

ACUPUNCTURE-BASED BIOPHYSICAL FRONTIERS OF COMPLEMENTARY MEDICINE

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Abstract- In this paper biophysical bases and frontiers of the acupuncture-based complementary medicine are considered, and essential significance of its resonance microwave (MW)/ultralowfrequency (ULF) electromagnetic (EM)/ionic nature as well as the quantum-holographic "electrooptical" neural-network-like-function of the acupuncture system are pointed out, as supported by microwave resonance therapy (MRT) of the psychosomatically disordered acupuncture system. At the same time, the non-threshold gap-junction-based self-assembling of the acupuncture system presents an explanation for the extreme sensitivity of the organism upon the influences of weak external MW/ULF EM fields.

Keywords- Acupuncture, microwave resonance therapy (MRT), biophysical bases, electromagnetic/ionic system, quantum-holographic-neural-network function, non-threshold gap-junction self-assembling.

I. INTRODUCTION

Currently, there is a tremendous interest in potentiating health. Yet, in spite of significant financial and human resources engaged in biomedical investigations and health prophylaxis, human health is still jeopardized by numerous modern psychosomatic diseases, having its convenient ground in modern men exposed to everyday stress. Since conventional partial methods have failed to prevent and treat these health problems, new approaches are required which will include holistic traditional methods, oriented in healing a man as a whole - but not a disease which is only a symptom of the disordered wholeness [1]. One of the main focuses (alongside with consciousness) of these traditional methods is the human acupuncture system, whose biophysical bases and frontiers will be considered further on.

II. BIOPHYSICAL FRONTIERS OF ACUPUNCTURE-BASED COMPLEMENTARY MEDICINE

Besides its practical medical aspects, Chinese (and Indian) complementary medicine is deeply colored with mystical connotations, which was one of the reasons why Western science has been hardly accepting experiences of Eastern tradition. The second reason was that within the 12 visceral organs corresponding to the 12 paired meridians, Chinese tradition has not included the brain and endocrine glands: however, in the past few decades it was found that the acupuncture system was in close functional interaction with both central nervous system and endocrine system, as well as with peripheral and autonomous nervous systems [1-4]. The final reason was a lack of clear anatomical basis of the

Chinese acupuncture system: however, new investigations of specific intercell channels (so called gap junctions, cf. Fig. 1, an evolutionary older type of intercell communications, transporting ionic electrical signals between excitable cells, whose conductivity can be modulated by intracellular pH-factor, Ca^{2+} -ions, neurotransmitters and second messengers, and even by voltage [5]) have shown their significantly increased concentration inside the acupuncture points [6].

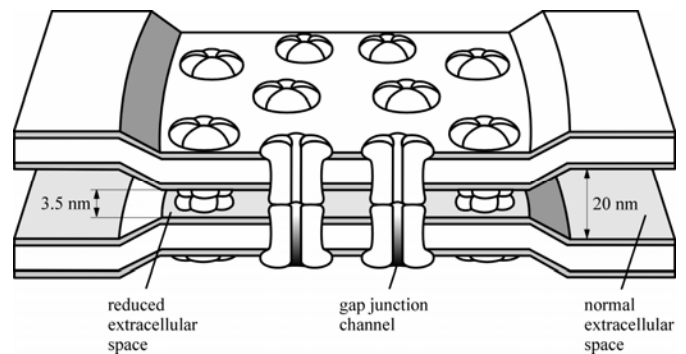


Fig. 1. A three-dimensional model of the gap junction channel based on X-ray diffraction studies; see the text for detailed clarification.

A better organization of cell structures and an ionic basis of the qi entity of the acupuncture system is also suggested by ~ 10 times higher skin electrical conductivity of the acupuncture points in respect to the surrounding tissue, as well as much higher reabsorption of aeroions in these points [3]. Besides, it seems that the external qi gong treatment [7] or healing process [8] might be related with the ionic diffusion between the healer and helee and/or information transfer of the ultralowfrequency (ULF) and microwave (MW) electromagnetic (EM) patterns responsible for normal functioning of acupuncture system and overall health [9,10]. In this framework, the positive ions have catabolic influence (yang) and flow predominantly through the right circulatory part of the acupuncture system, while the negative ions have anabolic influence (yin) and flow predominantly through the left circulatory part of the acupuncture system [1,11]. Therefore, the role of acupuncture stimulation might be the balancing of activity of the positive and negative ions within the body, corresponding to normal healthy condition.

