

UNDERSTANDING PRINCIPLES OF HUMAN PHYSIOLOGY FROM YIN-YANG THEORY

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Abstract

The integration of Traditional Chinese Medicine (TCM) and Western medicine enhances our understanding of human physiology and offers innovative diagnostic and therapeutic approaches. Yin-Yang theory, a foundational concept in TCM, was first documented in the Yi Canon and later elaborated in Huang Di Nei Jing. As TCM continues to evolve alongside modern medical advancements, the Yin-Yang framework has gained broader scientific significance. This paper explores the relationship between Yin-Yang theory and physiological principles, its connection with contemporary medical theories, and its potential clinical applications. Specifically, it examines the structural and functional aspects of Yin-Yang, its material basis, and its role in integrative medicine.

Keywords: Yin-Yang, TCM, Physiological principles, Integrative medicine, Yin-Yang balance

Basic Concepts of the Yin-Yang Theory

Yin-Yang theory is both a philosophical and scientific framework that explains the dynamic interplay of opposing forces in nature. It serves as a methodological tool for understanding and interpreting natural phenomena. The concept of Yin-Yang encapsulates the fundamental dualities observed in the universe—opposition, interdependence, and continuous transformation. Rather than existing as absolute entities, Yin and Yang function as relative, complementary forces that drive the generation and evolution of all things. For this reason, ancient Chinese physicians concluded that "Yin-Yang have their own name, but no form" [1,2].

The Yin-Yang ideology posits that all entities in the cosmos may be classified into two categories: Yin and Yang. Yin or yang may either be subdivided into yin (sub-1) and yang (sub-1). Any yin (sub-1) or yang (sub-1) may be further subdivided into yin (sub-2) and yang (sub-2), resulting in an infinite series [3].

The dichotomy of yin and yang is predicated on sunlight, with the sunward aspect representing yang and the opposite side denoting yin. Generally, everything that is active, outward, rising, warm, luminous, functional, or hyper-functional is classified as yang. In contrast, elements that are inward, descending, frigid, obscure, material, and deteriorating in function are associated with yin. The Yin-Yang relationship exhibits key characteristics, including relativity, correlation, dynamic interaction, universality, opposition, divisibility, balance, complementarity, as well as transformation. (Figure 1) [4,5].

In this illustration, although yin and yang signify two opposing orientations, they are inherently interconnected. The opposing factions of the fight, symbolized by black and white, are complimentary and mutually reinforcing, and it is via this interplay that the transformations and development of yin and yang are propelled. A circle symbolizes an object. The circle is ingeniously partitioned by a curve. The evolution of yin and yang is characterized by a non-linear, curved, wavy, and anti-S-shaped trajectory. Yin and yang are positioned at the terminus and inception of a three-dimensional spiral that ascends to a higher plane, rather than just oscillating on a two-dimensional plane. It indicates the presence of yang inside yin and vice versa, softness within hardness and vice versa, you within me and I within you. Despite their opposing dynamics, Yin and Yang ultimately maintain a cyclical balance, characteristic of dualistic frameworks.

