# Solving the mystery of triple energizer in traditional Chinese medicine

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**Abstract**

Triple energizer (Sanjiao, 三焦) is an extremely important concept in Traditional Chinese Medicine (TCM), which participates in comprehensive Zangfu viscera functions, but its spatial scope and anatomical basis has remained unknown for more than two-thousand years. Combining TCM and modern medicine, we have firstly identified triple energizer anatomical characteristics, and established a new definition of real triple energizer. Triple energizer is the sum of systemic connective tissues. It wraps around and supports the body tissues, viscera and cells, and sustains the basic upright posture of the human body, whose network is essential to human health. New definition reasonably unifies its anatomy and integrated functions. Thus, we have unraveled, for the first time, the medical mystery on the triple energizer of perplexing human beings. In a clear understanding of the basis of triple energizer, we have solved big issue of meridians (Jingluo, 经络). As pericardium belongs to the triple energizer system, not a separate viscus. Pancreas plays the role of Jueyin meridian. The hand Jueyin pancreas and hand Shaoyang triple energizer meridians are a pair of Yin and Yang related meridians involved in the formation of the twelve meridians. These primitive findings will contribute to the progress of human medicine.

**Keywords** : Triple energizer, Traditional Chinese Medicine, Meridian

## INTRODUCTION

Triple energizer theory originated from the oldest Chinese medical book "Yellow Emperor's Canon of Medicine (YECM)" [1]. It is an extremely important concept in traditional Chinese medicine (TCM), and is known to participate in the comprehensive regulation of visceral function, but its physical and anatomical basis is still elusive for more than 2000 years. YECM usually classifies triple energizer into upper, middle and lower parts according to their functions, without reference to their intrinsic morphology and structure. The upper part completes the function of the chest viscera, including the heart and lungs; the middle part completes the visceral function of the abdomen above the umbilicus, including the stomach, spleen, liver, gallbladder, pancreas and small intestine; and the lower part completes the visceral function of the abdomen and pelvic cavity under the umbilicus, including kidney and bladder. Limbs and head were excluded from the range of triple energizer. After analyzing the triple energizer theory put forward by YECM,Yellow Emperor's Eighty-one Hard Canon (YEEHC) also proposed that triple energizer has a name without a structure. Although this view has been controversial, it has become the mainstream [2].

## TRADITIONAL TRIPLE ENERGIZER DEFINITION AND FUNCTION

In TCM, triple energizer is one of the six Fu viscera of the human body, and is one of twelve meridians. The meaning of the word "焦" has been different in ancient doctors. "焦" is recognized from fire, like invisible "Qi (Yin and Yang essence)", which can rot ripe foods. Some people think that "焦" is "", which is a membrane system and is a tangible substance, indicating that triple energizer should have its structural basis.

Historically, there have been disputes over the understanding of the morphological structure of triple energizer and not yet reached a unified view. But the recognition of the physiological functions of triple energizer is basically the same.

Famous Chinese scholars Sun Simiao from Tang Dynasty in "Prescriptions Worth a Thousand Ounces of Gold" and Hua Shou from Yuan Dynasty in "Hard Canon Original Meaning"mentioned that triple energizer, guiding the viscera functions, had the channels outside but intangibility inside [3, 4]. Its effects exchanged Qi in Qichong acupoint, and transmitted viscera's Qi throughout the whole body. Qi circulates on a triple energizer network to prevent pathogenic factors from entering the body and expelling it from diseased tissues and viscera. They emphasized the overall functions of triple energizer, not limited to viscera themselves, but did not involve its inherent structure.

## REVEALING TRIPLE ENERGIZER REAL STRUCTURE

The sites of traditional definition of upper, middle and lower triple energizer is not compatible with the comprehensive function of the whole body, Its anatomical basis needs to be clarified. How do we reveal the existing and real triple energizer structure? From the following three aspects of the combination of TCM and modern medicine, we reveal the basic structure of triple energizer.

Firstly, triple energizer structure is integral. According to the definition of triple energizer, it appears as membrane shape. Some doctors believe that triple energizer is tangible because its function is based on a certain shape, but this shape is not a specific and definite structure of viscera.

"Introduction to Medicine" from Chinese Ming Dynasty pointed out that "after viewing the wonderful triple energizer , we know that the Zangfu viscera are different and the same, the division is twelve, and the whole is one triple energizer [5]." Zhang Jingyue's "Category Canon, Viscera " in Qing Dynasty proposed that "triple energizer is indeed a Fu viscera, it may cover all viscera outside the viscera, in the body, and triple energizer is the largest viscus, there is no matching viscera." Liu Yuxi of the Tang Dynasty said that "the so-called triple energizer invisible by the ancients is its uncommon structure."

