

COMMENTARY

Traditional Chinese medicine and aging: Integration and collaboration promotes healthy aging

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Aging is an unavoidable law of life. Traditional Chinese medicine (TCM) has had a clear understanding of aging since very ancient times. For example, it recognizes the limit of the human life span as 100–120 years, as unequivocally stated in the ancient *Huang Di Internal Classic*, which is known as the “Bible of TCM.”¹ On May 25, 2019, all member nations of the World Health Organization agreed to adopt the 11th revision of the *International Statistical Classification of Diseases and Related Health Problems*, which for the first time includes a chapter on traditional medicine originating from TCM.²

Compared with other traditional medicines, TCM is by far the most comprehensive. With a long history of practice and refinement, TCM represents the ultimate integration of humanity and natural sciences, health assessment, and herbal medicine and other means of intervention, as well as traditional Chinese culture and ancient Chinese philosophy. TCM has established unique views on life, fitness, diseases, and prevention and treatment of diseases with unique techniques, including Bian-stone, medicine, acupuncture, moxibustion, *tuina* (massage), and *daoyin* (such as tai chi and qigong) over thousands of years. Here, we introduce readers who might not be familiar with TCM and some of its key concepts in relation to human aging.

In the *Huang Di Internal Classic*, human aging is described in great detail with phenotypic features, such as graying hair and balding, dimming eyes, missing teeth, loss of ability to express oneself clearly, withered and wrinkled skin, loss of reproduction capability, crooked steps, and reduced mobility. TCM acknowledges that the main pathological changes associated with aging include degeneration and decline in functions of the viscera and organs, and that age-related problems usually occur slowly, linger together

and for a long time, aggravate gradually, and resist recovery, ultimately leading to death after multiple organ failure. Dr Meizhong Yue, an outstanding 20th-century TCM geriatrician, summed up the manifestations of common age-related chronic conditions in simple terms: “Only remember distant events not recent ones; tears when laughing, no tears when crying; blurred vision; poor hearing, yet inquisitive of gossips.”³ This vivid description of age-related problems effectively portrays the complexity of aging, from cognitive impairment, psychological disorders, oral and denture problems, and personality changes, to vision and hearing loss.³ Similarly, the World Health Organization has reported that by age 60 years, the major burdens of disability and death arise from age-related vision and hearing loss, mobility difficulty, and noncommunicable diseases, including heart disease, stroke, chronic respiratory disorders, cancer, and dementia.⁴

The principle of “yin and yang” is one of the core theories of Chinese philosophy as well as of TCM. Ancient Chinese philosophy holds that everything in the universe has two sides—yin and yang—which describe the properties of both the opposites and unity of interrelated things or phenomena in nature. According to TCM theory, one's physical health depends on harmony in the functions of various bodily organs, a moderate and stable state of emotional expression, as well as adaption to different environments, of which the most vital is the dynamic balance between yin and yang. TCM deems that illnesses are fundamentally due to the disturbance of the dynamic balance between yin and yang caused by external or internal factors. When yin and yang are in a state of balance, the body is healthy. When the balance is disturbed, the body becomes unhealthy. Although yin and yang levels decline gradually during aging, yin and

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yang are still in a state of balance when one is healthy. However, such balance is vulnerable and will eventually change to an extreme state—an unhealthy or diseased state. The *Huang Di Internal Classic*, which first appeared around 2000 B.C., definitively pointed out that the primary cause of aging is the decrease of yin and yang, and that the yin level halves from its maximum in one's 40s while the yang declines from its highest level at the age of 48 years. Some practical strategies on increasing life expectancy have also been described in this book, such as living in accordance with the general rule of yin and yang, and maintaining a restricted diet and a reasonable lifestyle, which helps one to reach the proclaimed life expectancy of 100-120 years.

