THE ROLE OF THE CONNECTIVE TISSUE MATRIX IN THE INVESTIGATION AND INTEGRATION OF THE THEORETICAL BACKGROUND OF HEALTH SCIENCES, NATURAL HEALING METHODS, COMPLEMENTARY AND ALTERNATIVE, MEDICINE AND TRADITIONAL CHINESE MEDICINE

Doctoral (PhD) thesis

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Preface

Financial support for the advancement of scientific research of Natural Healing Methods (NHM), Traditional Oriental Medicine (TCM), and Complementary and Alternative (CAM) Medicine is well below the level of support for pharmaceutical research. In spite of this, there has been a proportional increase in research-funding in the field of NHM, CAM and traditional oriental medicine in general for the past 10 years in the USA, in China, South-Korea, and Russia.

The methods of NHM, TCM and CAM are accepted both in Eastern and Western societies, however, its terminology and theoretical background are seemingly fundamentally different from modern biomedical interpretation. This fact renders acknowledgement and teaching more difficult, and today, even in China, it is becoming a highly problematic area in medical attendance as well as in research. Communication is at best difficult between professionals with traditional “Eastern” and modern “Western” backgrounds.

As a result of the above, the so called integrative biomedical approach received a momentum which has been improving for the past few years. This approach establishes a platform for communication for professionals coming from very different backgrounds but applying or researching similar methods. A fundamental condition would be to have physiological, cell biological results that are based on the research of basic mechanisms of NHM/TCM/CAM, represent an integrative viewpoint, and that they meet the criteria of the publication framework of the modern scientific community.

Introduction

The great variety of denominations for natural healing methods alludes to the different origins and legal regulations, suggesting that a common biomedical approach is beset with difficulties in modern, Western medicine.

Natural Healing Methods (NHM), Traditional Chinese/Oriental Medicine (TCM) and Complementary and Alternative Medicine (CAM) are healing methods whose origins are partially independently present in several nations' culture, while at the same time they also form a system in Asia, more specifically in China, where the oldest surviving historical-literary source materials have been found.

Stimulation point and channel (acupuncture/acupressure points and meridians) based diagnosis and treatment plan is a common feature in the above mentioned healing methods. As most of the time these points and channels cannot be scientifically tied to any accepted anatomical structure, and because they have outstanding importance in the application and teaching of NHM/TCM/CAM systems, the research of these points and channels is the first step in the integration of traditional Eastern and modern Western methods, or even in the design of specific research and experimental questions.

Aim

My initial research objective was to demonstrate through a critical analysis of literary sources that there are results in the integration of Eastern and Western medicine, and that these results have started to form a coherent system-approach supporting the scientific level teaching of NHM/TCM. This specific initial goal later broadened with personal professional relationships both in the field of healing and research.

As a researcher in neurobiology, I realized that the “blind” enthusiasm and confidence stemming from therapeutic success should be put aside, and questions should be raised and experiments

should be evaluated starting from the biological foundations. The past 60 years have seen several scientific results promoting quasi-solutions for integration, but in many cases the lack of precisely designed questions of basic research has side-tracked these results, or led to scientifically unacceptable models.

As the outcome of my research conducted during the past few years, we gained results that can further build the bridge between Eastern and Western medicine.

Research questions

1. Is there a tendency for integration in the research of the basic mechanisms of stimulative therapies and traditional Eastern healing methods?
2. Does the connective tissue matrix possess certain properties that can form an anatomical and physiological basis for the system-level communication and stabilization unit? Does the connective tissue matrix have proper electrophysiological and cellular physiological reactivity zones, inhomogenities, and histological continuity – needed to address the above question?
3. We know that the subdermal and intramuscular connective tissue is able to react in a similar way to a wide range of seemingly different stimulus modality, or, in other words, it is able to mediate therapeutic stimuli in several ways. In this case, a cellular-physiological molecular link should exist, capable of integrating various stimuli. Can extracellularly regulated kinase (ERK) be one such link? Is the miofascial ERK system capable of reacting to both electric and mechanical stimulus?
4. Static magnetic fields (SMF) have been used for decades in stimulative regenerative medicine and in eastern and Natural Healing systems, but their communication regulatory role related to neuronal and other cells is largely unknown. Is there an effect of SMF on the cellular network that is demonstrable among cellular physiological circumstances? To explore this phemonon, we chose an experimental neurocellular model with large statistical

numbers that is quickly reproducible and inexpensive (drosophila interneurons). We applied a static magnetic field impulse widely used and recognized in diagnostics for decades.

Methods

1. Introduction to the working model of Two-System Theory.
2. Three dimensional digital analysis of virtual body meridians (Virtual Human Bodies, VCH).
3. Computer tomography (CT) and magnetic resonance (MRI) analysis of the connective tissue of the human body.
4. Tissue electric conductivity measurement by "conductance response" method.
5. In vitro electrophysiological trials (HEKA Elektronik, Lambrecht/Pfalz, Germany).
6. Immunhistological and electromicroscope examination of the connective tissue and muscular tissue. (Detailed description of the methods applied can be found in the publications)

Discussion and results

It is hypothesized about the fascial network that it is an information-transmission system composed of cells, fibres and variations of extracellular matrix elements. This system is supposedly responsible for the support and regeneration of the differentiated functional cells of the body and the regulation of the inner environment.

The "fasciology" theory sheds light on the mechanisms of stimulative therapies, such as acupuncture and Chinese massage. These therapies apply mechanical stimulation on the subcutaneuos fascia and connective tissue in order to trigger a response in the functional cells and therefore cause palpable therapeutic effects.

