hydrogen-air electrochemical cells (Figure 7).

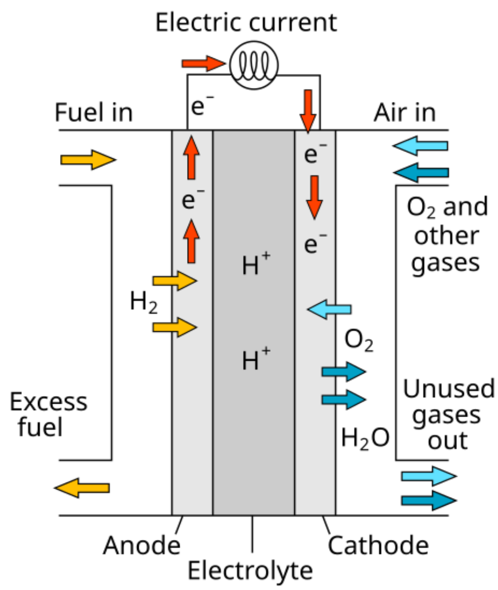

Figure 7. This is a diagram of a hydrogen-air electrochemical cell. The red arrows indicate the movement of electrons from the compartment with the aqueous solution bubbled with hydrogen to the compartment with the aqueous solution bubbled with air. It is noteworthy that bubbles of hydrogen gas cause negative electrization of the aqueous medium (left), whereas bubbles of oxygen gas cause positive electrization of the aqueous medium (right).

It is appropriate to add here that the high content of gaseous hydrogen in the human intestine [12] allows considering any human organism as a hydrogen-air electrochemical cell.

Thus, there are physical and chemical phenomena (Figure 7) due to which air, both in contact with the skin and inhaled, becomes a constant source of positive electrization of the human body.

It is probably worth noting here that one of the results of the mentioned electrifying effect of inhaled air on the human body is the positive electrization of arterial blood, which actually determines the positive potential of the left hand relative to the right (Figure 8); when analyzing this note, one should take into account the peculiarities of human vascular geometry [13, 14].

Light. Considering that light pushes positive charges in the direction of its propagation and negative charges in the opposite direction [15], all illuminated objects are enriched with positive charges and freed from negative charges; therefore, all water-containing objects, including the human body, acquire a positive charge when exposed to light.

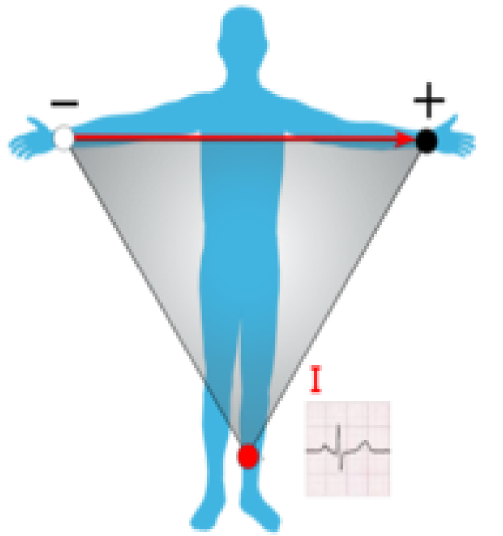

Figure 8: The human hands are polarized in such a way that the left hand has a predominantly positive charge (potential), and the right hand has a predominantly negative charge; it is this potential difference that is measured when recording an electrocardiogram (bottom right) [16].

It is probably clear that this same polarization turns the left hand into a source of positive charges and the right hand into a source of negative charges [2].

Clouds. The ability of clouds to positively electrify the subcloud areas (Figure 9) turns them into a source of positive electrization of both human skin and the air they inhale.

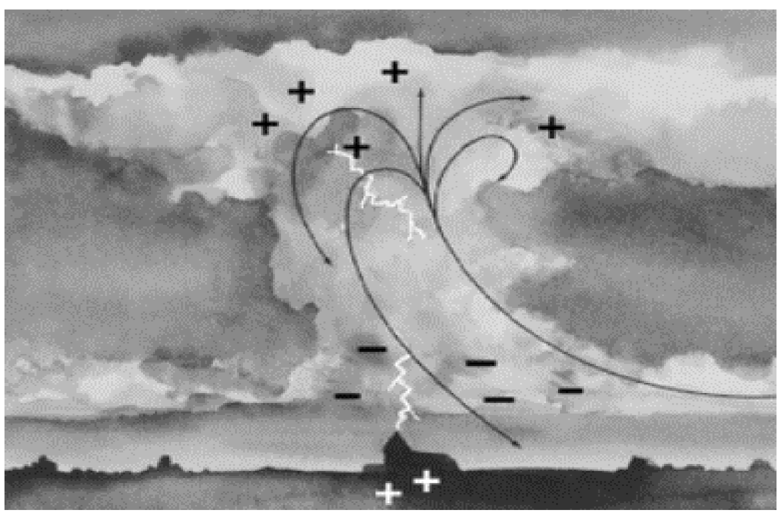

Figure 9: This diagram shows the distribution of charges in clouds and subcloud areas. Positively charged subcloud areas and objects located there are marked with white pluses [2]. Positive charges in the subcloud area arise due to their attraction from the negatively charged lower side of the cloud, that is, as a result of electrostatic induction [17].

