

The Essential Role of Zheng Qi in Promoting Health: From the Perspective of Chinese Medicine and Modern Medicine

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Abstract

The concept of Zheng Qi in traditional Chinese medicine (TCM) refers to the vital energy produced by the interaction of Yin and Yang forces in the body. Zheng Qi performs two main functions: Wei Qi (defensive Qi), which shields the body from external pathogens, and Ying Qi (nutritive Qi), which sustains the internal organs and enhances their functionality. In TCM, Chinese tonifying herbs can help restore the balance of Yin/Yang and Qi/Blood function in visceral organs (*i.e.*, optimal physiological functions), thereby fostering the efficient production of Zheng Qi and enhancing health. To ensure the quality of Chinese herbal products, functional assays to measure Yin/Yang, Qi/Blood functions, and Zheng Qi production should be implemented. The efficacy of Yang and Qi herbs can be evaluated by their ability to increase mitochondrial ATP in cultured mouse cardiomyocytes, while Yin and Blood herbs are tested through their immunostimulatory effects on antigen-induced T/B cell proliferation in mouse splenocytes and the production of erythropoietin/nitric oxide in hepatocytes/vascular endothelial cells, respectively. Additionally, Zheng Qi's effect can be gauged by examining natural killer cell activity and antigen-induced T/B cell proliferation in mice *ex vivo*. These assays act as biomarkers for assessing the quality and effectiveness of herbal health products within TCM theory.

Keywords

Traditional Chinese Medicine, Zheng Qi, Immunity, Biomarkers, Functional Assays

1. Introduction

The “Huang Di Classic of Medicine” stated that “with the sustenance of Zheng

Qi in the body, no evils can intervene (正氣存內，邪不可干)". What is Zheng Qi (正氣) in traditional Chinese medicine (TCM)? According to Dao theory, the Universe originated from one Dao, which split into Yin and Yang. The interaction between these two opposing forces in the body generates Zheng Qi, also known as vital energy [1]. Understanding the concept of Zheng Qi is essential for practitioners of Traditional Chinese Medicine (TCM), as it forms the basis of many treatment modalities.

According to Traditional Chinese Medicine (TCM) theory, two types of energy contribute to the generation of Zheng Qi in the body, which is responsible for maintaining health and vitality. Acquired Qi (Pectoral Qi or Zong Qi) is formed by combining vital essences extracted from atmospheric air and dietary food, while Primordial Qi is inherited from parents and primarily derived from the Universe (Figure 1) [2] [3]. The combination of these two types of energy in varying proportions leads to the generation of Zheng Qi. While both Acquired Qi and Primordial Qi are required for Zheng Qi generation, a sufficient supply of Acquired Qi can prevent the overuse of Primordial Qi, thus slowing down its rate of exhaustion. This concept forms the basis of promoting health and longevity in TCM [4]-[8].

