



Telomere and Body Constitution for the Role of Aging Population and Cancer Development



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Opinion

Shortened telomere in humans is emerging as a marker of disease risk and progression, and premature mortality. Having discovered telomeres and telomerase and their relationship to aging and cancer development, scientists observed that even the specific herbs or CHM formulae had potential use for cancer treatment, and that the investigation itself which was being separated from the pragmatic practice of CHM. Therefore, it limited the scope of translation and had minimal clinical value. Chinese Herbal Medicine (CHM) has been commonly practiced in Chinese since ancient times, but the notion of how clinical wisdom works is largely unknown. To classify the body constitution (BC) types in CHM, the Constitution in Chinese Medicine Questionnaire (CCMQ) was developed in Mainland China, and the validation and population prevalence were investigated in Hong Kong. Therefore, exploring the relationships between the telomere among different BC types in aging and cancer development would be of enormous significance.

Telomere is Related to Aging and Cancer Development

Shortened telomere in humans is emerging as a marker of disease risk and progression, and premature mortality [1-3]. Shortened telomere has been evidenced with the instability of the chromosome after cell division from oxidative stress [4]. Telomere length has been used as a "psychobio marker" linked to stress-related disease development and aging [5,6]. With further findings, telomere shortening can be counteracted by the cellular enzyme telomerase. Telomerase activity plays an essential role in cell survival by extending telomere length and protecting the chromosomes, which promotes cell growth and longevity [7-9]. Increased activities of telomerase have been proven to be related to aging and cancer development and has been suggested as a preventive measure [7,10].

Body constitutions of Chinese Medicine and Telomere

Having discovered telomeres and telomerase and their relationship to aging and cancer development, scientists have

started investigating the relationship of frailty and aging in Hong Kong population with negative result [11,12]. Besides, scientists have started to screen specific Chinese Herbal medicine (CHM) or compound formulae for specific age-related diseases and cancer development in either in vitro or in vivo studies since year 2000 [13-20]. In 2004, Tang et al explored the three different CHM formulae targeted for three imbalanced BC types for the cell line of nasopharyngeal carcinoma and discovered that two formulae could inhibit the telomerase activity [15]. However, the majority of the scientists observed that even the specific herbs or CHM formulae had potential use for cancer treatment, and that the investigation itself which was being separated from the pragmatic practice of CHM. Therefore, it limited the scope of translation and had minimal clinical value [15,21].

By 2013, Wang started to incorporate the concept of imbalanced BC types on patients with acquired aplastic anemia for expression of protective of telomerase 1 (POT1) and compared them with a control group. It was found that different imbalanced BC types did express with statistically different POT1 mRNA and age [19]. The research team has picked up the key pathway in linking up both patho-physiological and clinical treatment for anemia in compliance with the BC types for treatment direction. No one has conducted any research on telomerase or telomere on the basis of BC types, therefore, the aims of this study is to fill this research gap for finding the relationship between telomere or telomerase with BC types throughout the process of aging and cancer development.

Understanding of Body Constitution type of Chinese Medicine practice is lacking. Chinese Herbal Medicine (CHM) has been commonly practiced in Chinese since ancient times, but the notion of how the clinical wisdom work is largely unknown [22-24]. With the advancement of biomedical technology, the active ingredients of Chinese herbs or formulae have been a major focus in the success story of Artemisinin (Qinghaosu) by Professor Tu Youyou [25] which best illustrated her contribution

to the CHM. Despite this success, clinical practice has largely been ignored largely because Chinese Medicine diagnoses with its poor inter-rater reliability and internal consistency [26-28] for disease management could not be standardized. Although WHO has recommended that the evidence based traditional medicine should be backed up with its theory, the research output in enhancing the clinical practice is still lacking [22-24]. This implied that CHM was effective only on the basis of body constitution (BC) types with the diagnoses of Chinese Medicine Practitioners (CMP) [29].

Individualized Treatment Based on BC Types are Catching Global Attention

A recent UK bio bank study established the strongest prediction value of patients' reported outcomes (PRO) for mortality among all other 655 measurements of blood, cognitive function, family, medical, health history, physical or psychosocial factors, life style factors and socio demographic factors [30]. Inspired by the FDA standard in PRO instruments, two instruments were developed in Taiwan and Mainland China based on the TCM theory to determine the BC types of a person [31-34]. CCMQ is scientific for forming the basis of BC types. The Constitution in Chinese Medicine Questionnaire (CCMQ) was developed by Wang et al in Mainland China [34]. The CCMQ is a PRO instrument for measuring the body constitutions based in the TCM theory. The CCMQ consists of 60 items that classify the BC into 9 types: Gentleness, Qi-deficiency, Yang-deficiency, Yin-deficiency, Phlegm-wetness, Wetness-heats, Blood-stasis, Qi-depression and Special diathesis. A person can have more than one BC types.

The higher the score of the CCMQ, the more pathological BC types that someone will have. Validation studies and clinical application have found that CCMQ in Mainland China showed these instruments to be valid and reliable [35-38]. The CCMQ were linguistically validated on 2,128 of subjects who consulted Chineses or Western outpatient clinics of the Chinese population in Hong Kong [33,39]. In addition, population wide epidemiological studies had been confirmed with the prevalence of balanced or imbalanced body constitution (BC) types in the Hong Kong population. The CCMQ had also been shown to be valid and reliable in Japan (王琦, 朱燕波 et al. 2006). With the validation and population prevalence being investigated using CCMQ in Hong Kong, subjects with an imbalanced BC types had an increased likelihood of seeking medical service utilization [40,41]. It would be significant to find out whether any biomarkers differ among different BC types in Hong Kong Chinese because this notion concept has never been investigated in the industry. Echoing the WHO, Chinese Medicine research should be compliant with efficacy or effectiveness evaluation [22,24]. Whether telomere length or telomerase activity are associated with balanced or imbalanced BC type subjects are crucial.

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