

Autonomic nervous system
in the light of the teachings of traditional Chinese medicine
I.V. Boitsov
(LLC "PROFDIAG", Minsk, Belarus)

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IV Boytsov
(LLC "PROFDIAG", Minsk, Belarus)

SUMMARY

Based on the theory of traditional Chinese medicine (TCM), the author compared the main provisions of TCM with the known and new data on the neurophysiology of the autonomic nervous system. In addition, one of the conclusions of the article is the assertion that the teaching of traditional Chinese medicine illuminates, although in metaphysical language, all the main regulatory mechanisms - neural, humoral, electromagnetic. Meridians are conditional lines of the main directions of distribution of gradients of electromagnetic fields throughout the body, and the meridian system is a system for maintaining electromagnetic homeostasis, which is an integral part of the general homeostasis of the body. In this case, the electromagnetic fields propagating along the meridians, and, in fact, along the nerve conductors, constitute the concept of "energy of the meridians". The synaptic skin point is an area of the skin (biologically active point) and subcutaneous layers (acupuncture point) with special electrical and physiological properties that differ from the surrounding skin. Skin-synaptic points located within the skin segments of the vegetative supply, in fact, carry out electromagnetic separation of the external field.

Key words: traditional Chinese medicine, autonomic nervous system, vegetation, cutaneous segment of autonomic supply, cutaneous synaptic point.

RESUME

Based on the theory of Traditional Chinese Medicine (TCM), the author analyzed the main provisions of TCM with known and new data on the neurophysiology of the autonomic nervous system. In addition, one of the conclusions of the article is the statement that the theory of traditional Chinese medicine illuminates, albeit by a metaphysical language, but all the basic regulatory mechanisms - neural, humoral, electromagnetic. Meridians are conditional lines of the main directions of propagation of electromagnetic field gradients along the body, and the meridian system is a system for maintaining electromagnetic homeostasis, which is an integral part of the overall homeostasis of the organism. In this case, the electromagnetic fields that propagate along the meridians, and, in fact, along the nerve conductors, constitute the concept of "energy of the meridians". A skin-synaptic point is a skin area (biologically active point) and subcutaneous layers (acupuncture point) with special electrical and physiological properties that differ from the surrounding skin. Skin-synaptic points located within the skin segments of autonomic support, in fact, perform electromagnetic separation of the external field.

Keywords: traditional chinese medicine, autonomic nervous system, vegetotome, skin segment of autonomic support, skin-synaptic point.

INTRODUCTION

Traditional Chinese medicine with its zhen-chiu treatment method (acupuncture and moxibustion) originated several millennia ago in Asian countries. The philosophical teachings of the Ancient East were the basis for its development [1]. Having passed through the millennia, some of the provisions of TCM have been forgotten, but its main concepts for the diagnosis and treatment of diseases have survived to this day. Much of this has already been analyzed and explained by modern science, much remains a mystery to us. At the same time, doctors of the Western formation are confused by the seeming "unscientificness" of the terms used in TCM, but the desire for precise definitions is a purely European tendency. No matter how our medicine relates to the ancient Eastern teachings, practice shows that the zhen-chiu method, which they are based on, is effective in many diseases and various pathological conditions of the body.

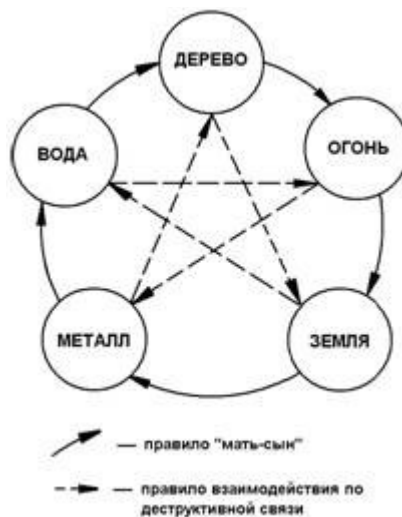
Purpose: to draw parallels between known and newly discovered data about the neurophysiology of the human body and the concepts of oriental medicine about its functional organization.

The purpose of this work was not a complete analysis of the entire theory of traditional Chinese medicine and its comparison with the course of neurophysiology for medical universities. This is impossible not only for a single article, but even for a separate book. Below we will give a brief description of only some TCM teachings (the YIN-YANG theory, the Wu-Xing concept, the doctrine of ZANG-FU organs and vital energy "Qi", about the meridians and acupuncture points), and then we will compare the data of traditional Chinese medicine with modern teachings about the autonomic nervous system (ANS).

The YIN-YANG theory is the basis for diagnosis and treatment in traditional Chinese medicine. "YIN-YANG" reflects two opposite phenomena and two opposite sides of one phenomenon. These are two polar forces, the interaction of which is carried out according to the law of "unity and harmony of opposites", it is the harmonious interaction of these forces that is the basis for the development of all phenomena of the surrounding world.