This also implies the significance of aeroionic balance [1,9,10-12] and regular rhythmical breathing, recognized in Indian tradition: according to swara yoga [13] the rhythmical

breathing through nose is especially important, in order to inhale as many as possible aeroions (prana) within the two (out of three) most significant nadis (the left ida and the right pingala, with their entrances in corresponding nostrils). This is recommended in fresh and nonpolluted air, when even some excess of negative ions exists, with the relaxing healthy influence on the body; in the same context, in closed environments a microclimate engineering can be recommended by applying aeroionizers which produce an excess of negative ions [1]. It should be added that swara yoga is also quite acquainted with the significance of ~ 2 hour (brain and nasal) ultradian rhythms, and recommends their simple nasal control in the process of recovering or keeping energy and emotional balance of the organism [13]. Although this rhythm is not apparently in phase with ~ 24 -hour acupuncture rhythm of successive dominance of 12 paired meridians (i.e. ~ 2 -hour dominance for each organ-related meridian with corresponding yin or yang functions in the following order: yin-yin-yang-yang...[2-4]), it seems that every ~ 2 -hour organ-related acupuncture phase (either yin or yang) needs complete ~ 2 -hour nasal phase (ida-pingala) in order to balance activities of the corresponding organ-related pair of symmetrical left and right meridians [1,11], to enable both regenerative (anabolic, ida-like left meridian) and degradative (catabolic, pingala-like right meridian) organ functions, contributing finally to either yin or yang overall corresponding organ-effect from the viewpoint of Chinese traditional medicine [2-4].

In ionic acupuncture currents the MW component is modulated by the ULF component [1,9,10], this being in overall agreement with the frequency and power windowing in tissue interactions with weak electromagnetic fields [14]. In support to the ULF nature of ionic currents in acupuncture channels, one can cite the resonance ULF (~ 4 Hz) stimulation of the acupuncture analgesia endorphin mechanism [15]. On the other hand, the evidence for the MW component of ionic acupuncture currents is provided by resonant MW (~ 50 -80 GHz) therapy [16,17], efficient even in very serious diseases [11,16,17], implying that acupuncture system is a dynamic structure differentiated at the locations of maxima of three-dimensional standing waves, formed as a result of the reflection of coherent microwave (~ 100 GHz [18]) Frohlich excitations of molecular subunits in the cell membranes, proteins, microtubules etc. - supported also by other investigations which have demonstrated that differentiation of gap junctions (of higher density at acupuncture points) is slightly sensitive to voltage [5].

III. DISCUSSION

In the context mentioned above, the explanation for efficiency of the microwave resonance therapy (MRT), as noninvasive nonmedicamentous medical treatment, should be sought [1,11]: some disorders in the organism give rise to deformation in the standing wave structure of electrical field of the organism in MW region, which influences corresponding changes in spatial structure of the acupuncture system, and consequently resonant frequencies of its meridians, resulting in some disease. During the therapy, applying the MW sound at

corresponding acupuncture points the excited acupuncture system of the patient is relaxing to the previous healthy condition, while reaching the normal resonant frequency responses of its meridians upon the wide spectrum MW source - and following to physiological mechanisms of the acupuncture regulation [2-4] the organism biochemically overcomes the disease.

At the same time this presents explanation [1,11] for the sensitivity of the organism on the influences of extremely weak external MW/ULF electromagnetic fields [14], through MW/ULF electromagnetic induction within electromagnetic/ionic circulatory acupuncture system, thus modulating acupuncture currents by external electromagnetic fields, without any limitations by threshold potentials which do not even exist within gap junction electrical synapses of the acupuncture system [5].

The quantum-like coherent characteristics of the MRT (sharply-resonant sensory response of the disordered organism, extremely low-intensity and low-energy non-thermal biologically efficient MW electromagnetic radiation, and negligible MW energy losses down acupuncture meridians) should be also pointed out [16,17], which might be viewed as a consequence of the existence of Sit'ko's nonlocal selfconsistent biological macroscopic quantum potential, cf. Fig. 2, which might give rise to nonlinear coherent EM MW long-range maser-like excitations of biological nonlinear absorption medium with the cells as active centers.

