

# Mode of Psychosomatic Medical Integration: Exploring the Pathogenesis of Heart, Brain-body Interaction

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**Abstract.** At present, the methods of neuroscience research have been widely used in the field of psychosomatic medical research, and now the mainstream medicine has developed a strong interest in integration, which is also a necessary prerequisite for the greater development of psychosomatic medicine. Explore multidisciplinary, multimodal, the integration of medical treatment, is expected to make patients with psychosomatic disorder treatment effect of progress, so that the causal mechanism of psychosomatic disease in new areas, compared with previous physical and mental medical research, now the neuroscience research results have stronger credibility, nerve medical research will be more psychosomatic medical research mode brings new inspiration, bring new ideas to psychosomatic disease diagnosis and treatment. Based on this, the paper proposed the integration model of mind and physical medicine, and respectively discussed the mechanism of mental and body interaction, body and body interaction, multiple and multiple interaction between mind and body, hoping to provide reference for related work.

**Keywords:** Medicine; integration; pathogenesis; patient; interaction

## 1. Introduction

Medicine, biology, psychology, sociology and other disciplines, is the relationship between human health and biological, psychological and social factors in disease, and the study of disease and health cognitive methods; in the narrow sense, medicine is the etiology, diagnosis, pathology, treatment, prevention and other problems, also called psychological medicine. The whole-human model of psychosomatic medicine is mainly related to four levels: A: emotion, B: brain, C: information transmission system, D: target organ. Nearly 50 years, psychosomatic medical research mode is mainly A-D, A-C, A-C-D, and psychosomatic medical research began to A-B-C-D whole human system integration mode is the significance of brain imaging research, which has created A new medical research field: "voice integrated medicine", comprehensive investigate how hard target organ function, and weight of each system disease heart, body, spirit pathogenesis[1]. As the psychosomatic medical research enters a new chapter, the human cardiovascular regulation, the chronic physical pain and gastrointestinal diseases are gradually integrated into the brain imaging rules. Through the demonstration of brain activity rules and brain imaging, these results are quantitatively studied. The pathogenesis of functional gastrointestinal diseases (FGID) is determined by the brain-gut axis; nerve center may intervene in psychosomatic activity, and the relationship between psychophysiological factors, psychosocial and cardiovascular diseases, and peripheral activity greatly affect physical pain. The integration model of psychosomatic medicine is based on the formation of a brain-based hypothesis, which can cover the A-B-C-D model, so establish an interdisciplinary research team, which studies both psychosomatic medicine and the neuroscience of special clinical phenomena. The A-C-D model shows that depression directly affects the mortality rate of coronary artery disease, which is determined by hypercoagulation and changes in human autonomic neuroregulation. Studying the A-B-C-D integrated model of psychosomatic medicine can improve the level of hospital diagnosis and treatment and care[2]. Of coronary heart disease, depression, anxiety, hostility, anger and other diseases and mood and adverse cardiac outcomes, by screening out the category of bad mechanism, can find out the common ground between them, and then study the psychological characteristics of patients, thus

discover function stronger, updated psychological detection method, eventually apply Zhejiang method to clinical treatment, psychosomatic medical researchers need to pay attention to: to the research topic acute screening, based on the brain research hypothesis, through the hypothesis contains link research, integration of A-B-C-D mode and ensure the accuracy of the research results. Not much is known in medicine about brainstem regulatory mechanisms, but about how brainstem mechanisms regulate the collective action, and how they are connected to the cortex. This is also an important project of psychosomatic medicine, and studying the brain stem of rodents and other animals to understand the regulatory mechanism of cardiovascular, pulmonary, renal and other systems, using human brain imaging technology to study the functional connection between cortical and subcortex, this imaging technology may directly observe neuronal activity. Psychosomatic medical workers need to integrate all the above information, and then solve how to change lifestyle, relaxation training, cognitive behavior or drugs choose precise treatment for specific patients, in psychosomatic medicine clinical treatment, also want to take into account the patients in biological, psychological, social differences[3]。