The main provisions of the YIN-YANG concept are as follows: first, the opposition of YIN and YANG, which manifests itself in constant opposition and confrontation between them; secondly, the interdependence of YIN and YANG, since they cannot exist in isolation from each other; thirdly, YIN and YANG constantly support and limit each other, and are not in some fixed state; fourthly, YIN and YANG are capable of mutually transforming into each other, since "a strong YANG will necessarily form YIN, and a strong YIN always leads to the formation of YANG"; fifth, mutual penetration into each other, that is, at each beginning one can find the germ of another opposite [2].

The doctrine of the five primary elements (the concept of Wu-Xing), based on the teachings of YIN-YANG, is an integral part of the theory of traditional Chinese medicine. Observing the phenomena of the surrounding world, the ancient scientists came to the conclusion about the cyclical nature of everything that exists, in other words, the entire Universe and each of its constituent parts are in constant motion, characterized by the alternation of YIN and YANG. This alternation, in addition to the stage of maximum YIN, denoted by the symbol "water", and the stage of maximum YANG (symbol "fire"), has three more main phases: the stage of transition from YIN to YANG (symbol "wood"), the stage of transition from YANG to YIN (symbol "metal"), The stage of transformation of the maximum YANG into YIN (symbol "earth"). The cyclical alternation of YIN-YANG provides for a strict sequence between these stages (primary elements), such a sequence in the TCM theory reflects the essence of the interaction between the primary elements in the relationship "mother-son" (Fig. 1). In addition, this interaction, which, in fact, is Yang (creative), is balanced by an interaction of the YIN type (destructive connection, or oppressive). Such an effect on the primary element, characterized by its activation and simultaneous suppression, can be balanced and unbalanced. The balance of the YIN-YANG interaction is characteristic of a healthy organism, the imbalance is a manifestation of the disease. characterized by its activation and simultaneous suppression, can be balanced and unbalanced. The balance of the YIN-YANG interaction is characteristic of a healthy organism, the imbalance is a manifestation of the disease. characterized by its activation and simultaneous suppression, can be balanced and unbalanced. The balance of the YIN-YANG interaction is characteristic of a healthy organism, the imbalance is a manifestation of the disease.



Rice. 1. Cycle of the five primary elements of WU-XIN

In traditional Chinese medicine, the doctrine of organs as functional biosystems, and not just topographically delineated anatomical structures, is of exceptional importance. All organs are divided into main and accessory, and the first are of two types - ZAN (dense, parenchymal, Yin organs) and FU (hollow, smooth muscle, Yang organs). The main organs correspond to certain primary elements. At the same time, each primary element owns one YIN and one Yang organ, which together form a pair of organs of this primary element. Within each such pair, the production, transportation, accumulation, preservation and consumption of the vital energy "Chi" of this primary element takes place.

According to the theory of traditional Chinese medicine, the life energy "Qi"

is the basis for the functioning of organs and body systems. All human activity is directly related to the change and movement of the "Chi". As a result of the movement of the energy "CI" of a certain primary element, the vital activity of the corresponding anatomical and physiological systems-organs is carried out. The totality of the energies of all organ systems constitutes the total energy of the organism. Moreover, even with a relatively normal amount of total energy, its qualitative composition may be unbalanced.

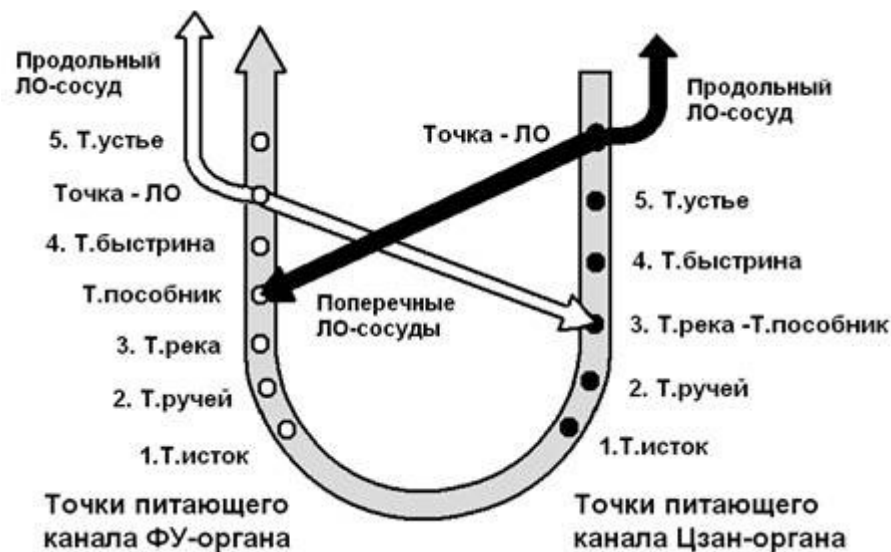
Depending on the "QI" current, the functional activity of individual systems and the whole organism changes. A decrease in "QI" leads to a decline, and an increase is accompanied by an increase in the functional activity of the organ system.