The connective tissue matrix model presented in this work is a very promising integrative area in the basic mechanism research of Eastern and Western stimulative therapies. Its unquestionable advantage compared to earlier models, and naturally in addition to them, is that it already facilitates

the teaching of TCM/NHM systems both in higher education and in vocational training in some countries, and beyond this, it draws attention to biological phenomena hardly known or studied in Eastern or Western medicine. However, it seems that this tissue-regenerative phenomena might form the basis of modern regenerative medicine in the future.

Answers to the questions raised

1. The Two-System Theory might serve as an explanation for the clinical success of certain aspects of TCM and Natural Healing Medicine. The anatomical and functional existence of these systems is supported in numerous biological research results. This proves the unequivocal integrational tendency of traditional Eastern and modern Western medicine. (Publications 1, 2, 3)
2. Digtal analysis of virtual meridians and their comparison to the CT, MRI analysis of the connective tissue matrix of the human body, and electrophysiological studies support the existence of an anatomically and functionally existing connective tissue matrix (Publication No. 4)
3. Extracellularly regulated kinase (ERK ½), and mitogen-activated protein kinase (p38) can be activated by acupunture needle manipulation, which verifies the effect of acupuncture on neurohormonal systems (Publication No.5).
4. The application of static magnetic field (SMF) changed the rhytmical, spontaneous activity of the local interneuron network of the drosophila, and also affected the tissue natrium and potassium concentration. These studies can be regarded as one of the first scientifically grounded in vitro studies justifying the effect of magnetic field on the neuronal functions (Publication No.6)

There are certain human nervous system disorders where we observe increased muscle tone activity invloving the diseased condition of potassium transport system. However, we cannot find a

satisfying neurophysiological explanation for the muscle hyperactivity. In these cases it might be right to consider the role of the myofascial system, and to involve alternative healing methods in our treatment. (Publication No.7)

As a summary of the answers for the questions posed in the introduction, it can be claimed that fasciology or the connective tissue matrix model can be capable of integrating the basic research methods of Eastern meridianology and Western stimulative therapies, thus promoting the formation of a common terminology, in other words, integration stemming from basic research level.

Factors aggravating integration of terminology between traditional Chinese and modern Western medicine:

1. Scientific-cultural differencies render real integration more diffult: there exists a huge and valuable knowledge-base regarding the biomechanical and bio-electromagnetic basic mechanisms, and clinical applications of NHM/TCM that is only available in Russian and Chinese. Most of the Russian and Chinese researchers and clinicians publish only in their mother tongue, and are not concerned in being part of the Medline-centered, English language researcher community. In this area, even today, the only way to open up gates is personal professional relationship, which requires a great amount of working hours spent on translation and interpretation caused by the frequent terminological dissimilarities.

2. There are a lot of case studies, while basic research is lacking.

3. Even in basic research integrative study incentives are rare, therefore research results occasionally just widen the gap, as they do not facilitate the teaching of TCM and NHM and because non-integrative research-questions will not build a bridge between terminologies.

4. Meridianology studies using healthy human subjects are very rare. Meridianology both in the East and West focuses too much on symptoms and illnesses, neglecting research-questions concerning basicmechanisms.

5. Despite the gaining ground of stimulative therapies developed from electroacupuncture and magnetotherapy, there are only a few research publications that discuss the cellbiological basis of electromagnetic stimulation using Western scientific methods in the framework of Western impact factor based scientific publication system. Though these methods are becoming popular both in the East and West and there is an increasing number of case studies published, there still exists a rift between the two scientific communities.

6. Meridianology studies representing and electrophysiological approach are mostly clinical works starting up from the preconception that electrophysiological inhomogenities exit in the connective tissue matrix that overlap with the acupuncture meridian system, therefore the researchers do not carry out adequate and enough control point measurements on the supposedly non-acupuncture points.

7. The neuronal network- and neuroanatomical models only partially explain the analgetic effects along dermatomes and myotomes evoked by stimulation. The collateral inhibition mechanism mediated by encephalinergic interneurons (gate-control model) at the level of spinal cord, and the dowregulating serotonerg, noradrenerg and peptiderg tracks of the periaquaeductal midbrain grey matter and the raphe nuclei as the peripheric and central endogen analgetic systems are often-used models in the mechanism research of stimulative therapies. Beyond their numerous disadvantages one of their strong points is the discussion of the prefrontal cortex connections, thus giving partial directions towards the interpretation of the connection between the patient's inner intention, motivation and the success of the therapy. These models cannot handle the meridian system, as the functional unit providing the background for TCM.

<u>Basic research processes stimulating integration of terminology between traditional Chinese and modern Western medicine:</u>

1. There has been a growing demand during the last few years for examination of the endogen, non-bone marrow stem-cell reserves of the adult human and mammalian system. The investigation of

their mobilization possibilities and their role in cell-regeneration is a hot line in both basic and applied research.

2. The study of the targeting of exogen tissue-specific stem-cells by electroacupuncture is an integrative field, where the research of tissue-regenerative therapies and the acupuncture methods reach a common ground. The role of the connective tissue has become more important in connection with the research of methods for mobilizing the endogen tissue specific stem-cells or at least cells showing pluripotency factors.

Several independent reasearch-teams have started to treat the connective tissue matrix as a functional and biomechanical unit to form research- and therapeutic questions and research plans. This approach points beyond the working-mechanism research of TCM/NHM, and leads toward the deeper understanding of the mechanical and electromagnetic stimulative capabilities of the tissue regenerative processes.

Referring to the closing figure of our artice published in 2011 in the 'Egészségakadémia' journal, I would like to finish my thesis with the following sentence:

“We have to understand the difference between traumatic wound-healing and healing microtrauma”

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