## **2. Explanation of the heart, brain and body interaction mechanism**

### **2.1 Psychological impact on the brain.**

Through the study of depression and its causes, the transcription factor ring phosphorus adenosine response element binding protein (CREB) with the development of the disease will decrease, but once after interventional treatment, its hippocampal CREB activity will increase, in short, psychosomatic stagnation shows that many studies found that drug therapy and psychological therapy can have a better effect. It can be seen that the neurological function of depressed patients is influenced by drugs and psychotherapy, which will lead to a series of functional reactions, such as a top-down effect by reducing the activity of the bean-like nucleus, or a bottom-up effect by reducing the activity of the parahippocampus, which acts on the emotional neural circuits and activates the normal in the corresponding brain regions. However, the related research of human emergency, depression and neuroplasticity focuses on the hippocampus. Through transient electrical stimulation, the hippocampus causes continuous changes in the three-process neural circuit, which can produce enhancement effect and long duration effect (LTP). Among them, stress can change neuroplasticity, which is based on the multiple neural level. During the treatment of stress and depression, neuroplasticity needs to be observed in the molecular path, regardless of the long and short range[4]。

### **2.2 Cardiac-brain axis interaction mechanism.**

At present, in the national disease classification, the incidence of cardiovascular and cerebrovascular diseases is the most, and human activities require sufficient blood supply, which is the basis for maintaining organ coordination. The human body coordinates its activities through blood supply, but blood will give priority to regulate the cardiovascular system. People have a high cardiovascular sensitivity, easy to be affected by emotions and the environment, so people uniformly harm the cardiovascular disease when they are too excited, and then due to a series of mediated human cardiovascular diseases[5]。

Human plant sympathetic nerve and plant nerve activity is also affect the two elements of human health, especially the former can stimulate the brain stress response, and then directly on the cardiovascular system, parasympathetic nerve after ciliary nerve information into the brain, again with parasympathetic nerve conduction nucleus longa, it completed the information from heart to brain. The transmission of sympathetic nerve is first related to the human information processing center- -extracardiac ganglion, and then connects the dorsal root ganglion and the medulla, and the information is afferent from the subcortical areas such as amygdala and thalamus, and finally to the cerebral cortex. The heart mainly transmits information to the brain in four ways, including biological stress response, energy interaction, electromagnetic field action, pressure wave

transmission, nerve impulse transmission, etc., among which the focus is on the cardiac electromagnetic field. And, of course, they began to think about the heart is through what way to respond to the brain information, so the research between heart and brain information is no longer as single as traditional research, here is the heart and brain interaction regulation system mechanism, how the body through heart nerve perception external nervous system, how to integrate the information. The human heart and the brain interact, and the mechanisms of this interaction are bidirectional and continuous. During cognitive and psychological stimulation, including increased heart rate and blood pressure, cardiovascular activities, which are related to the local neural activity of the forebrain (the insula, the anterior cingulate to the geniculate) and the brainstem (dorsal pons). Therefore, brain area activity also indicates the effect of sympathetic nerve (low frequency part) on the rhythmic changes in heart rate[6].

Heart disease also increases the risk of arrhythmia, and the addition of increased brain function during emotional excitement can potentially affect the arrhythmia. One of the important end factors may be the unilateral advantage of autonomic signals sent by the brain. When the human body is in a strong emotional stimulus, it will induce the asymmetric response of the brain hemisphere. At this time, the sympathetic signal appears lateralized phenomenon, and then the order of myocardial repolarization is affected. However, if the contraction signal appears before the complete repolarization of the heart muscle, it will destroy the procedure and coordination of the myocardial contraction, which will lead to the unstable contraction of patients with heart disease. In addition, healthy people will also due to psychological stress and induce autonomic reaction, leading to arrhythmia, found in the process of the study of heart disease function and the pathogenesis of the right brain activity (brachial nucleus) under the psychological and physiological stress can provide the basis for predicting arrhythmia of cardiac changes, and then identify those patients with high risk of arrhythmia. After studying the brain waves in cardiac patients, it was found that myocardial contraction was controlled by brain activity in response to stress, and then we studied the A-B-C-D pathway, which also included the human autonomic and endocrine intermediary mechanisms (C levels). Neuroimaging related studies show that the sympathetic and parasympathetic nerve can accurately control cardiovascular activity, and aversion stimulation threat related to the amygdala activity, mood induced cardiovascular activity change is sympathetic or parasympathetic control, and the activity of the amygdala area or myocardial contraction is predictable through anxiety. Before stroke or dementia occurs, the human body has a negative impact on a series of cognitive activities, and the heart (D-B-A path), cardiovascular disease, hypertension, myocardial infarction, cardiac arrest and so on will directly affect the human brain function and its signal output.

