

CONCEPT OF MIND AND BRAIN IN TRADITIONAL CHINESE MEDICINE

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ABSTRACT

In Traditional Chinese Medicine (TCM), the functions of the brain are dispersed to five zang organs, and are maintained by comprehensive functional interactions among the five zang organs. Therefore, brain diseases are regarded as systematic diseases in TCM, and their treatments are aimed to normalize not only the activity of the organs, but also the balance of functional interaction. In addition, interestingly, the functional interaction between the five zang organs in TCM resembles a biological model based on chaos theory. These features of TCM derive from its theoretical basis in Yin-Yang and the five elements. In conclusion, TCM had co-opted the basic idea of a complex system for the diagnosis and treatment of human diseases thousands years ago. Research into TCM should not only evaluate the effects of herbal medicine or acupuncture, but should take into consideration the view of human beings in TCM.

Keyword: Brain; Complex system; Chaos; Fractal; Traditional Chinese Medicine

1 INTRODUCTION

Functions of the human body in traditional Chinese medicine (TCM) are based on theories of Yin-Yang and the five elements. These theories tend to be ignored in research on TCM since these are ancient Chinese philosophical ideas that are considered incompatible with modern science. However, the concept of the human body and its functions in TCM may yield new insights into human welfare. In this paper, I will present the characteristics of the views of the human body in TCM as compared with those in western medicine.

2 YIN-YANG THEORY

The whole idea of Yin-Yang theory is expressed by the Tai-Chi symbol (Fig. 1A). The black and white areas in the Tai-Chi symbol indicate that the whole world, including human beings, consists of two opposing components, namely, the Yin (black area) and

the Yang (white area). Importantly, each component exists within the other component; the white and black areas contain small black and white circles, respectively. This means that Yin/Yang is a relative concept, and any Yin or Yang aspect can be further subdivided into Yin and Yang. Therefore, the world is considered to be infinitely divisible into Yin and Yang, and each part has a structure similar to the Tai-Chi symbol. Thus, in Yin-Yang theory, the whole world, including human beings, consists of fractal structures. Fig. 1B shows a Sierpinski triangle, which is a well-known figure in fractal geometry. In this geometry, any part has the same geometry and structure as the whole. If the black part is Ying, and the white part is Yang, the Sierpinski triangle and the Tai-Chi symbol can be considered to have the same meaning.

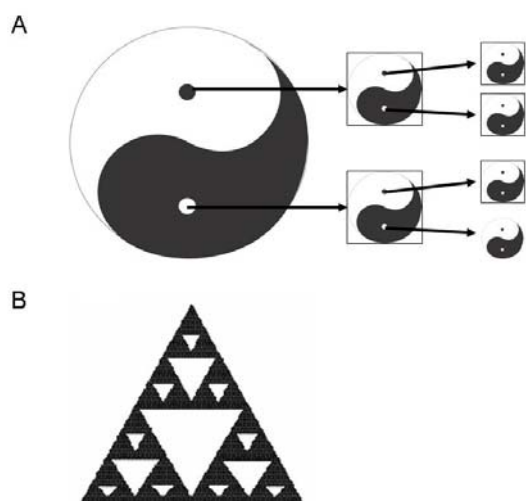


Figure 1. Tai-Chi symbol (A) and Sierpinski triangle (B)

In TCM based on Yin-Yang theory, all parts of the human body are classified into Yin or Yang. For example, the interior, anterior, and abdominal parts of the human body, and five *zang*-organs are classified as Yin, while the exterior, posterior, chest, and six *fu*-organs are classified as Yang. Therefore, in anatomy according to TCM, the human body consists of many Tai-Chi and fractal structures. Such a fractal structure of the human body plays an important role in diagnosis and treatment in TCM. For example, parts of the human body, such as the feet, hands, and ears, are considered to reflect the condition of the whole body, which is known as reflexology (Fig. 2). It is difficult for modern science to accept such an idea since the different parts are anatomically unrelated. However, if the human body has a fractal structure, this idea is reasonable.

