



REVIEW ARTICLE

# Meridian Studies in China: A Systematic Review

Guang-Jun Wang<sup>1</sup>, M. Hossein Ayati<sup>2</sup>, Wei-Bo Zhang<sup>1\*</sup>

<sup>1</sup>Institute of Acupuncture and Moxibustion, China Academy of Chinese Medicine Science, Beijing, China

<sup>2</sup>Acupuncture School, Beijing University of Chinese Medicine, Beijing, China

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**Abstract**

Meridian theory is a major part of Chinese medicine and has guided acupuncture and clinical practice for thousands of years. Meridian theory describes many important concepts about the rules of human body function and regulation, but has comparatively huge differences with the basic concepts of modern medicine. These differences have caused deep concern and attracted attention from scholars, both inside and outside of China. The interest in meridian theory lies in determining the structural nature of meridians. Not only is this information still unclear, it is very difficult to achieve clear results in a short period of time. Despite this, the phenomena of meridians can be used as the entry point for meridian studies.

After many years of effort, although the physical structure of meridians has not been found, the existence of the meridian phenomena has been fully confirmed. Although there is a lack of morphological evidence for the existence of the meridian, concluding non-existence may be incorrect as morphology techniques develop and structures previously not determined are being found. Since the phenomenon of meridians exists, some biological basis behind its occurrence must be present. This implies that research on meridians needs to continue as research techniques advance and may eventually reveal the biological basis of the meridian phenomenon. In the present review, we analyze the history of meridian studies in China.

## 1. The Origin of Meridian Studies in China

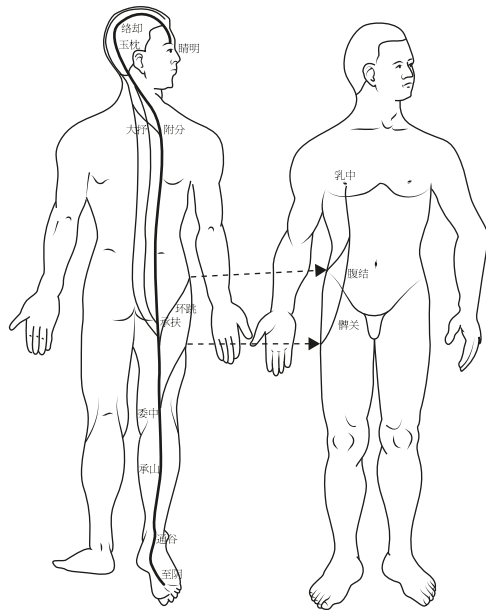
Meridians are passageways for the flow of “qi” and “blood”, which are the two basic bodily fluids in Chinese medicine. These passages include 12 standard channels, 12 collaterals, 8 extra meridians, 15 large collaterals, musculature of 12 meridians and 12 skin divisions. Meridians spread on the surface of the whole body vertically and horizontally, integrating the inside with the outside of the body. They also connect the inner organs, joints and extremities, thus transforming the whole body into one entire organ. As Chinese medicine attaches

great importance to the concept that all body functions are under the complete state of one organism, the black-box theory was adopted in its research [1]. The theory pays attention to changes in outside phenomena, as such, its theoretical system lacks an anatomical basis. However, along with the development of modern medicine, people gradually realized that acupuncture, that follows the meridian theory, has the best outcomes; traditional Chinese medicine believes that the therapeutic effects of acupuncture are achieved through the meridian system. Additionally, by studying a number of skin diseases, propagated sensations and the migration of isotopes along the meridians (Figures 1, 2 and 3,

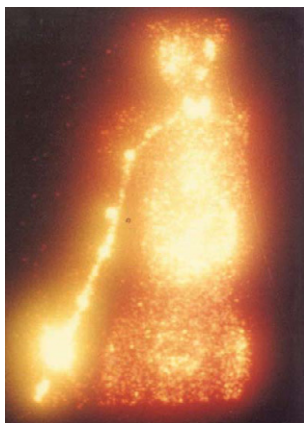
\*Corresponding author. Institute of Acupuncture and Moxibustion, China Academy of Chinese Medicine Science, No. 16, Dongzhimennei, Beijing, 100700, China.  
E-mail: zhangweibo@hotmail.com



**Figure 1** Skin disease along the meridians. Figure taken from Li [2].



**Figure 2** Propagated sensation travelling along the Urinary Bladder Channel. Figure taken with permission from Hu and Cheng [3].



**Figure 3** Migration of an isotope along meridians. Figure taken from with permission from Meng et al [4].

respectively [2,3,4]), the existence of the meridian phenomenon was confirmed. Ultimately, this kind of regulating and controlling channel parallel to the body surface cannot be explained by current

medical knowledge. Meridian study and research therefore attracted a lot of interest.

In 1963, Dr Bonghan Kim from North Korea [5–7] announced the discovery of the meridian anatomy and structure, and named them “Bonghan duct” or “Bonghan capsule”. Bonghan’s work however failed to be repeated and was widely questioned. The Austrian expert Kellner stated that the structure Bonghan found exists, but was only a remnant from development, and could not support the function of the meridian system [8,9]. At the same time, China planned to systematically duplicate Bonghan’s work but failed to support Bonghan’s conclusions, and the repeated work has not been published. Nevertheless, during the repetition of Bonghan’s work, a meridian research team was organized and marked the beginning of meridian study in China. Prior to this, only a few histological studies into acupoints had been conducted in China (Table 1 [10–21]).

## 2. The Main Significance of Meridian Studies in China

### 2.1. Investigations into propagated sensation along meridians

The effects of acupuncture rely on the integrity of the nervous system, thus the study of meridians focusing on the neural aspect has become commonplace. In the 1950s, Professor Xi-Jun Zhang stated that action of the meridians is accomplished through neural reflection [22]. From a gross anatomy perspective, meridian and acupoint regions are always richly innervated. Moreover, the meridian and peripheral nervous systems are roughly very similar in their path around the body, especially below the elbow and knee joints where the meridians are almost along the path of the nerve trunks and their main branches. Descriptions of meridian function in classical Chinese medical records are also closely related to the nervous system. Therefore, meridian research from the neural perspective may still be highly fruitful.

Propagated sensations along channels (PSC) is a meridian phenomenon which was investigated in over 100,000 people over 20 provinces in China in 1970s. These studies revealed that approximately 0.3% of people exhibited PSC. PSC is considered a window for revealing the substance of the meridian. However, this propagated sensation is a subjective feeling, and must therefore be associated with the central nervous system, particularly the sensory cortex. This has led some researchers to believe that PSCs are an expanding excitement occurring within the sensory cortex [23]. However,

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