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Bonghan Duct and Acupuncture Meridian as Optical Channel of Biophoton

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A biophoton in connection with inter-cellular communication is introduced, with its important source DNA. The Bonghan duct as anatomical structure of acupuncture meridians is considered with its flowing contents, DNA-granules. A hypothesis of an optical channel of coherent biophotons is proposed as a new communication and control network of photons, which is the physiological function of Bonghan ducts. This can explain scientifically the therapeutic effects of acupuncture.

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I. INTRODUCTION

1. Biophoton and inter-cellular communication

Emission of photons in the visible range by animal cells and tissues has been described for a variety of organs and by many authors. By the use of photomultiplier tubes (PMT) emission has been readily detected from liver [1–4], heart [5,6], lung [7], nerve [8], and muscle [9,10]. Recently there have been observations of biophotons from human skin for fundamental study [11–13], and for possible diagnostic applications [14–16] in connection with acupuncture.

In considering the possibility that cells and organisms may communicate at long range by means of electromagnetic signals, Presman [17] suggested that there may be a system of communication that sends messages simultaneously to all organs, including those perhaps not directly connected with the nerve network. He proposed that electromagnetic signals are involved, which is consistent with the sensitivity of animals to electromagnetic fields. Biophotons could be the electromagnetic signals that Presman envisioned, as practically all organisms emit biophotons at a steady rate from a few photons per cell per day to several hundred photons per organism per second.

Communication and control between cells and tissues are deeply related with the development and differentiation of cells and the regulation of the gene activity that have been considered one of the most important problems of biology. Nagl and Popp [18] proposed that the biophoton field of cells plays the key role in the processes of cell development and differentiation. The model is a complete theory of the origin and biological function of the ultraweak photon emission of a living system.

2. DNA as a source of biophotons

Light is emitted from an excited atom or molecule when an electron, having absorbed a quantum of energy, is elevated to a higher energy level. Charge separation underlies the primary bioenergetic transduction processes associated with biological membranes, and the formation of excitons and their propagation are involved in energy transduction and in biocommunication. Rattemeyer and Popp [19] suggested that the DNA molecule is an exciplex in which photons are stored and which can be a source of biophotons. Exciplex formation in DNA has been shown to predominate, even at room temperature.

The non-coding DNA may act as a photon store and coherent radiator, because of its enormous polymer size and its ability to form exciplexes. The resulting long-range electromagnetic waves and fields can be seen as the basis of self-organization, mitosis and differentiation. The biophysical model for inter- and intra-cellular communication by Nagl and Popp [20] postulated that the biophoton is trapped and emitted by a cellular physical resonance device, namely DNA, which results in biophoton emission with a high degree of coherence.

II. BONGHAN DUCT AND ACUPUNCTURE MERIDIAN

1. Acupuncture meridian

The meridians and collaterals are the pathways for the circulation of Qi throughout living animals. The system

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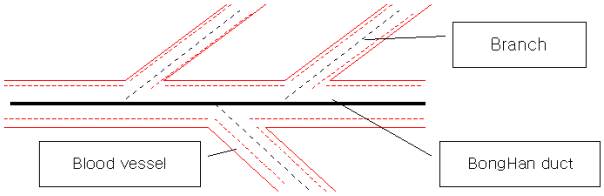

Fig. 1. Bonghan duct inside blood vessel (schematic diagram).

includes the Twelve Regular Meridians, the Eight Extra Meridians and collaterals. They form a network that integrates the living animal into a whole organism.

The Twelve Regular Meridians are composed of three yin(−) meridians of hands, and feet, respectively, and three yang(+) ones of hands, and feet, respectively. These meridians control the function of five Zang and six Fu.

The acupoints and the meridians have been investigated for their physical properties by various people. The most prominent feature is that they have lower electrical impedance, compared with non-meridian points. They have other peculiarities, such as higher CO2 production, more biophoton emission [21] at the acupoints, and better propagation of acoustic waves, *etc.*

Concerning the anatomical basis of the acupoints and meridians, there have been many attempts to find any structural evidence, but without success. It is now generally accepted that the therapeutic effects are due to cooperative action of the nervous system.

2. Bonghan Theory

In the early 1960s the North Korean Bonghan Kim discovered a new system of anatomy and histology, a network different from the nervous system, vascular vessel and lymphatic channel, which is regarded as the physical form of the Meridians [22]. He studied the system in great detail to find the Bonghan corpuscle, the structure of acupoints, and a Bonghan duct as the tubular structure connecting the Bonghan corpuscles.

Kim used a staining technique to trace the Bonghan networks and found that they indeed include the whole of the meridian systems. Furthermore, the network is distributed deep inside the body all over the surface of major organs. Most surprisingly, the Bonghan ducts exist even inside blood and lymphatic vessels (Figure 1).