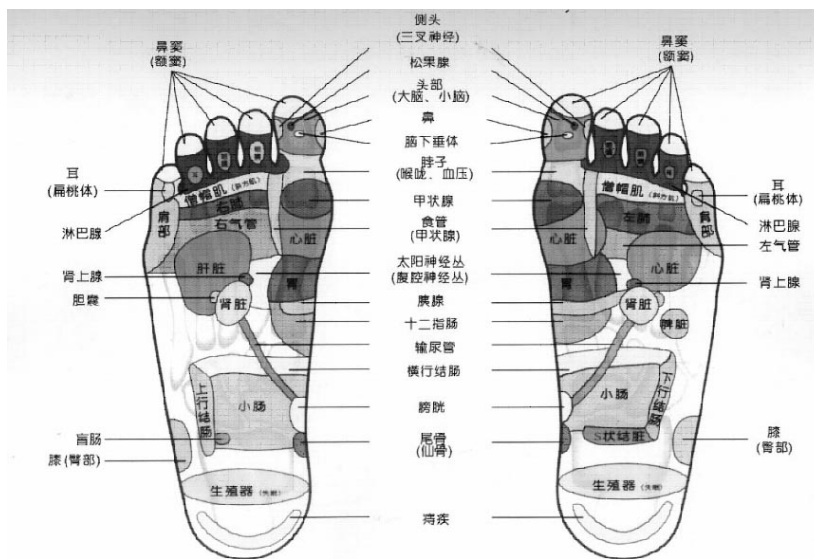


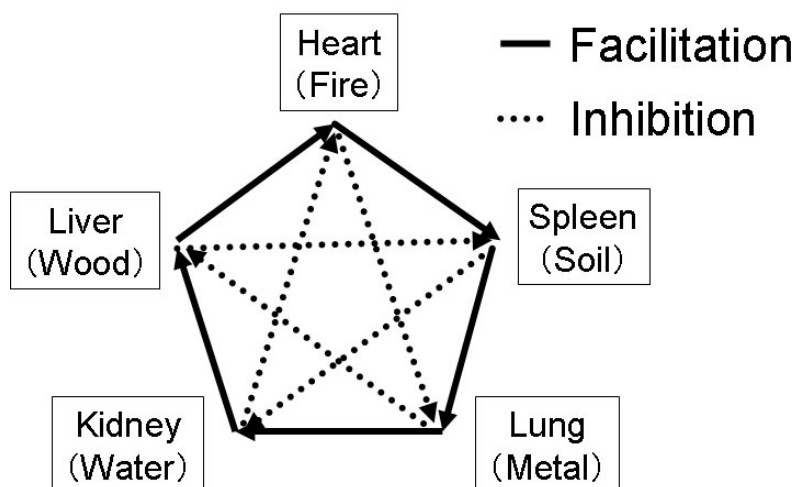
Figure 2. Reflexology chart of the feet

3 FIVE ELEMENTS THEORY

The main concepts of the five elements theory are as follows. First, the world is composed of five elements: wood, fire, soil, metal, and water. Second, each component interacts with the others to maintain the balance of the whole system. Fig. 3A shows the interaction between the five elements. In TCM, each organ is classified into one of the five elements, depending on its nature (five *zang*-organs), and human bodily functions are maintained by interactions among the organs, such as facilitation or inhibition effects on the target organs.

Interestingly, this idea resembles the dynamic model of biological systems based on chaos theory [Gohara, 1996]. In this model, input signals are processed by interactions among the partial systems, and when the parameters of the partial systems are changed, the output signal changes from steady state to period two, four, or chaos (Fig. 3B). In the TCM model, the exogenous factors are processed by interactions between the five *zang*-organs, resulting in various symptoms. If we assume the five *zang*-organs are the partial systems in the mathematical models of biological systems based on chaos theory, the TCM model is quite similar to the biological model. This implies that TCM attaches greater importance to function than to structure (i.e., anatomy) and regards the human body as a dynamic system.