The doctrine of meridians in traditional Chinese medicine is based on the assertion that all organs and systems of the body are interconnected with each other and the environment through the circulation of the vital energy "Chi". The paths of movement "TsI" form a single system of channels and collaterals (TsZIN-LO). The main importance of the meridian system is to provide the systems-organs with the energy "QI", as well as the relationship and interaction between organs in the body and organs with the environment. All meridians, depending on their function, are divided into several types, among which, first of all, twelve paired main channels should be distinguished.

The main channels are the pathways for the transfer of bioenergy from their corresponding organs. They represent a closed energy chain. Each channel belongs to the system of one FU or ZAN-organ, which needs energy of a certain quality for its functioning. According to the TCM theory, the maximum influx of energy of a certain quality into the body occurs at certain hours of the day, it is at this time that the maximum activity of the corresponding organ system begins. The sequence of the onset of maximum daily activity in the body systems is displayed in a large circle of energy circulation (BCCE).

The distal part of each main meridian is the "feeding channel" of the corresponding organ system [3]. Feeding channels (PC) start from the tips of the fingers and toes, then at the level of the knee and elbow joints go deep and go to their corresponding organ. Topographically, they consist of a group of distal points of the main meridians of the same name. It should be emphasized that through the main channels the total energy of "Chi" flows, i.e. undifferentiated by quality composition. The feeding channel of a specific organ system converts the total energy received from BKCE into energy of a certain quality, intended specifically for its organ.

The process of energy conversion and, therefore, the function of the organ can be controlled by means of the points of the supply channel, among which the tonic and sedative ones should be emphasized. Only by following through the five antique (U-SHU) points of the feeding channel, the energy gradually acquires the quality that the organ can accept (Fig. 2).



Rice. 2. External-internal connection of a pair of meridians of one primary element

According to TCM teachings, acupuncture points (TA) are zones of energy exchange between the body and the environment through energy channels. All TA can be divided into different groups, but the main ones are the points located on the main channels, and among them are the antique points, i.e. points identified with certain primary elements. It is the impact on these points that is the main one for restoring the balance of energy in the organ systems. In this case, the main criterion for choosing points for treatment is their functional significance or, in other words, the "aftereffect" of the point [2].

Of course, unlike Western medicine with its instrumental, laboratory, histological and other modern research methods, doctors of traditional Chinese medicine, based on monitoring the patient's condition, interviewing, listening, palpation of the pulse, could not compose a complete picture of the disease, but, as we see that they had a fairly accurate idea of the vegetative status of a sick person, the level of damage to the autonomic nervous system. At the same time, the description of the patient's clinic was carried out in metaphysical language, but the accuracy of such a description, the accuracy of the classification of the vegetative status according to TCM syndromes made it possible to carry out effective symptomatic, and, in certain cases, pathogenetic therapy.

If we compare the main provisions of the YIN-YANG theory with the laws of interaction of the sympathetic and parasympathetic divisions of the ANS, then the patterns described in TCM and in modern medical science are practically identical: first, sympathetic activity is opposed to parasympathetic; secondly, the sympathetic and parasympathetic divisions constitute a single autonomic nervous system; thirdly, the activity of these departments supports and limits each other; fourthly, the clinical picture of the disease is characterized by the alternation of the activity of one department for the activity of another. For example, the transformation of the maximum "YANG" into "YIN" can explain the development of the pathological process in

infectious disease. Initially, the JIAN increase in the body's defense systems in response to the introduction of an infectious agent is accompanied by a growing fever with a red skin, rapid breathing, frequent heartbeats, hot sweats (symptoms characteristic of an increase in sympathetic activity). But if the body is unable to cope with the infection, the patient's condition changes to YIN syndrome, which is characterized by the predominance of parasympathetic activity with symptoms such as a decrease in temperature, bradycardia, rare breathing, pallor of the skin with sticky cold sweat. Fifth, the modern science of the autonomic nervous system claims that conditions such as complete, "total" sympathicotonia and vagotonia (parasympathicotonia) do not exist either in physiological shifts or in pathological conditions [4].