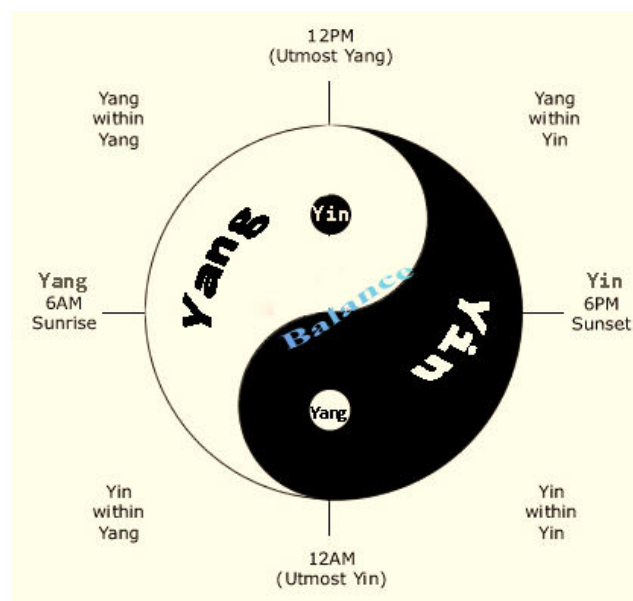


Figure 1: The Yin-Yang model of ancient Chinese philosophy

The Yin-Yang Theory in Traditional Chinese Medicine (TCM)

Yin-Yang theory was incorporated into medical practice by early Chinese physicians and remains a foundational principle in Traditional Chinese Medicine (TCM). This doctrine provides a comprehensive framework for understanding human physiology, disease etiology, and therapeutic interventions. It explains the origin of life, the maintenance of physiological balance, the progression of pathological conditions, and the guiding principles for diagnosis and treatment. For centuries, Yin-Yang theory has shaped the theoretical and clinical applications of TCM, influencing both diagnostic methodologies and treatment strategies [6].

In the context of the human body, yang denotes outward, exterior, upward, invigorating, penetrating, warm, elevating and thrilling attributes, while yin signifies cohesive, interior, tranquil, inferior, chilly, subdued and moist characteristics [7].

The main elements of the Yin - Yang doctrine in TCM

The interdependence of human yin - yang: The human body's yin and yang are oppositional but united; the mutual foundation of yin and yang signifies their interdependence, indicating that yin and yang are synergistically beneficial to one another. Each aspect of yin and yang cannot exist autonomously; one needs the other as a prerequisite for its existence. Yin and Yang are inherently related concepts, defined by their opposing yet complementary nature, which allows for the differentiation of relative attributes and interrelationships. To draw an analogy, if the top represents yang and the bottom signifies yin, then the absence of the top negates the existence of the bottom, while without the bottom, the top cannot be differentiated from the bottom. In the context of the human body, material life is contingent upon the organism's functional activity, and functional activity is dependent on the discharge of material energy [8].

Mutual inclusion of Yin and Yang into human physiology: Interdependence is intricately connected to mutual inclusion. If yin relies on yang, then yang is always involved in yin. The perpetual interplay between yin and yang signifies that yang always contains an element of yin, and vice versa. Among the four seasons, summer is the most yang, although it harbours a yin power that begins to manifest throughout summer, persists through autumn, and culminates in winter. Winter represents the pinnacle of yin; however, it reveals a yang energy that will reach its zenith from spring until summer [9].

The dynamic interaction and advancement of yin and yang inside the human body: The proliferation and decline of yin and yang inside the human body are consistently shown via their interconnection and mutual restriction. Excessive dominance by one side invariably results in the corresponding weakening of the opposing side. The oscillation of yin and yang is always dynamic. When this cyclical fluctuation is in a condition of relative equilibrium, the body demonstrates normal physiological function. When the equilibrium is disrupted, either yin or yang may intensify or diminish, resulting in pathological states [10]. In medical therapy, yin and yang must be simultaneously cultivated. It is said, for instance, that yin will not react to the medication or acupuncture without a certain level of yang.

Mutual transformation of yin and yang inside the human body: The metamorphosis of yin and yang inside the human body indicates that they may be converted in opposing directions under certain situations. Yin can be converted into yang, and yang may be converted into yin. It is the process of quantitative and qualitative alterations in the dynamics and metamorphosis of entities [2].

The shift of yin and yang transpires at a pivotal condition of qualitative change, encapsulated by the old adage, "when things reach an extreme, they can only move in the opposite directions." For example, extreme cold can transition into heat, and vice versa, illustrating the principle of mutual transformation. When it comes to the human body, there are many tangible manifestations of the yin and yang transformation, such as the exchange of substances and energy within the organism, the regulation of physiological activities through

stimulation and inhibition, and the transition between yang and yin symptoms during disease progression [8].