### **2.3 Social behavior factors.**

We know that it takes a long time to change a person's unhealthy habits, and that more than average people with cardiovascular disease have failed to change their lives, even though they have been constantly told that they are health hazards. Complex relationships between social environment, social activities, psychology, and physiology have always existed. These interactions can affect human brain activities, and thus affect human health. And the scope of human health not only refers to the body, but also includes people's clothing, food, shelter and transportation, as long as all the behavior habits occur in the human body, it is inextricably linked with human diseases.

## **3. Mechanism of body-body interaction**

### **3.1 Brain regulatory mechanisms of depressed mood and Psychological-neural-immune interaction and integration.**

To understand the connection between the limbic system and other systems, can study the pathogenesis of patients with depression, as long as the study proved that the patients with the brain system between the practice is abnormal, including the cerebral limbic system connection, can

know how these abnormalities to reduce the executive function and cognitive function, so also can prove that such patients with the limbic system (amygdala, hippocampus, nucleus accumbens) and limbic system (anterior cingulate, medial prefrontal lobe) connection is two-way. The microecological environment of the human brain-gut axis can affect emotional changes. After the elevated cross maze, it is found that the anxiety behavior of organisms is affected by the microecology of the brain-gut axis in most of the gut, etc. Therefore, the depression of the human body affects the brain structure and dynamics under emotional regulation and stress response[7]. The immune system of the human body is regulated by the brain through the hypothalamus and other mechanisms, in addition to the pituitary gland, which is often called the immune regulation mechanism, the serotonin in the blood can also contain the immune system, and cytokines are closely related to the immune system. People's immune system can through psychological, cell-mediated behavior change, infection, trauma, such as inflammatory process, the process of the immune system consumes a lot of serotonin (5-HT) and dopamine (DA) and cause anxiety, thus arouse the body's protective mechanism, or plant nerve mediated repair, eventually lead to behavior change and neuropsychiatric diseases.

### **3.2 Multiple and multilevel interaction and integration of the mind and body**

Stress and depression affect the molecular process: stress response will promote the body to release glucocorticoids and thyroid stimulating hormone, which is the negative feedback from the HPA axis of stress patients, which is also due to the abnormal function of their neurotransmitter levels. Heart can affect the body, which is a transformation of physical and mental response; body affects the heart, leading to physical and mental problems; mental and physical interaction: lower the threshold of physical disease; and stress response can promote disease. Human psychological activity can affect the brain, endocrine and immune, form interactive reaction, when the human body through immune activation, will release a series of inflammatory factors, these inflammatory factors is one of the causes of the human body pain, also can reduce the receptor sensitivity, the receptor refers to the glucocorticoids, etc., eventually lead to insufficient HPA axis negative feedback. Here we include heart-heart interaction, heart-brain interaction, infection and inflammation interaction, infection and immune interaction, immunity and inflammation interaction, brain immune interaction, brain plant nerve interaction, etc. Internal brain coordination includes prefrontal lobe, anterior cingulate, amygdala, hypothalamus; autonomic nerve balance interaction includes sympathetic and parasympathetic nerves; and target organs and various psychosomatic diseases form interactions between target organs. The purpose of mind and body integration is to achieve a virtuous circle of mind and body, to be physical and mind comfortable, and to have a positive impact on psychology and body. At present, the mechanism of the brain mechanism has made certain achievements, these are by exploring the mechanism of the connection between the organs, to explore these links, and enrich the body related theory model: signaling system (C), control organs or disease (D), social and environmental state (A) and the brain (B), in the analysis of the above four levels, further study the significance of "psychosomatic interaction" system, and integrate the multidisciplinary knowledge system[8].

## **4. Summery**

To sum up, through the psychosomatic medical integration mode, study the psychosomatic interaction mechanism, psychosomatic multiple interaction integration, physical and mental interaction mechanism, further explore the psychosomatic disease interaction mode, integrate clinical multidisciplinary integration, psychological, behavior, the relationship between social factors, answer the phenomenon of puzzle. At the same time, the popularization of psychosomatic medicine should be enhanced, and in the future, clinical practice research and psychosomatic-related brain mechanism research should be strengthened in the future, focusing on the creation of science course integrated medical mode, integrating psychosomatic medicine and

precision medicine, and dismantling the "wall" set up under the biomedical mode. In the future, the whole significance of psychosomatic medicine is far-reaching, which not only affects how to promote the physical and mental health of patients, but also affects the clinical medical model, and even has a profound impact on the progress of the medical industry in the future. However, everything requires the concerted efforts of medical workers to overcome the integration mode of psychosomatic medicine.

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