Compared with the thousand-year history of BMT, we can say that Western medicine only yesterday learned that every organ is under the simultaneous influence of two divisions of the ANS - sympathetic and parasympathetic, one of which activates the function of the organ, and the other, on the contrary, inhibits the latter. We can only be amazed at the observation and systemic thinking of the doctors of the Ancient East, who more than a thousand years ago discovered this regularity of the work of our body. As we know from the doctrine of the five primary elements, in the WU-XIN cycle, each organ system is under the simultaneous influence of a constructive and destructive connection. In this case, the body works in such a way that in order to balance the YIN-YANG balance in the organ system, in the event of an excessive increase in the activity of the creative connection, it is not weakened, but, first of all, the activity of the destructive connection increases, and thus equilibrium is restored. Here it is necessary to focus on the fact that at the present stage of development of medical science, the idea of the so-called antagonistic interaction of two divisions of the ANS (increased activity of one leads to a decrease in the functionality of the other) is considered outdated by most physiologists [4]. The physiological state is characterized by the following pattern: with an increase in the activity of one part of the ANS, the activity of another part increases compensatory, returning the functional system to homeostatic indicators [5]. that at the present stage of development of medical science, the idea of the so-called antagonistic interaction of two divisions of the ANS (increased activity of one leads to a decrease in the functionality of the other) is considered outdated by most physiologists [4]. The physiological state is characterized by the following pattern: with an increase in the activity of one part of the ANS, the activity of another part increases compensatory, returning the functional system to homeostatic indicators [5]. that at the present stage of development of medical science, the idea of the so-called antagonistic interaction of two divisions of the ANS (increased activity of one leads to a decrease in the functionality of the other) is considered outdated by most physiologists [4]. The physiological state is characterized by the following pattern: with an increase in the activity of one part of the ANS, the activity of another part increases compensatory, returning the functional system to homeostatic indicators [5].

Thus, it should be assumed that the WU-SIN cycle characterizes the interaction between the vegetative control centers of various body systems. Such intersystem interaction in modern medicine refers to the "nervous regulation of the body." But, as we know, there is at least one more regulation of the function of organs and the whole organism as a whole - humoral regulation. What did traditional Chinese medicine know about this vital body function? So, Western doctors studying TCM, most of all questions in understanding the Eastern doctrine of organs arise with a pair of organs "pericardium - triple heater". It should be clarified that the name "pericardium" in no way means the organ itself pericardium (the shell of the heart), but is, in fact, an incorrect translation of the ancient Chinese hieroglyph, meaning the concept of "shell", or "around the heart." It would be correct to call this organ not "pericardium", but "vessels", which are also located around the pump - the heart. Then

the symbolic name of the paired organ "triple heater" - the unifier of the organism, becomes clear. In fact, the "triple heater" is blood with biologically active substances dissolved in it (hormones produced by the endocrine glands), and the pair of organs "pericardium - triple heater" identifies humoral regulation in the body. At the same time, the structural Yin component of this regulation is the vessels, and the Yang component is the active, mobile component, which is blood with biologically active substances dissolved in it.

In the doctrine of the movement of the vital energy "Qi" in the body, it is indicated that there are four main levels of disturbance of YIN-YANG balance, which can be determined using pulse diagnostics [1].

When carrying out pulse diagnostics, first of all, it is established whether the patient has an increase or decrease in all superficial and deep pulses on both hands, which is characteristic of a general excess (general YANG syndrome) or deficiency (general YIN syndrome) of vital energy "QI" in organism. This is the so-called first level of disturbance - the level of the state of general energy "Chi".

The main distinguishing feature of the second level, which characterizes the imbalance between the total Yang energy and the total YIN energy, is the difference between superficial and deep pulses. In this case, the following two types of disorders should be distinguished: 1) Yang syndrome, which is characterized either by an excess of total Yang energy with a relative lack of total YIN energy (increased surface pulses, and they prevail over deep ones), or a lack of total YIN energy with a relative excess of total energy YAN (deep pulses are weakened, and then the superficial ones prevail); 2) YIN - syndrome, which is characterized by either an excess of total YIN energy with a relative lack of total Yang energy (strengthening of deep pulses, and they prevail over superficial ones),

The third level is characterized by disorders of the "external-internal" type (quadrant imbalances between YIN and YANG energies), in other words, this level includes different types of excess and deficiency of YIN hands, Yang hands, Yin legs and Yang legs [2]. At the same time, as a result of pulse diagnostics, changes in pulse strength at radial points typical for these disorders are revealed: for example, the predominance of superficial pulses in I and III positions on the right hand and in I position on the left hand indicates an excess of YAN-hands, and the prevalence of deep pulses in II position on the right and left hand and in III position on the left hand - about the excess of YIN legs [1].

But more often there are cases when energy disturbances do not concern the entire meridian system, but only individual channels - this is the fourth level of disturbance in the movement of energy "Chi", in which pulse diagnostics requires the highest skill with the ability to identify and correctly interpret single changes in the pulse wave in individual positions.

According to the classification of violations of the movement of energy "TsI" in four

the main levels, when comparing the clinical picture at each of them with the clinic of lesions of the autonomic nervous system, the first level of impairment (lack or excess of the total energy "CI" in the body) should be identified in modern science of the ANS with the level of the initial tone of the body [4, 6], where a violation of the vegetative status reflects the work of the higher suprasedgmental centers of the ANS (limbic system, reticular formation, hypothalamus, cerebral cortex). The second level (imbalance between the total YIN energy and the total Yang energy) is identified with this type of damage to the higher centers of autonomic regulation, in which the ratio of the activity of the parasympathetic and sympathetic divisions is disturbed, where an increase in sympathetic (more precisely, adrenergic) activity or a decrease in parasympathetic (more precisely, cholinergic) activity correlates with the body's YH syndrome, and an increase in parasympathetic activity or a decrease in sympathetic activity - with YIN syndrome. The third level (disturbance of the YIN-YANG balance of the "external-internal" type) correlates with a number of specific lesions of the ANS in the pathology of the central nervous system [6]. The fourth level (violation of YIN-YANG balance in individual organ systems and their meridians) is identified with the defeat of autonomic centers of regulation for individual visceral systems. Since the fourth level correlates with the state of YIN-YANG balance in individual meridians as cutaneous representations of functional systems, here we are talking mainly about the defeat of the spinal vegetative centers (nn.intermediolaterales), the universality of which is characterized by the fact that