Boiled water. Boiling water, which is in a liquid state, acquires a positive charge when it comes into contact with bubbles filled with its vapor. In this case, the positive electrization of liquid water occurs in full accordance with Kyon's rule: when two phases come into contact, the phase with the higher dielectric permittivity acquires a positive charge, and the phase with the lower dielectric permittivity acquires a negative charge [8]. So, if, as usual, we assume that the dielectric permittivity of water vapor is ~1, and the dielectric permittivity of boiling water is ~56 [8, 18], then the latter should acquire a positive charge. It seems also obvious that foods placed in boiling water also acquire a positive charge, which is retained until they cool.

Refrigerator. Considering that the dielectric permittivity of ice at –1 °C is ~90, and the dielectric permittivity of air at –1 °C is close to 1 [17], frozen products acquire a positive charge, of course, in accordance with this very Kyon's rule [8].

Thus, there are numerous sources of positive electrization of the human organism. Moreover, it seems that people feel the need for such electrization and therefore strive to strengthen it, in particular with the help of hot drinks such as coffee and tea, or hot dishes. This, in turn, allows assuming that positive electrization of the organism is intuitively perceived by a person as a condition that ensures his comfortable existence.

Thus, extrapolating to the human body the fact that it is positively charged water that has a high surface tension (Figures 1 – 3), one can assume that a person's need for this water is due to his intuitive desire to increase the tone of both the skin and blood vessels and, thus, saturate the brain with blood and, accordingly, oxygen and nutrients. Therefore, it is quite possible that this need may be driven by a person's intuitive desire to improve both their mental abilities and coordination.

It is also worth extrapolating to the human body the exceptional ability of positively charged water to hydrate biopolymers, turning them into hydrogels with the adhesive properties of bone glue or starch paste [1 – 3]. Thus, a person's need for such water may reflect his intuitive need to strengthen intercellular contacts in his body and, consequently, the need for a sense of his own integrity.

However, one must also not forget about the ability of positively charged water to increase the permeability of cytoplasmic membranes [4]. Perhaps this ability of positively charged water should also be taken into account when explaining people's need for hot drinks and food. So, it is likely that people feel that the nutrients contained in hot drinks and foods are more easily absorbed by their cells. At the same time, it is quite possible that people's desire to consume hot drinks and food is also due to their intuitive desire to stimulate cell proliferation [3] and, thus, the renewal of the body at the cellular level.

Either way, it appears that positive electrization of the body can provide a number of benefits to a person. Despite this, it seems quite expected that an excessive level of this very electrization can provoke diseases (as everything excessive does). Thus, it is quite possible that the same ability of positively charged water to transform biopolymers into hydrogels [4] also manifests itself in the formation of blood clots, in particular those associated with cancer [19 – 22]. Moreover, it is equally likely that it is this ability of positively charged water that is responsible for the formation of blood clots in the lungs, heart and brain [23 – 26].

When analyzing the last statement, it should be taken into account that the air inhaled by a person primarily electrifies his lungs, similar to the air flow in the anode compartment of a hydrogen-air electrochemical cell (Figure 7, right). Then, it should be taken into account that from the lungs blood quickly flows to the heart and brain [13, 14]. In addition, it should be taken into account that the body of a standing or sitting person is polarized in the vertical direction like a cloud (Figure 9), and therefore the human brain itself, even without blood flow, accumulates positive charges, thereby promoting thrombus formation [2, 27].

It is probably worth recalling here that all the mentioned thrombi can be formed from both hydrated biopolymers [4, 27] and emulsified fats (Figure 5).

It is also likely that it is the destructive capacity of positively charged water (Figures 2, 3) that causes hemorrhagic ischemia, particularly in the brain. Apparently, it is worth noting here that the body of a standing or sitting person is polarized like a cloud (Figure 9), and therefore the human brain is the place where positive charges predominantly accumulate [2, 27]; in any case, it is this assumption that most clearly explains the high frequency of occurrence of hemorrhagic ischemia in the human brain.

Realizing that all these considerations are unusual for doctors, it is worth demonstrating here that it is precisely the negative electrization of the human body that unites a number of therapeutic means and, therefore, can be considered as the true cause of their effectiveness.