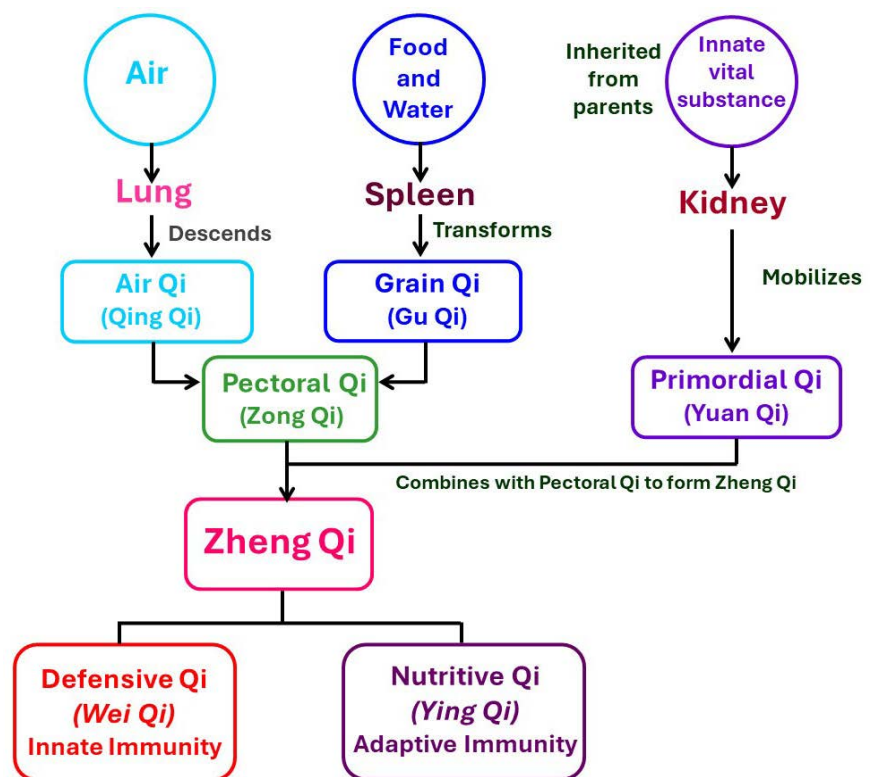


Figure 1. The formation of Zheng Qi and its primary physiological functions.

Zheng Qi has two main functions: Wei Qi (Yang in nature) and Ying Qi (Yin in nature) [5] [9]. Wei Qi protects the body against external pathogens, similar to innate immunity, while Ying Qi nourishes the visceral organs with vital es-

sences, thereby promoting their function, including that of adaptive immunity. The generation of Zheng Qi requires the functioning of visceral organs, specifically the Lung, Spleen, and Stomach, which extract Air Qi and Grain Qi (Acquired Qi) from atmospheric air and food. Additionally, the Kidney helps mobilize the Primordial Qi [9]. However, the amount of Primordial Qi is fixed from conception and cannot be easily replenished during a lifetime [3] [5] [10] [11]. Maintaining the Yin/Yang balance of visceral organs to ensure their optimal physiological functions is crucial for the efficient generation of Acquired Qi and the mobilization of Primordial Qi. Chinese tonifying herbs, categorized into Yang-invigoration, Qi-invigoration, Yin-nourishing, and Blood-enriching, can restore this balance and Qi/Blood function in visceral organs. This enables the efficient generation of Acquired Qi and mobilization of Primordial Qi, preventing the overuse of Primordial Qi [3] [11]-[16].

Yang/Qi deficiency is linked to chronic fatigue syndrome in Western medicine [8], while Yin deficiency is associated with autoimmune diseases [17]. Pharmacological studies of Chinese tonifying herbs have shown that restoring Yin/Yang balance and Qi/Blood function affects various cellular functions, leading to the resumption of normal physiological functions. These include enhancing mitochondrial ATP generation with Yang and Qi herbs and potentiating the adaptive immune response with Yin herbs. Blood herbs can also induce nitric oxide (NO) production in cultured vascular endothelial cells and erythropoietin (EPO) production in cultured hepatocytes [18]. Recent studies have shown that the status of Zheng Qi generation can be assessed by measuring the natural killer (NK) cell activity and antigen-induced T/B cell proliferation in an *ex vivo* mouse model [19].

2. Discussion

The use of herbal formulations in Traditional Chinese Medicine (TCM) is a holistic approach focused on the overall health and well-being of an individual [7] [11] [18] [20]. The principle of using multiple herbs for disease prevention and treatment is based on the belief that a combination of herbs, guided by TCM theory, can produce a more comprehensive therapeutic effect than a single herb alone [20] [21] [22] [23]. In cases of sub-optimal health conditions, diagnosing the deficiency pattern in specific visceral organs guides the formulation of herbs based on relevant functional categories and meridian tropism (targeted visceral organs) [24] [25]. The functional characterization of Chinese herbs relies on thousands of years of human usage, guided by Traditional Chinese Medicine (TCM) theories, including Yin and Yang, the Five Elements, and the Meridian theory [23] [26] [27]. Administering herbs or herbal formulations can restore a normal Yin/Yang balance and Qi/Blood function in visceral organs. This leads to improved physiological function and health outcomes, presumably through the enhancement of Zheng Qi generation [3] [27]. Mycelium cultures of *Cordyceps sinensis* (Cs4) (Table 1) and Lingzhi spore (Table 2), popular herbal health

products, were found to enhance Zheng Qi generation. This was assessed by measuring natural killer cell activity and antigen-induced T/B cell proliferation in an *ex vivo* mouse model.