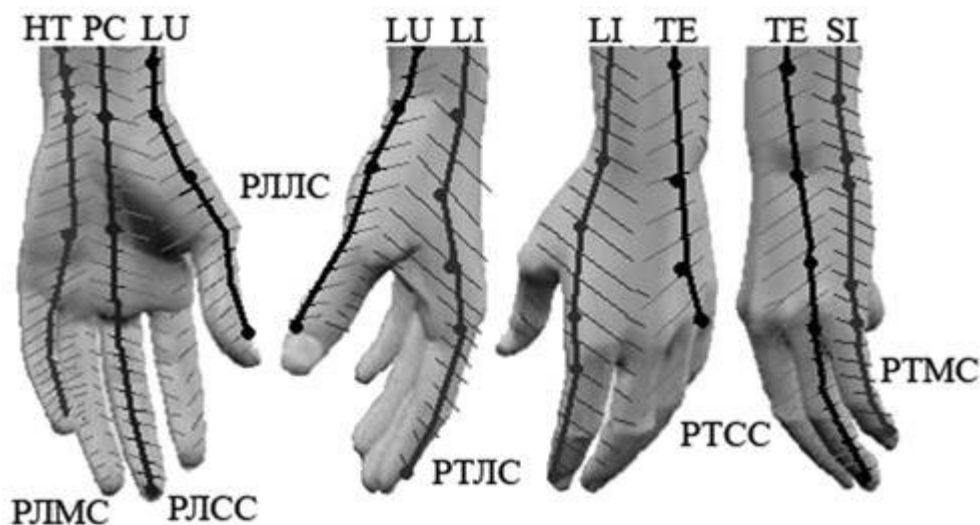
Among the modern advances in the science of the autonomic nervous system, the doctrine of the vegetative tome and the previous detection of the skin segments of the autonomic supply (KSVO) on the skin should be highlighted [7, 8].

Thus, dynamic segmental diagnostics of patients with severe and moderate forms of pathology of the visceral systems of the body showed: firstly, rather clearly delineated skin areas are determined on the distal parts of the extremities, where the intensity of skin sympathetic reactions differs several times from adjacent areas; secondly, in patients with the same type of pathology, such areas of the skin with pronounced changes in cutaneous sympathetic nervous activity have typical localization and are located in the form of segments elongated along the limb ("stripe" type of distribution); thirdly, a total of 12 paired segments were identified (three segments on the outer and inner surfaces of each limb), each pair of KSVO for vegetative support is interconnected with the corresponding visceral system of the body through the spinal center of autonomic control (group of nuclei nn.intermediolaterales); fourthly, it was revealed that adjacent CWBOs have zones of overlap of innervation.

The discovery of the skin segments of the vegetative supply on the skin confirmed the segmental distribution of the vegetative innervation in the process of embryogenesis and made it possible to formulate the concept of the vegetotome, which is a site of the embryonic anlage of the autonomic nervous system.

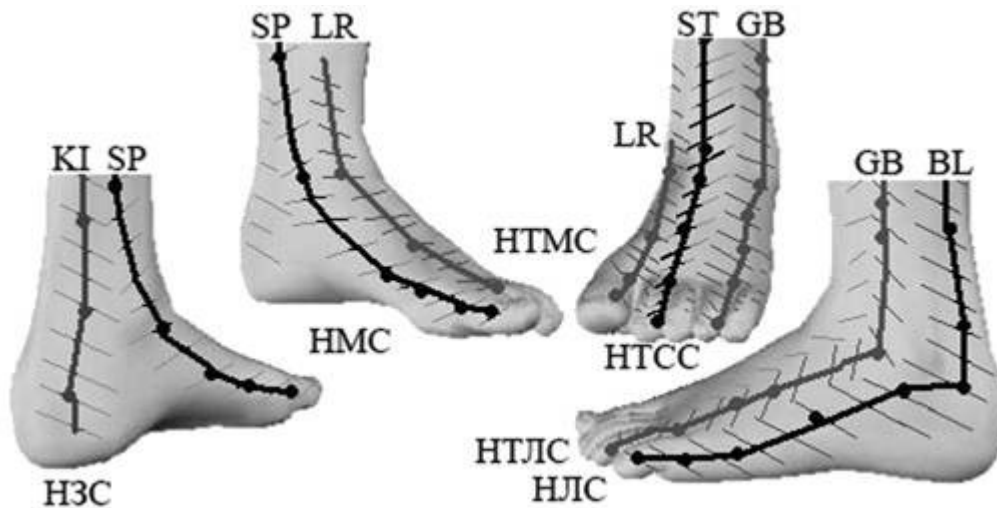
forming a single vegetative innervation of individual sections of the meso-, ento- and ectoderm. Subsequently, certain groups of muscles, bones, blood vessels, specific visceral systems and areas of the skin with its epithelial structures, which received primary autonomic innervation from the same vegetative during embryogenesis, become interconnected by a single segmental autonomic innervation.