Contrasts and constraints of yin - yang: The theory of TCM posits that all interconnected entities or occurrences in nature, including heaven and earth, ascension and descension, cold and heat, water and fire, motion and stillness, as well as success and failure, possess dual characteristics of yin and yang. In TCM, yin and yang are said to resist, constrain, and repel one another during conflict, however they do not exist in a perpetual state of hostility. In actuality, we often see that an entity may possess contradictory attributes contingent upon the context, thus it is not logically inconsistent to assert that something is little (relative to a mountain) and enormous (relative to an ant). Yin and yang facilitate transformation and progression, sustaining the organism's vital functions and enabling the flourishing of nature. Objective assessments are omitted unless explicitly indicated as such [11].

The dynamic equilibrium of yin and yang inside the human body is neither static or immutable; rather, it is always in flux and transformation. Under physiological circumstances, when yin and yang achieve relative dynamic balance, the human body attains a state of health. An imbalance between yin and yang, caused by certain causes, will result in either success or loss in their competition, leading to a state of disarray. Furthermore, an imbalance whereby one feature predisposes to triumph or loss will result in sickness [12].

Yin-Yang theory serves as a foundational guideline in clinical diagnostics and therapeutic strategies within TCM. This framework allows practitioners to categorize physiological functions, pathological conditions, and treatment approaches based on Yin-Yang dynamics. As illustrated in Figure 2, the clinical applications of Yin-Yang theory encompass disease classification, diagnosis, and treatment selection.



Figure 2: The main elements of the yin and yang doctrine in TCM
(<https://agelessherbs.com/yin-yang-theory/>)

The organizational structure of the human body may be elucidated via the concept of yin - yang, categorizing its numerous components based on their spatial and functional features. The concept of yin-yang may encapsulate the physiological activities of the human body. The sustenance of human life and proper physiological functioning arises from the reconciliation and equilibrium of yin - yang, exemplifying the interaction between these forces and the unification of opposites [13].

Yin - yang are used to delineate pathogenic alterations in the human body. Yin and yang include both the beneficial qi and the malevolent qi of the human body. Positive qi has two components: yin essence and yang essence, whereas bad qi is divided into two categories: yin evil and yang evil. Excessive yang may induce yang exuberance and yin deficiency, resulting in symptoms of heat in TCM. Yang excess may induce yang exuberance and yin deficiency, resulting in symptoms of heat in TCM.

If yang is poor and unable to regulate yin, it will result in a symptom of illusory cold according to TCM. If yin is deficient and inadequate to regulate yang, it will result in a symptom of insufficiency heat in Traditional Chinese Medicine. The imbalance of yin and yang is the fundamental cause of all ailments [14].

The concepts of yin - yang are used in the diagnosis and identification of ailments. Yin - yang may encapsulate the location and kind of lesions, as well as the attributes of other symptoms, so functioning as a diagnostic framework.

Lesions may also be categorized into yin and yang based on their coloration. If the colour is bright, the lesion is characterized as yang; if the colour is dark, the lesion is characterized as yin.

Voice and breath may be categorized into yin - yang. Elevated and boisterous behaviour, characterized by abundant speech and enthusiasm, often signifies the presence of yang heat; conversely, subdued and feeble demeanour, marked by limited communication and silence, generally indicates yin cold deficit.

In Traditional Chinese Medicine, pulse denotes the velocity, vigour, and profundity of the pulse, often assessed at the radial artery. The condition or kind of pulse is a distinctive word in TCM, denoting the characteristics and dynamics of the arterial pulse, and serves as a fundamental basis for evidence identification in TCM. The pulse may be classified as either yin or yang. If it seems to be floating, huge, flooding, slippery, or in plenty, it is classified as yang; if it seems to be sinking, tiny, fine, astringent, or delayed, it is classified as yin.

