Modern Studies on the Mechanisms of Acupuncture Therapy

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Acupuncture-moxibustion (acu-moxibustion) is a unique therapeutic system and a principal non-drug therapy in Chinese medicine, characterized by its ability to regulate functional activities of multiple systems of the human body, and to play a regulative efficacy more in line with the physiological regularities than medicines. Thus, its scientific reasonability leaves no room for doubt.

1． Studies on the mechanism of acupuncture analgesia

Acupuncture stimulation induced analgesia has local and systemic effects. At the same nerve segment level, merely by activating A fibers in the acupoint area, can acupuncture produce a marked analgesic effect. The underlying mechanism is that signals of acupuncture-activated coarse afferents suppress the activities of the pain sensitive neurons in the spinal cord to close the floodgate for transmitting noxious information to the higher levels of the central nervous system, that is, only activating the thicker afferents, can acupuncture gives birth to a segmental analgesic effect.

Acupuncture induced systemic analgesia at the different parts of the body is due to its resultant activation of the anti-pain system in the human body after acupuncture stimulation. Under the circumstances, only stronger stimulation to activate Aδand /or afferents, acupuncture can activate the related structures of the endogenous analgesic system. In both clinical and experimental studies, an apparent and definite acupuncture analgesia

including topical and extensive effects has been observed, revealing its topical and systemic mechanisms.

2. Studies on the regulative effect of acupuncture on nerve-endocrine-immunological network

In heroin-dependant patients, the affected neuro-endocrine system mainly refers to the hypothalamus- pituitary- gonad axis. In heroin-dependant female patients, about 99.8% women experience abnormal menstruation including amenorrhea or menstrual prolongation. Heroin-dependence induced impairment of the immune system involves multiple aspects including hypofunction of the non-specific immune, humoral immune and cellular immune. Clinical and experimental studies demonstrated that in heroin-dependant female patients, acupuncture could regulate the performance of the immune system, improve symptoms of drug withdrawal and normalize their menstruation.

3. Studies on the mechanism of correlation between the meridian or acupoint and the Zang- or Fu-organ

During long-term clinical practice, people often find some palpable nodosity or cord-like things in the subcutaneous tissues of the acupoint area which are closely associated with some pathological changes of the internal organs. Form example, in patients with gastroptosis, the so-called cord-like thing often appears in Zusanli (ST36) region; the involved sites of myocardial ischemia induced referred pain, radiating pain and hyposensitive zone in the upper limb are basically identical to the running courses of the Heart Meridian, Small Intestine Meridian and the Pericardium Meridian, which appears on the basis of segmental connection of the peripheral nerve system. These phenomena including sensations and motor dysfunction in the acupoint region and the running course of meridians (at the body surface)

caused by physiopathologic changes of the internal organs display a close association between body surface and internal organ(s), and correlation between meridians and Zangfu organs.

Stimulating acupoints has regulative and therapeutic effects on physiological and pathological activities of the internal organs, which is realized by means of segmental, inter-segmental and super-spinal (general) efficacies of acupuncture.

Research results reveal that the afferents of “Neiguan” (PC6) mainly distribute in C6~T1 spinal nerves, being basically same to the segmental distribution（C5~T1）of the median nerve. It was demonstrated that electro-acupuncture (EA) of “Neiguan”(PC6) to activate afferents of group II and group III could apparently improve abnormal electrocardiogram (ECG) in acute myocardial ischemia animals, while after cutting off the median nerve, the therapeutic effect of EA disappeared.

Morphological studies reveal that the skin and muscles of “Zusanli(ST36) area are innervated respectively by superficial and deep peroneal nerves. The afferent inputs from ST36 ascend via the somatic nerve and nerve plexus in the vascular walls to project to the dorsal root ganglia of T6~S3. EA of ST36 could potentiate motor function of the stomach and intestines innervated by the same segments, and promote the secretion of enkephalin, further enhancing the regulative effect of EA on gastrointestinal activities. When ST36 was blocked with 0.5% aethocaine hydrochloride, the effects of EA disappeared immediately. If the sciatic nerve or femoral nerve was cut off, the effects of acupuncture were attenuated correspondingly; if these two nerves were cut off simultaneously, the effects of acupuncture vanished completely. The spinal cord is the low center of the nerve system, the afferents innervating ST36 reach the spinal cord first, when trans-

sectioned, the effects of acupuncture of ST36 in potentiating motor function of the small intestine in the rabbit still existed in most experiments, but if the lumbar segment and sacral segment of the spinal cord were damaged completely, the effect of acupuncture vanished completely.

These findings indicate that after excluding the control of the higher nerve center, acupuncture still can affect gastrointestinal movement via homo-segmental nerves and spinal reflex, revealing the underlying mechanism and regularity of acupuncture in the treatment of disorders of the internal organs.

4. Studies on the mechanism of sensation transmission along the meridian

Since 1990, researchers have conducted a deeper study on the phenomenon of sensation transmission along the meridian (STM) from different levels as the peripheral nerve, spinal cord and cerebral cortex. Regarding the peripheral nerve, an excited nerve ending may activate another adjoining nerve ending by some active substances such as histamine, serotonin, etc from mast cells, which contributes to the appearance of trans-nervous transmission of sensations. Experimental results suggest that STM may also be closely associated with the facts that the summation of the electric current derived from the excitement of the skeletal muscles after acupuncture stimulation results in secondary excitement of the related nerve—skeletal muscle, followed by appearance of trans-neuro-segmental transmission and trans-articular transmission of the excitement impulses.

Conclusion

Chinese acu-moxibustion therapy has been already spread to more than 140 countries and districts, playing an important role for the cause that “everyone enjoys health”. Except its definite therapeutic effect, acu-

moxibustion also has its unique theoretical system, i.e., meridian doctrine. It is currently known that the regularities of connection and reactions described by the meridian-collateral system involve a functional regulative system of which the nerve system is the primary component. The phenomenon of STM belongs to the range of sensory physiology, the correlation between the acupoint and Zang- or Fu organ involves the connections and pathways of body surface — visceral nerves — humor in the human body, and the general regulative effects of acu-moxibustion on multiple organs are closely related to the activated nerve-endocrine-immune system. Thus, that acupuncture can be used to treat different kinds of disorders is realized by way of the activated self regulation of the organism's homeostasis.

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