Table 1. The immunomodulatory effect of Cs4 in mice. Animals were treated with Cs4 or vehicle (distilled water) (*i.e.*, the control group) for 3 days intragastrically. NK cell activity and Concanavalin A (Con A)/lipopolysaccharide (LPS)-induced splenocyte blastogenesis were measured as described by Leung and Ko (2023) [19]. Values are presented as percent relative to the untreated control and are expressed as mean \pm SD (n = 4). The control values were as follows: NK cell activity (%) = 6.36 ± 0.16 ; Con A-induced blastogenesis (AUC) = 2034 ± 133 ; LPS-induced blastogenesis (AUC) = 1842 ± 141 . *Significantly different from the control with p-value < 0.05 (using student's t-test by Excel).

	Control	Cs4, 1 g/kg
NK cell activity	100 \pm 2.46	113 \pm 1.49*
Con A-induced blastogenesis (T cells)	100 \pm 6.56	125 \pm 7.42*
LPS-induced blastogenesis (B cells)	100 \pm 7.63	120 \pm 2.40*

Table 2. The immunomodulatory effect of Lingzhi spore in mice was investigated by treating animals with Lingzhi spore or vehicle (olive oil) (*i.e.*, the control group) for 14 days via oral administration. NK cell activity and Con A/LPS-induced splenocyte blastogenesis were measured following the methods described in Leung and Ko (2023) [19]. Values are presented as a percentage relative to the untreated control and expressed as mean \pm SD (n = 3). The control values were as follows: NK cell activity (%) = 4.88 ± 0.10 ; Con A-induced blastogenesis (AUC) = 3044 ± 121 ; LPS-induced blastogenesis (AUC) = 2456 ± 113 . *Significantly different from the control with p-value < 0.05 (using student's t-test by Excel).

	Control	Lingzhi spore, 0.246 g/kg
NK cell activity	100 \pm 2.02	119 \pm 7.22*
Con A-induced blastogenesis	100 \pm 3.97	125 \pm 5.63*
LPS-induced blastogenesis	100 \pm 4.60	149 \pm 12.75*

Chinese medicine often uses tonifying herbs and multi-component herbal formulations to treat deficient body conditions. To ensure the quality control of Chinese herbal products, functional assays related to Yin/Yang and Qi/Blood functions should be included. This is in addition to chemical marker analysis and pharmacological assays for specific medical claims [6] [21] [26]. Chinese tonifying herbs are classified into four categories: Yang-invigorating, Qi-invigorating, Yin-nourishing, and Blood-enriching. These herbs can be used alone or combined to address deficiencies in body function in sub-optimal health conditions [3]. Yang-invigorating herbs stimulate mitochondrial ATP generation. Qi-invigorating herbs improve cellular glutathione redox status, leading to an increase in mitochondrial ATP generation capacity [28]. Yin-nourishing and blood-enriching herbs possess specific pharmacological activities, measurable by antigen-induced T/B cell proliferation and EPO/NO production in hepatocytes and endothelial cells, respectively [18] [19]. Additionally, the capacity of herbal health products

to boost Zheng Qi production can be evaluated by measuring NK cell activity and antigen-induced T/B cell proliferation in an ex vivo mouse model [19]. These functional assays serve as biomarkers for the quality control of Chinese herbal products.

3. Conclusion

TCM often utilizes Chinese tonifying herbs and herbal formulations to rebalance Yin/Yang and Qi/Blood functions in visceral organs, thereby enhancing the efficient production of Zheng Qi (*i.e.*, physiological functions) and promoting good health outcomes. To ensure quality control of Chinese herbal health products, functional assays measuring Yin/Yang and Qi/Blood functions, as well as Zheng Qi production, should be included. These assays can act as biomarkers for assessing the quality and efficacy of herbal health products within the framework of TCM theory.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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