Yin and yang are used to direct illness therapy and establish the rules governing therapeutic approaches. The TCM practitioner rectifies the imbalance of yin and yang, so restoring equilibrium and facilitating the cure of the ailment.

The concepts of yin and yang are often used to encapsulate the characteristics of pharmaceuticals as a foundation for therapeutic application. Chinese medicine classifies drug qualities into many categories: Frigid, scorching, temperate, and mild. Cold and cool medications possess yin characteristics and address yang ailments. Warm and hot substances are yang in character and address yin ailments [15,16].

Chinese medicine categorizes the flavours of substances into sour, bitter, sweet, pungent, salty, and light. Pungent, sweet, and mild-flavoured substances are yang in nature and are often used to alleviate yin symptoms; sour, bitter, and saline substances are yin in nature and are commonly utilized to address yang symptoms. [17].

TCM categorizes the properties of medications as ascending/descending and floating/sinking. The ascending and floating category of drugs is characterized by yang properties, promoting the rise of yang qi, dispersing wind and cold, and facilitating the opening of orifices; conversely, the descending category of drugs embodies yin properties, serving to clear heat, induce catharsis, alleviate stagnation, and eliminate obstructions.

From the viewpoint of dissipative structure theory, comprehending the structure and function of Yin-Yang reveals that "Yin manifests physical forms" as a process of self-organization that constitutes the human body. "Yang transforms substances into a Qi state," referring to the dissipation of material and energy inside the human body. When bodily self-organization and dissipation are in a stable and orderly condition, this state is referred to as "Yin Ping and Yang Mi." Yin signifies the corporeal foundation of the human body, whereas Yang denotes the functional condition. Yin-Yang represents the intrinsic oneness of structure and function.

With the advancement of human genome research and proteomics, the structure and function of Yin-Yang are also reflected in genetic mechanisms. DNA has four nucleobases: adenine (A), thymine (T), guanine (G), and cytosine (C). The bases A, T, G, and C are paired according to the core dogma. Once the sequence of bases on one strand is established, the sequence on the complementary strand is also determined. If A and G are associated with Yang, then T and C are associated with Yin, and conversely. The four bases consistently manifest as a mix of Yin and Yang [18].

The Yin-Yang concept may also be elucidated via physiological mechanisms, including the activation and deactivation of proteins. For instance, enthusiastic Yang individuals are always in an exhilarating mood, characterized by heightened sympathetic nerve activity and dilated pupils. The increase in adrenal hormone production results from the up-regulation of the enzyme responsible for its synthesis, which is caused by the enhanced transcription of DNA into RNA. The materials of Yin-Yang are articulated via varying degrees.

Conclusion

Yin-Yang theory in TCM provides a physiological framework for understanding the dynamic interactions that sustain life. It shares conceptual parallels with modern medical theories, particularly in the domains of energy metabolism, structural-functional relationships, and homeostasis. The principle of "Yang transporting Qi and Yin forming materials" aligns with

the functional and structural aspects of biological systems. Similarly, the concept of "Yin Ping Yang Mi" describes a state of dynamic equilibrium akin to modern homeostatic regulation.

The material basis of Yin-Yang theory extends from the macroscopic level (organ systems) to the microscopic level (genes, proteins, signalling molecules, and second messengers). Emerging research in genomics, proteomics, and molecular biology continues to reveal correlations between Yin-Yang principles and modern biomedical sciences.

Furthermore, key Yin-Yang doctrines—such as "mutual transformation of Yin and Yang," "Yin generating Yang and Yang generating Yin," and "seeking Yang from Yin and seeking Yin from Yang"—offer valuable insights into disease progression and therapeutic strategies. These principles not only contribute to the theoretical foundation of TCM but also hold potential for integration into modern medical research and practice. Further interdisciplinary studies are warranted to explore these connections and advance holistic healthcare approaches.

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