Slow breathing. Given that air currents positively electrify the aquatic environment (Figure 7, right), it can be expected that slow breathing slows down the positive electrization of the lungs and, consequently, the blood that flows from the lungs to other organs. Therefore, the healing effect of such breathing [28 – 31] seems quite understandable, of course, from the point of view proposed here.

Hydrogen inhalations. Considering that hydrogen gas flows negatively electrify aqueous media (Figure 7, left), it can be expected that inhaled hydrogen gas can also negatively electrify the lungs and, consequently, the blood flowing from them. This, in particular, allows explaining the successful use of hydrogen inhalations in the treatment of cancer and ischemia [32 – 40], accepting, of course, that it is the positive electrization of human tissues that promotes both cancer and thrombus formation [22].

Metal therapy and acupuncture. It is believed that the dielectric permittivity of metals significantly exceeds the dielectric permittivity of water (in theoretical calculations, the dielectric permittivity of metals is equal to ∞ [17]). Therefore, all metals, including corrosion-resistant ones, are expected to exhibit electron-donor properties in relation to aqueous media, in accordance with the above-mentioned Kyon's rule [8]. Apparently, this alone allows considering metals in contact with the human body as sources of its negative electrization and, consequently, justifies their therapeutic use (accepting, of course, the negative electrization of the human body as a therapeutic agent). Based on this, both copper coins attached to human skin [41] and metal nanoparticles introduced into the human body [42 – 46] can be considered entirely adequate therapeutic agents; in any case, this is fully consistent with expectations regarding the use of metal nanoparticles in both anti-cancer and anti-ischemic therapy [42 – 46].

When analyzing the therapeutic effect of acupuncture, it should be noted that the metal needles used are usually polarized in the vertical direction, like clouds (compare Figures 9 and 10); this, in turn, means that the needles used negatively electrify the human body in two ways: firstly, by exhibiting, like all metals, electron-donating properties in relation to aqueous media [8], and, secondly, due to the higher concentration of electrons at the lower ends of the needles [2, 47].

Figure 10: The lower ends of the vertical needles represent regions of high electron density [47].

DMSO. Considering the ability of dimethyl sulfoxide (DMSO) to attach aqueous protons, as well as its ability to quickly leave the human body, especially in a protonated state [4], this substance can be positioned as a means of reducing the positive electrization of the body and, consequently, as a means of promoting the desired negative electrization of the body. Therefore, the positive therapeutic effects of DMSO against various types of cancer [49 – 50] seem quite understandable from the point of view proposed here; at the same time, reports that DMSO can act as an antithrombotic agent [51, 52] also seem quite expected.

PEMF therapy. Considering the forms of chlorides formed in aqueous solutions under the influence of pulsed electromagnetic fields (PEMFs) (Figure 11), it can be concluded that these fields contribute to the negative electrization of aqueous solutions and, consequently, the human body; it is probably worth recalling here that chlorides are widely distributed in the human body [53 – 55].

Figure 11: These are crystals formed after drying an aqueous solution of $CuCl_2$, which was previously subjected to the action of EMF, pulsing with a frequency of 10 Hz for 10 minutes; for contrast, the crystals formed were treated with ammonia vapours [56]; compare with Figure 6, right.

Thus, the anticancer and antithrombotic effects of PEMFs [57 – 62] seem quite expected, naturally, from the point of view proposed here.

Electrotherapy. Considering the forms of chlorides formed in aqueous solutions through which an electric current was passed (Figure 12), one can conclude that the same negative electrization of the human body causes the therapeutic effects of electrotherapy, in particular, those indicated by oncologists and cardiologists.

Figure 12: These are crystals formed after drying an aqueous solution of $CuCl_2$ through which a direct current of 10 mA was passed for 10 minutes [56]; compare with Figure 6, right.

Thus, the anticancer and antithrombotic effects of electrotherapy [63 – 70] can also be considered expected.

Conclusion

Thus, it is suggested here that physicians should not ignore the fact that water is the main component of the human body, and also the fact that the electric charge (potential) of water essentially determines its properties, including its vital properties. Accordingly, it is suggested here that an awareness of these facts will enable physicians to readily accept the idea advanced here that human diseases may be caused by excessive positive electrization of the human body, and also the idea that similar therapeutic effects of agents of different natures may be due to their common ability to negatively electrify the human body. (Apparently, the fact that both of these ideas have not only a physicochemical but also an evolutionary basis [71 – 73] will facilitate their acceptance.)

Otherwise, both of these ideas can be considered solely as an attempt to provide an adequate response to the well-known statement by A. Szent-György: “Biology, perhaps, because until now not successful in understanding the most common functions, that focused on the matter in the form of particles, keeping away them from two matrixes: water and electromagnetic fields”.

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