When comparing the above presented new data on the organization of the autonomic supply of the organism with the teachings of traditional Chinese medicine, first of all, it should be noted that the outer parts of the main meridians necessarily pass along the detected skin segments of the vegetative supply (Fig. 3, 4).



Rice. 3. Projections of classical Chinese meridians and acupuncture points on manual skin segments of vegetative support: RLMS - palmar-medial; RLSS - palmar-median; Radar - palmar-lateral; RTLS - rear lateral; PTCC - dorsal-median; RTMS - dorsal-medial.

This coincidence is certainly not accidental. Moreover, each of the main meridians follows strictly within its skin segment, the vegetative support of which is associated with the vegetative regulation of the main organ of the functional system corresponding to this meridian.



Rice. 4. Projections of classical Chinese meridians and acupuncture points on leg cutaneous segments of vegetative support: NZS - back leg; NMS - leg medial; NLS - leg lateral; NTMS - dorsal-medial; NTSS - dorsal-median; NTLS - dorsal-lateral.

According to the theory of traditional Chinese medicine, it is in the distal meridians, and specifically in the supply channels, that "energy of a certain quality" flows, which is specific - feeding for specific functional systems, in contrast to the rest of the meridians, where the energy is undifferentiated [3].

Perhaps these metaphysical representations of the East from ancient times give us an answer to the question of why the boundaries of the skin segments of the vegetative supply are traced quite clearly only on the distal parts of the extremities and are blurred proximally. From the point of view of a neurologist and physiologist, such a blurring of the boundaries of skin segments has, as a rule, one explanation - the overlap of the innervation of specific areas of the skin from effector neurons belonging to different vegetotomes.

Functional system (FS) is one of the key concepts in the theory of traditional Chinese medicine, which denotes a set of certain organs (main and accessory), parts of the tendon-muscular apparatus (tendon-muscular meridian) and functional pathways (meridians and collaterals) connecting all parts of the system into a single whole and uniting all functional systems into a single organism.

All structures of the body that received primary autonomic innervation from the same vegetative during embryogenesis become interconnected in a single system of segmental autonomic innervation. In fact, such an organization of the body's vegetative support explains many of the TCM provisions on functional systems and their meridians.

From the standpoint of modern knowledge about the neurophysiology of the body based on the concept of the vegetative tome, it seems to us that the concept of "functional system" in TCM includes the unity of specific internal systems of the body, tendon-muscle groups, part of the bone

skeleton, part of the vascular system and certain areas of the skin based on the common segmental autonomic innervation. In other words, vegetotomes, as areas of the embryonic anlage of the segmental division of the ANS, are combined into separate functional systems by means of autonomic neuronal connections from nn. intermediolaterales are certain areas of the three germ layers and, accordingly, the components of PS that develop from them.

Thus, according to the TCM theory, the functional system includes the ZAN- or FU-organ, the external passage of the meridian, the internal passage of the meridian, the tendon-muscle meridian of the same name, and branches of collaterals connecting all functional systems into a single organism. From the standpoint of modern neurophysiology, the unifying principle for the components of the FS is the autonomic neural apparatus, which is a derivative of one vegetotome (Fig. 5), where effector neurons of specific segments (vegetative) control the corresponding splanchnotome (an internal organ of the functional system - TsZAN or FU organ for TCM), the skin segment (KSVO or the representation of this functional system on the skin - the outer course of the meridian), the myotome and the sclerotome (muscles and tendons - the tendon-muscular meridian of the same name), and the inner course of the meridian is made up of the processes of neurons, which, as part of the nerve trunks and pathways, ensure the integrity of the entire functional system and its relationship with other systems. According to the TCM theory, with the pathology of any functional system, all its constituent parts suffer, which corresponds to the modern concept of the vegetotome of a single segmental autonomic regulation of all FS structures. Pathological afferentation from any part of the functional system, acting on the segmental neural apparatus, destabilizes the work of the entire FS, all its constituent parts. Treatment-oriented afferentation from any part of the FS (for example, from the skin segment upon puncture or from the tendon-muscle group during the meridian massage) stabilizes the segmental neural apparatus of the given vegetotome, and when acting on the points of general action, several vegetotomes.