The structure of the triple energizer is realized through the connection of the membrane system. Zhang Jingyue pointed out that "the membrane is like fascia, and the thin fascia and tendons connected with each other among the viscera are called membranes".

Triple energizer membrane system is distributed throughout the body and has various forms, and belongs to all kinds of membranes inside and outside the human body. They are located among the body surface, the viscera, and tissues wrapping the cells, which are criss-crossed, including the pleura, peritoneum, meninges, etc. In the Yuan Dynasty, Hua Shou painted Mingtang (the Bright palace)map to clearly connect the internal viscera such as the large and small intestines, which is reflected in the visceral mesangial structure of modern anatomy.

TCM describes the integrity of the triple energizer membrane system comprehensively and systematically applies its functions. Although modern medicine has the anatomical basis of connective tissue, its understanding of structure is mainly limited to the connection, or limited to certain viscera, certain mesangium, and lack of integrity. In recent years, there has been a breakthrough in understanding connective tissue. In 2016, Coffey pointed out that the mesentery that has been fragmented in the digestive system is actually a continuous viscus [6].

It can be seen that triple energizer should be the tissue structure that links the whole body of the package and its morphology is determined by the shape of the viscera. Mesentery is part of the triple energizer membrane system and belongs to a modern anatomical connective tissue. Starting with modern medical anatomy, the triple energizer membrane system appears as connective tissue.

Secondly, triple energizer function is holistic. TCM can not confirm the intrinsic shape of triple energizer, but through thousands of years of clinical practice, the function of triple energizer has long been clear [5].

Triple energizer membrane system covers various layers of the viscera, the muscles and bones, and its functions of connecting up and down, intercommunicating inside and outside. The interaction of triple energizer makes the isolated viscera resonate harmoniously.

Triple energizer membrane system indicates that the various viscera of the human body are closely connected through this system, which is the material basis for Qi scattered in the liver, through the heart, in the spleen, higher than the lungs, and lower in the kidney. Clinical treatments of various diseases finally achieve a neat and smooth membrane system, and "the five internal viscera are smooth, people are harmonious" in "Synopsis of the Golden Chamber".

Thirdly, the functions of triple energizer and its meridian are realized through the information transmission of connective tissue.

Clinical practice has found that triple energizer function is accomplished by connective tissue conduction. For example, the wrist-ankle needle and the floating needle are gentle acupuncture for superficial connective tissue (not a classic system of acupoints), and the distal tissue analgesic effect can be produced by spreading through the connective tissue network [7,8].

Neck tissues massage, orthopedic and antagonistic therapy achieve triple energizer function by activating connective tissue networks to cure disease.

Shaoyang triple energizer meridian is one of the twelve meridians. Its membrane runs through the body, and the fire and heat of the body Qi communicate internally and externally, which passes through the viscera, and finally reaches the external skin striae [9].

Triple energizer meridian is both a meridian and a triple energizer membrane system. The transmission of meridians is realized by connective tissue, and the triple energizer membrane system is also the same, which suggests that there is a close relationship between triple energizer and meridians [10].

Thus, it can be seen that connective tissue should be the basis for realizing the overall function of triple energizer.

## THE ANATOMY OF TRIPLE ENERGIZER

By integrating the functionality of TCM with modern medical anatomy and physiology, we propose that the triple energizer system is a whole body system which connects all the tissues and viscera of the human body from head to feet, including viscera, muscles, bones, nerves, blood vessels, and cells. Its morphological entity contains all tissues packages including mesangium, ligaments, fascia, sheath and other systemic connective tissues (Fig. 1). Therefore, we now have thoroughly understood the true state of triple energizer. In a nutshell, triple energizer is the sum total of fibrous connective tissues of the body. This new definition of triple energizer signifies that it is an inherent and explicit human viscus with name, tangibility, anatomy and functions. This system links, wraps up and supports the whole body, just like the universe containing stars.

