



# Human biological rhythm in traditional Chinese medicine

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**Abstract** Traditional Chinese medicine (TCM) has a comprehensive and thorough understanding of biological rhythm. Biological rhythm is an inherent connotation of “harmony between human and nature”, one of the thoughts in TCM. TCM discusses emphatically circadian rhythm, syzygial rhythm and seasonal rhythm, and particularly circadian and seasonal rhythms. Theories of Yin Yang and Five Elements are the principles and methods, with which TCM understands biological rhythms. Based on theories in TCM, biological rhythm in essence is a continuous variation of the human body state synchronized with natural rhythms, and theories of Yin Yang and Five Elements are both language tools to describe this continuous variation and theoretical tools for its investigation and application. The understandings of biological rhythm in TCM can be applied to etiology, health care, disease control and treatment. Many understandings in TCM have been confirmed by modern research and clinical reports, but there are still some pending issues. TCM is distinguished for its holistic viewpoint on biological rhythms.

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Biological rhythm, the phenomenon of temporal rhythm observed in vital activities of living creatures, is an inherent function endowing them with the capability to adapt themselves to environment and often synchronized with natural rhythms. During recent decades, biological rhythm has become a focus under investigation. Along with

constantly deepened understanding of biological rhythm in modern medicine and biology, fruitful results have been achieved through a great deal of researches on rhythm from the individualized level to the molecular one, providing important references in respect of recognition of etiology and therapeutic idea for diseases, and promoting the progression of medicine powerfully.

Despite the absence of the term of biological rhythm, traditional Chinese medicine (TCM) theory elucidates profoundly the rhythmic phenomenon of human being, including circadian rhythm (daily rhythm) that has been

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studied most, as well as syzygial rhythm (lunar rhythm) and seasonal rhythm (annual rhythm), and has the developed theory to elucidate the rationale and application of biological rhythm. This work aims to elucidate the understanding of human biological rhythm in TCM, and provide probable materials and ideas for modern research.

### Biological rhythm – the inherent connotation of the TCM thought of “harmony between human and nature”

The thought of “harmony between human and nature” is rooted in traditional Chinese philosophy and a conclusion about the relationship between people and the nature, highly generalized by ancient Chinese. In TCM, this thought is the logical basis for understanding human biology and pathology and contains three connotations. Firstly it is the isomorphism between human and nature, i.e., their compatibility on structure and composition. It was stated in *Keqi of Spiritual Pivot* that five Zang organs of human compatible with five musical scales of heaven, six Fu organs of human compatible with six tunes of heaven, 365 acupoints of human compatible with 365 days a year; knees and shoulders of human compatible with mountains on the land; axilla and popliteal spaces of human compatible with valleys on land; 12 meridians of man compatible with 12 rivers on the land, etc. Similarly, the rhythm of nature can be also observed in human body. Therefore, isomorphism between human and nature is a TCM explanation of the presence of biological rhythms. Secondly there are same virtues between human and nature, i.e., there are similar and comparable functions and phenomenon between human and nature. It was stated in *Tianyuanji Article of Plain Questions* that human has five Zang organs that can metabolize five Qi to generate happiness, anger, thoughts, sorrow and dread, just like the heaven has Five Elements that can drive Five Positions to generate coldness, heat, dryness, wetness and wind. Visceral manifestation theory in TCM is centered on the understanding of functions of heart, liver, spleen, lung and kidney of human body via natural phenomenon of generation, growth, metabolism, collection and storage, relating temporal factors like day, night and four seasons to biological and pathological variations. Same virtues between human and the heaven, therefore, are the main theoretical basis and main approaches in investigation on biological rhythms in TCM. Thirdly it is interaction between human and heaven, i.e., as the individual system of its own, human and nature are open but not closed, with mutual exchange of information and energy and mutual influences. It was stated in *Yinyangyingxiang Article of Plain Questions* that Heaven Qi is communicated to Lung, Earth Qi to throat, Wind Qi to Liver, Thunder Qi to Heart, Grain Qi to Spleen and Rain Qi to Kidney. It is also a prerequisite of explaining human pathological rhythms in TCM, as stated in *Zangqifashi Article of Plain Questions* that a patient with liver diseases feels fresh in the morning, but the disease tends to be aggravated in the evening and then relieved at midnight. It is also a basic foundation for TCM health care, as stated in *Siqitiaoshen Article of Plain Questions* that the sage cultivates his Yang during spring and summer and his Yin during autumn and winter. Interaction between human and heaven is the

theoretical foundation and approaches to apply biological rhythm to practice.

In summary, based on the point of views in TCM, biological rhythms are inherent biological functions analogous to natural rhythms, and can be intervened through some positive approaches.

### Biological rhythms in TCM theory

Given the fact of harmony between human and the heaven, all rhythms in the nature should be found in human body! In fact, in comparison with modern medicine scrutinizing circadian rhythms but neglecting other rhythms, *Huangdi's Canon of Medicine* description about circadian rhythm, syzygial rhythm and seasonal rhythm is of great reference value in details.

Human circadian rhythm is embodied in the operation of *Ying Qi* and *Wei Qi*, as stated in *Yingweishenghui Article of Spiritual Pivot* that *Ying Qi* circulates within pulse and *Wei Qi* circulates out of pulse, and they circulate continuously, *Ying Qi* has the circulating rule of fifty cycles along the body within one day and one night, *Wei Qi* has the rule of circulating along yang (the external body) during daytime for 25 circles and yin (the internal body) during night for 25 circles, the circulation of *Wei-qi* dominates human sleeping/awake cycle. Moreover, it is put forward by *Shunqiyirifenweisishi Article of Spiritual Pivot* the rhythm division method imitating four seasons that one day is divided into four seasons with morning as the spring, noon as the summer, sunset as the fall and midnight as the winter. Similarly, human also has the biological rhythm that qi emerges in the morning, grows at the noon, declines in the evening and enters organs at midnight, which is analogous to seasonal rhythms with its significance listed as following.

Human syzygial rhythm is embodied in prosperity-decline variation of qi and blood. It is stated in *Bazhengshenming Article of Plain Questions* that accumulation of blood qi and circulation of *Wei Qi* start from crescent; at the full moon, blood qi are substantiated and muscles strengthened; at the wane, muscles and meridians are weakened, *Wei Qi* is gone and figure exists alone without essence. It is stated in *Suilu Article of Spiritual Pivot* that at the full moon sea water flushes to the west and human qi and blood are accumulated with strengthened muscles, tight skin, strong hair and compact texture, but at the wane sea water flushes to the east and human qi and blood are weak, with *Wei Qi* gone, figure alone (without essence), shrunk muscles, flabby skin, open texture, sparse hair and thin muscle texture. So phase of the moon is synchronized with the prosperity-decline of human blood and qi.

Human seasonal rhythms are the biological rhythm that is discussed most in *Huangdi's Canon of Medicine*, and is embodied in rotated duties of Five Zang organs. Liver is on duty in spring, heart in summer, lung in autumn and kidney in winter. Due to Five Zang organs taking turns to be on duty, pulse manifestation also shows periodical changes including pulse in spring like string, summer flood, autumn hair and winter stone; based on which human also show corresponding vulnerability to certain diseases. The rhythm that Five Zang organs take turn on duty is the most important idea concerning rhythm in TCM. It should be

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