Information signals of the nervous regulation of the body, transmitted by means of action potentials, create electromagnetic fields around the nerve fibers with certain frequency-phase and amplitude characteristics. In this case, the encoding of electrochemical impulses occurs mainly in the frequency range, depending on the duration of the refractory period of the corresponding neurons, embryologically laid down as a single vegetative. It is the electromagnetic fields around the nerve conductors, in our opinion, that form the basis of the concept of "meridian energy", which propagates along conditional lines (meridians), and, in fact, along the autonomic fibers that are part of the peripheral nerves and the sympathetic sheath of the vessels.

It should be noted that the external electromagnetic field surrounding a person and also having frequency-phase characteristics affects

the field of our body, which, basically being a reflection of information carried along the nerve fibers in the form of electrical signals, can, by its frequency-phase characteristics, interact with the external field resonantly or be in dissonance with it, which will facilitate or prevent the passage of a nerve impulse through the fibers and through synaptic contacts.

The way the nervous system functions are reflexes. An electrochemical impulse propagating along nerve fibers is interrupted at nerve synapses, where information between two neurons is carried out chemically by means of mediators.

Skin areas in the area of acupuncture points, anatomically practically indistinguishable from the surrounding skin, normally have a functionally more active sympathetic supply, which makes them more electrically conductive. Also, in the dermis of these skin areas there is a large number of mast cells [9, 10, 11], and, therefore, such skin areas are chemically more active, since more biologically active substances are released here.



Rice. 5. The structure of the functional system according to the TCM theory in the light of modern scientific evidence

It seems to us that the role of acupuncture points due to the altered electrophysiological properties of the skin in the area of their localization [12] is reduced to interaction with an external electromagnetic field. Under the action of the latter, the chemical component of TA activity (for example, mast cells) is activated with the release of biologically active substances, which, acting on the autonomic receptors in the dermis, are, in fact, a neurotransmitter for them and the cause of the emerging autonomic afferentation from the area of acupuncture points.

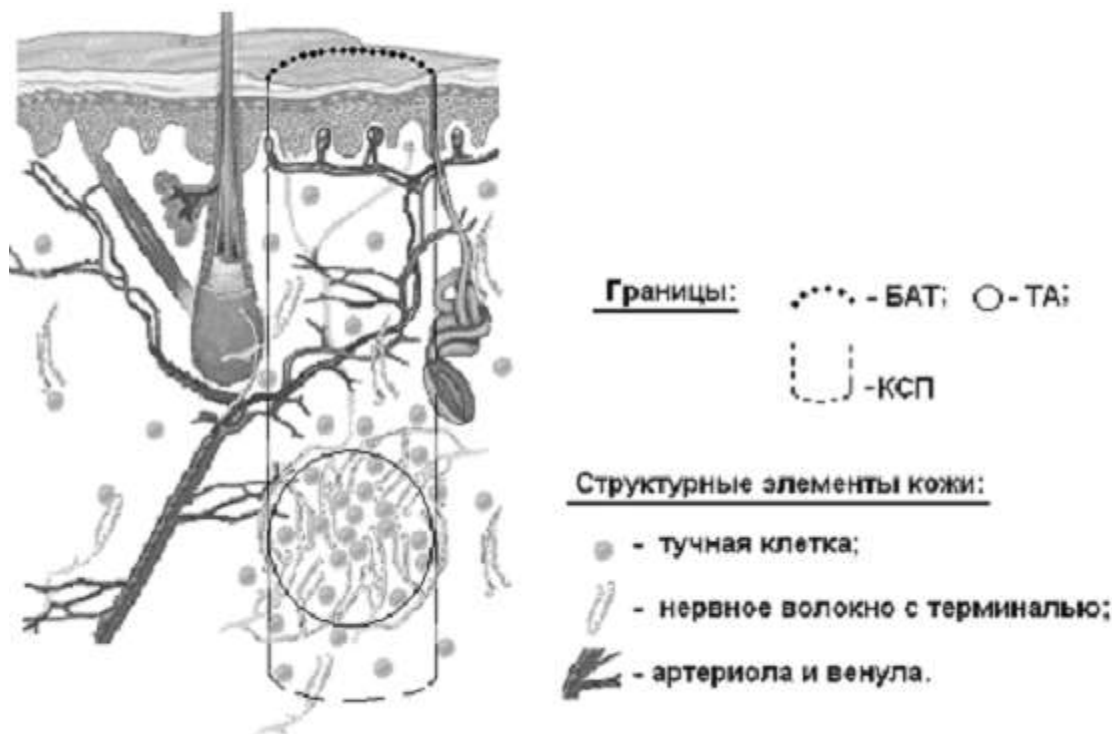
Such afferentation ultimately exerts a regulatory effect on the efferent autonomic component of functional systems.