The physiological role of the Bonghan system is deeply related with cell therapy by regenerating cells in the damaged tissues. These therapeutic effects are achieved by DNA granules that flow in the Bonghan duct, and the DNA granules play an important role in the development process as well.

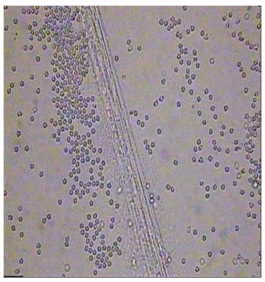

Fig. 2. Differential interference contrast image of a Bonghan duct.

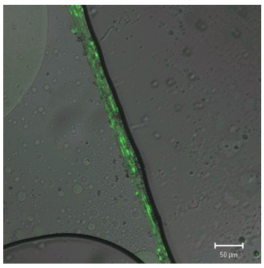

Fig. 3. Confocal microscope fluorescent image of acridinine orange stained Bonghan duct. Rod shaped nuclei are shown in line.

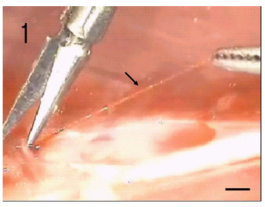

Fig. 4. Bonghan duct enshrouded and thickened by fibrin is taken from the caudal vena cava of a rat 2mm.

3. Recent progress: Intra-vascular Bonghan duct

Unfortunately, Bonghan theory has not been confirmed by other people, mainly because his method was not disclosed until now. Only in the last year has a new method been contrived to confirm part of his theory, namely, the existence of a threadlike structure inside blood vessels [23].

The existence of a threadlike structure floating in blood vessels is a challenge to the long held textbook knowledge of anatomy. Yet its existence could be confirmed by the technique recently developed [24]. Due to its transparency and small size the intra-vascular Bonghan duct can not be observed either by magnifying glass or light microscopes.

Only under phase contrast microscope is the duct barely detectable, but almost indiscernible from fibrins (Figure 2). It is, however, quite clearly distinguishable by its rod shape nuclei under fluorescence microscope when the sample is stained by acridin-orange by using a

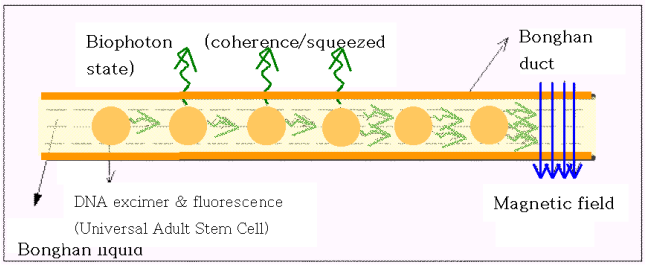

Fig. 5. Optical channel model of biophotons in a Bonghan duct. DNAs are sources of coherent biophotons which propagate along the duct. (Schematic diagram)

method developed by us [25] (Figure 3). When a sample is taken from the caudal vena cava of a rat (Fig. 4) the intra-vascular duct is enshrouded with fibrins to become thick and strong, and requires urokinase solution or an electric field separation technique to recover the pure intra-vascular tissue [26].

III. OPTICAL CHANNEL MODEL OF BIOPHOTON

As pointed out by Presman [17], there may be a system of communication that sends messages to all organs, including those perhaps not directly connected with the nerve network. Presman proposed that electromagnetic signals are involved, and Popp suggested that a biophoton field is the desired answer, and DNA conformation is the source of the biophoton [8,20].

With DNA and biophotons we still need a network or channel to biologically realize the Presman-Popp postulation. Bonghan theory is just the answer. It supplies the channels with DNA granules flowing inside, and the channels are distributed all over the body, connecting the acupoints in the skin to the internal organs. As the channels form a network of one-dimensional tubes with light sources, they can be an optical channel which can produce a coherent photon state (Figure 5). Thus, we can understand the coherence of biophotons, and the regulation mechanism of the body as a whole. This picture is the scientific basis of acupuncture therapy, and could lead to a new quantum communication paradigm based upon biological function.

IV. DISCUSSION

Thousands of years of acupuncture practices have not been scientifically understood, and anatomical support of acupuncture points and meridians has been lacking. Now, the emergence of biophoton theory that requires coherent emission from DNA, and the discovery by Bonghan Kim of the network of ducts in which DNAs flow meet together to form an optical channel of communication and control of a biological system as a whole.

This model not only explains the therapeutic effects of acupuncture in terms of modern science terminologies like DNA, excimer, biophoton, coherence, and quantum optics, but also supplies a wide new area of future development in biology, east and west medicine, and quantum communication.

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