The yin and yang concept has also been adopted in modern life science studies, helping people to understand the nature of life, aging, and illness from a different perspective. In 1986, yin and yang concepts were used for the first time to explain cell growth regulation.⁵ It is accepted that the yin-yang icon symbolizes the balance and harmony between two opposing forces.⁶ An “inflammation of yin and yang” picture was also taken as the cover background of the first issue of *Science* in 2013, indicating the opposing sides for the role of inflammation (ie, beneficial in some cases, such as in the case of acute inflammatory response to fighting against infections, but also detrimental in others, including its role in the development of neurodegenerative diseases, cardiovascular diseases, and metabolic syndrome).⁷

An holistic approach to health assessment and intervention is another key and related principle of TCM that is particularly pertinent to aging and one of the characters of geroscience research. Although geroscience is a new field of biological aging research, like TCM, it has the central theme of the health span and the primary objective of identifying the biological mechanisms and strategies that will improve the health span.⁸ Modern medicine and, for that matter, the entire health-care system are based on identifying symptoms, signs, and abnormal laboratory and imaging findings from which disease diagnosis and a treatment plan can be formulated. This approach can be effective in dealing with a single disease, but not so when dealing with issues related to aging or health conditions in older adults. Instead of focusing and treating individual symptoms, TCM approaches the whole body and its overall health condition as well as its interactions with the environment. The concept of “qi” is such an example. While there is no molecular or signaling pathway can be used to explain qi, this is a unique way, based on TCM theories and empirical experiences, to look into underlying mechanisms and potential etiology. Overall, TCM and geroscience endorse similar principles and approaches to promoting healthy aging and address the root problems of illnesses in the elderly.

TCM has also established effective strategies against specific age-related illnesses during its long history of practice managing age-related diseases. With the development of molecular biology and various advanced technological approaches, more efforts are being made to elucidate potential mechanisms and pathways for promoting healthy aging, reducing age-related risks of specific diseases, and preventing and treating age-related conditions. Results of acupuncture for chronic severe functional constipation in patients of middle and older age indicate that 8 weeks of electroacupuncture

increases complete spontaneous bowel movements and is safe for the treatment of chronic severe functional constipation.⁹ A study on acupuncture for urinary incontinence in elderly patients showed that electroacupuncture treatment involving the lumbosacral region resulted in less urine leakage after 6 weeks.¹⁰ Tai chi training appears to reduce balance impairments in patients with mild-to-moderate Parkinson's disease (mean age = 68 ± 9 years), with additional benefits of improved functional capacity and reduced falls.¹¹ It may also be a useful treatment for fibromyalgia and merits long-term study in larger study populations.¹² A study of TCM's impact on age trajectories of health indicates that the TCM application has an important role in long-term health (mean age = 63.5 ± 7.7 years).¹³ Furthermore, many TCM herbs have shown effects promoting anti-inflammation, anti-oxidation, anti-apoptosis, and autophagy. Treatment of bone-marrow-derived mesenchymal stem cells with astragalus polysaccharide was proved to impede mitochondrial reactive oxygen species accumulation and remarkably inhibited apoptosis, senescence, and reduction of proliferation and pluripotency of bone-marrow-derived mesenchymal stem cells caused by ferric-ammonium-citrate-induced iron overload.¹⁴

An ancient Chinese tale, “Blind Men and an Elephant,” warns against mistaking a part for the whole. Likewise, life is a very complex process, and so are aging, its underpinning mechanisms, and their role in contributing to the development of age-related diseases. A one-sided view of them will only lead to judgment deviation or even major errors. An holistic view of TCM may help to gain a better understanding. As a flock of starlings relies on connectivity, dynamics, and communication, the human body is a dynamic equilibrium system with interrelated and interacting physical and mental elements.

In the past, people thought that TCM concepts might sound alien to the Western world. The integration and collaboration between TCM and modern medical research have since emerged and continue to advance at an accelerated speed. While the application of the TCM approach to geroscience research and vice versa has just begun, these two disciplines share key principles, which make it feasible and likely synergistically fruitful. This will ultimately lead to the development of novel interventional strategies for promoting healthy aging and mitigating age as a major risk for chronic diseases.

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CONFLICTS OF INTEREST

Nothing to disclose.

AUTHOR CONTRIBUTIONS

Weihong Cong and Keji Chen critically reviewed the literature and wrote the manuscript.

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