Thus, acupuncture points, in terms of their functional significance, are a kind of synapses with their mediators, which trigger electrical processes and are themselves activated by electrical processes, which are based on the electromagnetic component of the Earth's external field. But if an ordinary synapse is a chemical mediator between the electrical signals of different neurons, then the acupuncture point is a chemical mediator between the electrical (and / or magnetic) signals of the external field (encoded in frequency, amplitude, and, apparently, other characteristics) and electrical signals of autonomic neurons (autonomic nervous system as part of the electrochemical control of the body). To transfer information through a normal synapse, the incoming electrical signal must have such characteristics as which are able to trigger the chemical component of the synapse in a volume sufficient to trigger an electrical impulse in the next neuron along the reflex arc. Similarly, at the point of acupuncture, the incoming electromagnetic pulse of the external field, according to its characteristics, should be such as to launch the chemical component of TA in such a volume that it could activate the electrical activity of the autonomic receptor apparatus and launch an electrical impulse that will carry the information signal from the external field through the nerve fibers to specific functional system or systems.

The mechanisms of action on acupuncture points as "synaptic" mediators between the external field and functional systems are basically similar to those used to activate and block ordinary synapses of the nervous system. For example, in order for a chemical mediator located in vesicles on the presynaptic membrane to act on the receptors of the postsynaptic membrane and cause its depolarization to the threshold of stimulation with the triggering of an action potential, the main condition is the presence of this mediator in the vesicles and its release from them into the synaptic cleft [13] ... Under normal conditions, the release of mediators from the vesicles occurs under the action of an electrical stimulus coming to the presynaptic membrane. If we in some way, for example, mechanical, could destroy the vesicles of the presynaptic membrane and release the mediator into the synaptic cleft even without an incoming electrical impulse, then this chemical, acting on the receptors of the post-synaptic membrane, would trigger ionic transmembrane currents and cause depolarization of the latter to the threshold of stimulation with the launch of an action potential. Perhaps we are doing something similar during acupuncture, destroying and releasing biologically active substances from mast cells. Of course, it is possible to activate the release of a mediator from the vesicles of a normal synapse and biologically active substances from mast cells without destroying these natural containers with a mediator, for example, to simulate an electrical impulse arriving at the presynaptic membrane of a normal synapse or to mast cells in the dermis (electropuncture, magnetopuncture),

or mast cells (microelectrophoresis, pharmacopuncture) and the like. At the present time, there are enough ways to influence acupuncture points, but the result of such an effect is the excitation or inhibition of the point.

So, the skin in the TA projection has electrophysiological properties different from the rest of the skin and is designated as a biologically active point (BAP) [14]. But the acupuncture point itself, which has the maximum concentration of mast cells and, accordingly, a mediator, lies deep in the dermis, and if during acupuncture the needle does not reach TA, then this effect will either have no effect, or it will be insignificant. Of course, both the skin surface (BAP area) and dermal structures, especially at a certain depth of occurrence (TA area), differ in the degree of vegetative supply, functional activity and physiological properties (for example, the ability to diffuse and intercellular fluid) from the rest of the skin and represent itself, the so-called synaptic skin point (CSP),



Rice. 6. The structure of the skin in the area of the synaptic skin point

Due to its various and absolutely unstable, and time-varying, characteristics (frequency-phase, first of all), the external field is able, according to the daily rhythm of activity (BCCE), to selectively affect specific systems of the body through distal skin-synaptic points that make up the feeding channels of functional systems [3], and to carry out a general effect on the body through the proximal CSP.

CONCLUSION

Thus, the teaching of traditional Chinese medicine illuminates, albeit in metaphysical language, all the main regulatory mechanisms (neural, humoral, electromagnetic), with the help of which the body is controlled and influenced by our body. Moreover, the meridian system is a system for maintaining electromagnetic homeostasis, which is an integral part of the general homeostasis of the body and is carried out through intermeridian (intersystem) interaction and the interaction of skin-synaptic points with an external electromagnetic field. Meridians are conditional lines of the main directions of propagation of gradients of electromagnetic fields throughout the body. In this case, the electromagnetic fields propagating along the meridians, and, in fact, along the nerve conductors, constitute the concept of "energy of the meridians". Skin-synaptic points are areas of the skin (BAP) and subcutaneous layers (TA) with special electrical and physiological properties that differ from the rest of the skin, located along the lines of propagation of the electromagnetic field and carrying out the interaction of the external electromagnetic field with the internal field of the body. Skin-synaptic points located within the skin segments of the vegetative supply, in fact, carry out electromagnetic separation of the external field, which forms the basis for the selective interaction of specific functional systems with this field. located along the lines of propagation of the electromagnetic field and carrying out the interaction of the external electromagnetic field with the internal field of the body. Skin-synaptic points located within the skin segments of the vegetative supply, in fact, carry out electromagnetic separation of the external field, which forms the basis for the selective interaction of specific functional systems with this field. located along the lines of propagation of the electromagnetic field and carrying out the interaction of the external electromagnetic field with the internal field of the body. Skin-synaptic points located within the skin segments of the vegetative supply, in fact, carry out electromagnetic separation of the external field, which forms the basis for the selective interaction of specific functional systems with this field.

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Author's address

Dr. med. Boytsov I.V. - reflexologist doctor, LLC "Profdiag", Republic of Belarus,
Minsk

avicenna_h1@mail.ru

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