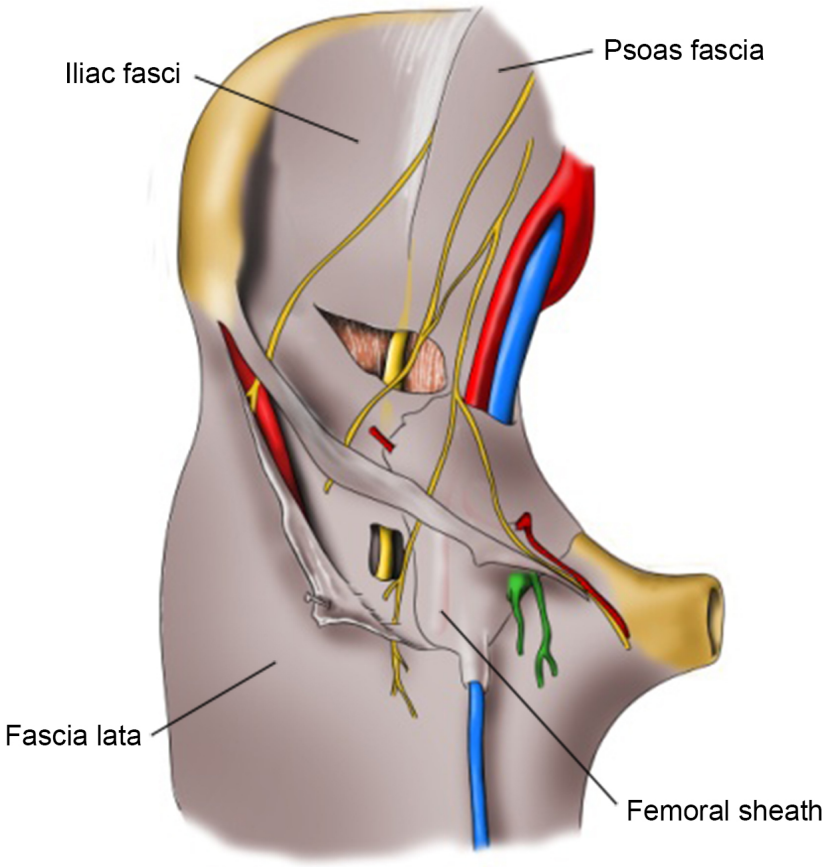


**Figure1.** Iliac femoral anterior region of triple energizer connective tissues wrapping regional

muscles, nerves, vessels etc.

Taking Zang-fu viscera for example, how do they maintain their shape, location so as to perform functions? Here we have a vivid metaphor. If the skeletal system with the spine as the center is treated as a "spinal coat rack" of human body, the triple energizer system is like various handbags, in which all tissues and viscera are wrapped up inside and hung onto the "spinal coat rack" which is also packaged in the triple energizer system.

If there is no triple energizer system constituting the body universe, there would be no core of the human structure, and man can not stand upright and viscera have no foundation to rely on.

## TRIPLE ENERGIZER CONNECTIVE TISSUE ELECTRICITY MECHANISM

Triple energizer connective tissue network constitutes the body universe, completing partial and overall efficacy. Human biological electricity bi-transmission among cells, viscera, and the whole body relies on this network.

The triple energizer connective tissue matrix is in a cholesteric crystalline state during its life, and refers to a cholesterol derivative that is in a liquid crystal state at a normal body temperature, which has good semiconductor conductivity and can conduct bio-electricity efficiently. The cholesteric liquid crystal has piezoelectric effect and anti-piezoelectric effect. Acupuncture or massage changes the spatial structure of connective tissue, produces mechanical force coupling, generates bio-electricity through the piezoelectric ef-

fect, and the generated electrons are transported to specific organs along protein and mucopolysaccharide channels, generating anti-piezoelectric effects, and changing cell ion channels Recover the physiological functions of molecules and cells, and quickly relieve pain. Connective tissue can conduct mechanical signals and bioelectricity three times faster than nerve conduction [11]. The body can adjust the activity of the enzyme through the arrangement effect of the connective tissue liquid crystal, and the body fluid flow between the connective tissues allows Qi to continuously react with various enzymes [12].

Studies have also shown that connective tissue itself is an organization with independent functions. The nerves, blood vessels, and lymphatic vessels all run in the triple energizer connective tissue network to implement integrated functions. The main mechanisms of acupuncture analgesia, such as neural mechanism and connective tissue mechanism, are fused into one, and all of them are completed in the connection of the triple energizer connective tissue [13,14].

The network of triple energizer connective tissue awakens the connective tissue that has so far fallen asleep. The powerful function of triple energizer is based on the triple energizer connective tissue mechanism, which will open the new channel for life research.

## TRIPLE ENERGIZER AND MERIDIANS

It is well known that stimulation of the meridians can produce the effect of acupuncture anesthesia. The connective tissue network is an acupuncture transmission channel [15]. Thus, there is a close link between the triple energizer and meridians. Based on clear understanding of the triple energizer, we have created a new recognition of the meridians.

Triple energizer and meridians are the mysteries of TCM. They are strikingly similar and all have important functions for maintaining the human body. Until today, the Chinese medical community still believe that the functions of meridians exist in living tissues, which are formed by the involvement of connective tissues, nerves, blood vessels, lymph fluid. After the disappearance of life, the meridian function disappears and there is no inherent anatomical structure [16].