A



B

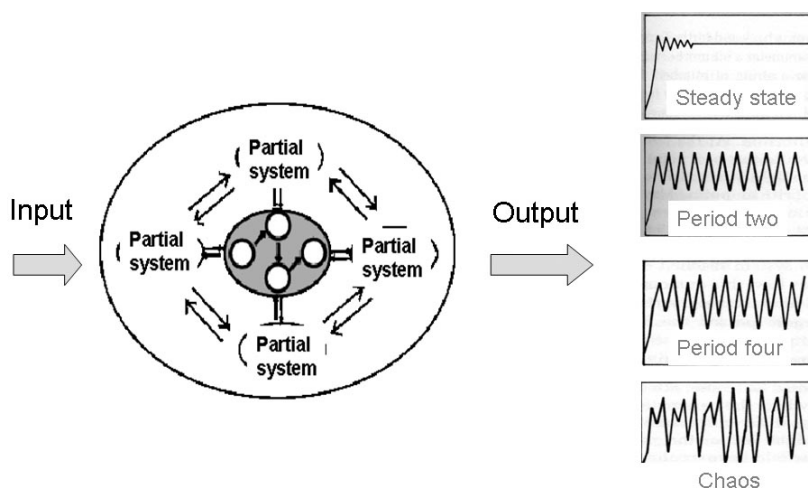


Figure 3. Comparison of human body function in TCM (A) and the dynamic model of biological systems based on chaos theory (B)

4 CONCEPT OF MIND AND BRAIN IN TCM

In modern Western medicine, the brain is the most important organ, acting as a control center. In contrast, the brain is not included in the organs of TCM, i.e., the five *zang*-organs (heart, liver, spleen, lung, and kidney) and six *fu*-organs (gallbladder, stomach, small intestine, large intestine, bladder, and triple-warmer). Interestingly, in TCM, the brain functions are scattered over the human body. For example, the five *zang*-organs arouse various emotions: heart, liver, spleen, lung, and kidney arouse happiness, anger, deep thinking, melancholy, and fear, respectively. In TCM, therefore, brain diseases are regarded as systemic diseases rather than disorders of a single organ

(i.e., the brain), and their treatments are aimed at normalizing not only the activity of the organs but also the balance of functional interaction among the organs.

5 CONCLUSION

Modern western medicine has been developed based on reductionism (Fig. 4A). In contrast, TCM regards complex systems as irreducible or holistic things and puts great stress on functional interactions in complex systems, including the human body and its environment (Fig.4B). Ideas based on TCM and dynamic models may provide new paradigms for preventive medicine and health promotion.

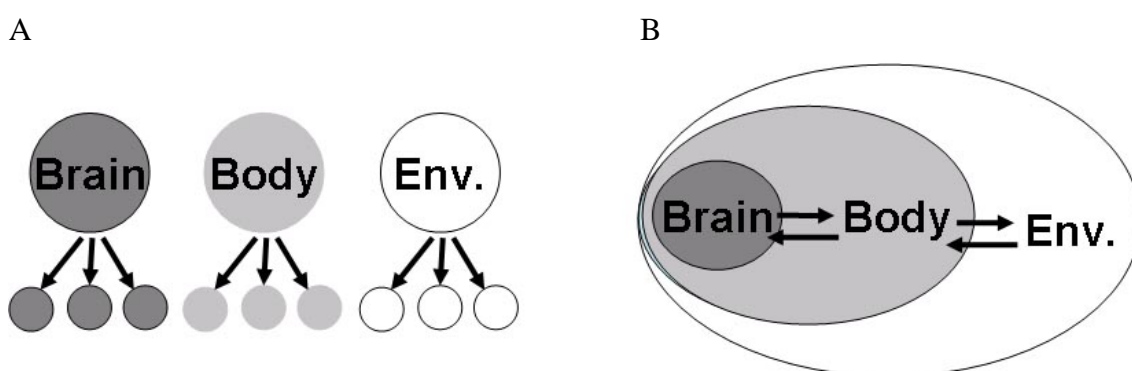


Figure 4. Modern western medicine based on reductionism (A) and TCM based on holism (B).

TCM incorporated the basic idea of the human body as a complex system for the diagnosis and treatment of human diseases thousands of years ago. Research into TCM should not only evaluate the effects of herbal medicines or acupuncture but should also take into consideration the view of human beings found in TCM. Such studies may help us to understand disease in terms of the relationship between humans and their environment.

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