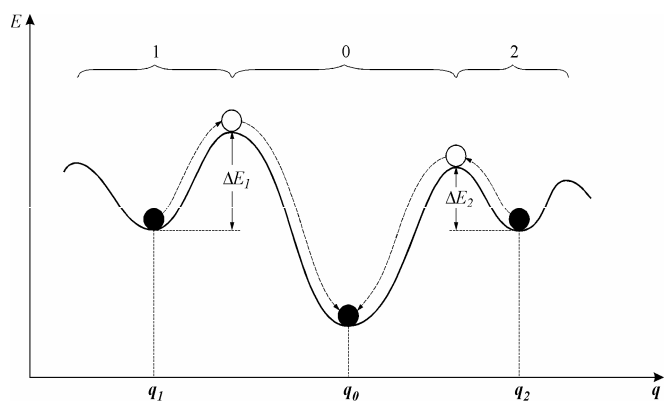


Fig. 2. Schematic presentation of the potential hypersurface of nonlocal selfconsistent macroscopic quantum potential of the acupuncture system of an organism in energy-configuration (E, q) space, with the balls representing stable (black) and unstable (white) configurations, which belong to different basins of attraction: 0 - basin of attraction of the ground (healthy) state q_0 ; 1 and 2 - basins of attraction of the two excited (disordered) states q_1 and q_2 . It should be pointed out that energy surface changes gradually during the MRT treatment, by decreasing the potential barriers ΔE_1 and ΔE_2 (and corresponding MRT sensory responses) of the potential wells 1 or 2, to be overcome in traversing to the 0 basin of attraction of the ground (healthy) state, when organism gradually recovers by further spontaneous approaching the healthy state q_0 (with poor MRT sensory response, as already being in the ground-state).

In this framework, acupuncture meridians might be related to eigenfrequencies and spatio-temporal eigenwaves distributions of every individual biological quantum system. This suggests that healthy state might be considered as an absolute minimum (ground state) of the nonlocal selfconsistent macroscopic quantum potential of the organism, some disorders of an acupuncture system corresponding to higher minima of the (spatio-temporally changeable) potential hypersurface in energy-configuration space [1,11], which possibly explains the higher sensory responses of the more excited (more disordered) acupuncture system, and poor MRT sensory response of the healthy acupuncture system being already in the ground state, cf. Fig. 2.

Such a picture is very close to the associative neural networks ones in their energy-configuration spaces [1,11], and to pattern recognition as convergence of the neural networks to the bottoms of the potential hypersurface, being the attractors of neural networks memory patterns [19,20]. This also supports the electromagnetic/ionic MW/ULF quantum-holographic function of the acupuncture system (like complex oscillatory holographic Hopfield neural network [20]), and its essential relation to (complex-valued quantum relativistic) consciousness, as strongly suggested from modeling of altered and transitional states of consciousness [1,9-11].

IV. CONCLUSION

In this paper biophysical frontiers of acupuncture-based complementary medicine were considered, and essential significance of its resonance MW/ULF EM/ionic nature was pointed out, as well as biophysical bases of psychosomatic disorders on the level of acupuncture system.

Particularly, the macroscopic quantum-like coherent characteristics of the Microwave Resonance Therapy (MRT) of the disordered acupuncture system suggest that healthy state might be considered as an absolute minimum (ground state) of the nonlocal selfconsistent macroscopic quantum potential of the organism, some disorders of an acupuncture system corresponding to higher minima of the (spatio-temporally changeable) potential hypersurface in energy-configuration space.

Such a picture is very close to the associative neural networks ones in their energy-configuration spaces, and offers a new insight in the mechanisms of the more abundant dynamic assembling of the gap junction hemichannels and hence acupuncture points and meridians - upon the internal microwave MW electromagnetic field spatio-temporal maxima at the temporary position of the acupuncture system, modulated also by ultralowfrequency ULF brainwaves EM fields - and hence the very biophysical nature of the temporary psychosomatic health or disease.

At the same time this presents explanation for the extreme sensitivity of the organism upon the influences of weak external MW/ULF EM fields, through the MW/ULF EM induction within EM/ionic circulatory acupuncture system, thus modulating acupuncture currents by external EM fields, without any limitations by threshold potentials which do not even exist within gap junction electrical synapses of the acupuncture system.

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