Langevin et al. found that 50% of acupoints and 80% of meridians on the upper arm locate in the connective tissues [17]. Lu also suggested in 1996 that meridians are in the state of connective tissue cholesteric phase liquid crystal only during the life span [11]. The above studies of the meridians and connective organizations are almost close to the understanding of the nature of the meridians. Because of the failure to integrate TCM and modern medicine, it failed in the last mile.

After recognizing the overall structure of triple energizer, we realize that triple energizer is the connective tissue wrapping of the whole body structure. Triple energizer is the carrier of meridians. The meridians are the parts of triple energizer that fulfil its main functions. A large number of external acupoints and Ashi points are located outside the meridians, above the triple energizer connective tissue network.

## RELATION TO THE THEORY OF 12 MERIDIANS

Corresponding to the theory of 12 meridians in TCM, people have six pairs of interior-exterior Yin and Yang related Zangfu viscera. Since the nature of triple energizer had not been clearly understood, YECM and YEEHC took triple energizer as one of Fu viscera that belongs to Yang viscera. Its mutual Yin viscus was defined as the pericardium, which was also regarded as a Zang viscus. TCM believes that the pericardium is called the master of the heart and helps the heart perform its functions.

After having a clear understanding of the triple energizer structure, the nature of the pericardium is also clear, and it belongs to the part of the new triple energizer connective tissue system (Fig. 2). The pericardium is a specific connective tissue package of heart like outsourcings of the other viscera, such as lung wrapped by both visceral and parietal pleura etc. Structure of these packages are not a separate viscus.

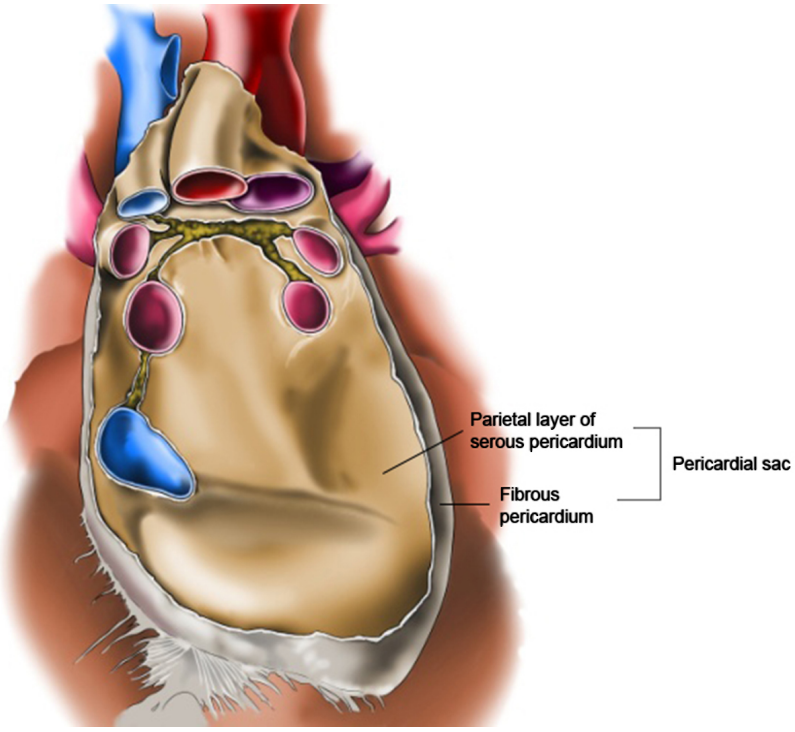


**Figure2.** Posterior pericardium of part of triple energizer connective tissues wrapping heart

tissue.

The pancreatic juice together with endocrine insulin and the bile formed by the liver are secreted together into the small intestine to complete the subtle assimilation of foods. The pancreas has the action mechanism of Jueyin channel, not the action of the liver. In typhoid theory, the general outline of Jueyin disease is " thirsty, hungry but not craving, diarrhea without stop", which is manifested by the abundance of cold and dampness. We propose that the pancreas be used as a Yin meridian relative to Yang meridian of hand Shaoyang triple energizer. The hand Jueyin pancreas and hand Shaoyang triple energizer meridians are a pair of Yin and Yang related meridians involved in the formation of the twelve meridians [18].

## CONCLUSION

The confirmation of the triple energizer anatomical features is the perfect crystallization of TCM medicine and modern medicine. Triple energizer structure is the sum of systemic connective tissues, which reasonably unifies its anatomy and integrated functions. Thus, the medical mystery on triple energizer of perplexing human beings has been unraveled. Meridians are the key links of the triple energizer network. Pancreas plays the role of hand Jueyin meridian. These preliminary findings will contribute to the progress of human medicine.

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