

Human water model: interstitium and meridians of traditional Chinese medicine

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Key words: interstitium, water structures, acupuncture meridians, human model

Motivation and Aim: It is well known that the human body is a complex and still insufficiently studied biosystem. However, the network that runs through all the tissues of the interstitium in the human body that has been found quite recently became a complete surprise for the scientific community [1]. This network consists of interconnected visible structures – microcavities containing interstitial fluids, in which the water content is 99 % of the volume. These structures are constantly contracting and expanding as water moves through the network. This characterizes the interstitium network as a dynamic water network. The purpose, structure and distribution of the network in the human body are still unclear. Along with this, there are hypotheses that suggest that the network can serve as the anatomical basis of either a previously unknown organ or a long-known network of acupuncture meridians of traditional Chinese medicine [2]. The presence of an interstitium water network indicates the need to build new models of the human body, taking into account contemporary ideas about water and its role in biosystems. Previously, the author developed a human water model, which takes into account the processes of water self-organization in biosystems [3]. Thus, the purpose of this work is to present the formalized foundations of the human water model and their application to explain the structure of the interstitium network as well as to elucidate the possibility of the network to serve as an anatomical basis for the network of acupuncture meridians.

Methods and Algorithms: When presenting the basics of the human water model, we considered human body consisting of almost 70 % of water in a simplified way as a water environment without taking into account electrolytes and organic components of this environment. It was believed that its structural arrangement is determined by the processes of self-organization of water, which for different water systems occur according to their own rules. Therefore, we used the rules of water self-organization in biosystems, which were first established using the method of generalized crystallography [4]. According to these rules, a scheme of phased self-organization of the water environment was built. At the beginning, the formation of five simplest water clusters from water molecules was considered, in the form: dimer, trimer, tetramer, pentamer, and hexamer, from which five simplest dissipative structures consisting of clusters of the same type were further formed. Then these structures were combined into cyclic dissipative structures, from which subsequent fractal structures of the water environment of a higher hierarchy level were further formed. This scheme was formalized in the form of a graph of the water environment, similar to the Petersen graph. The graph was analyzed in order to identify the mechanism that ensures the dynamics of self-organization of the water environment. Next, the medium was divided, as is customary in physiology, into two parts: intracellular and extracellular, and the found

mechanism was used to identify the network outside the cellular part of the water environment. They built a graph of this network, analyzed its structure and properties, and the paths of the graph were interpreted as water channels of the interstitium and used to explain the networks of the interstitium and meridians.

Results: The structure of the interstitium network the model explains how the body's water circulation system consists of interconnected 12 main and 36 secondary water channels of three types. This system is characterized by three essential properties. The first property is due to the fact that in the system there is a directed movement of charged ions H^+ and OH^- , which form ionic (electric) currents of two polarities, circulating through the water channels of the network simultaneously in two opposite directions. Therefore, this property manifests itself in a constant change in the direction of the total current of the network, depending on the current ratio of the contributions of the two ionic currents. The second property is due to the fact that moving ion currents excite two fields around the water channels – electric and magnetic. This property is manifested in the arrangement of the channels of the water environment in two perpendicular directions of these fields. Moreover, in each of these directions, the interaction of water channels will obey the Ampere law: parallel channels with currents of the same polarity, the networks flowing in one direction will attract, and in the opposite direction they will repel. The third property is due to the fact that all water channels are grouped into three groups within the network, which has a rotational symmetry of the third order. These three groups of channels can be considered as analogues of "sensors" of electromagnetic fields, which are arranged in a similar way and contain the same working substance in the form of water molecules and H^+ and OH^- ions. It follows that the network will have three spectral windows of absorption and emission of electromagnetic energy. Moreover, each window will have two resonant frequency peaks that are multiples of the resonant frequencies of the molecular vibrations of the H^+ and OH^- ions. Comparison of the models of the interstitium network and the meridian network reveals an almost complete coincidence of their structure. It makes it possible to count the interstitium as the anatomical basis of the meridian network of traditional Chinese medicine.

Conclusion: The results obtained in this paper confirm that the human water model and the Chinese medicine model are similar despite their different terminology. Both models describe the same process of accumulation and removal of H^+ ions found in the model, which is realized in the water environment of the interstitium of the human body. The importance of the human water model being for medicine is due to its new content. It allows clinicians to take a fresh look at the causes of many human diseases associated with disorders in the structure and dynamics of the body's water environments.

References

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