



# Traditional Chinese Medicine and Cancer: Past Contributions and Future Directions

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## Abstract

The earliest description of cancer in traditional Chinese medicine (TCM) started at least in the year of 1170, and systemic clinical and mechanism studies started in the 1950s. TCM has changed the evaluation criteria of cancer treatment from cancer remission to prolong life expectancy in conventional medicine. Another major contribution of TCM in cancer treatment is that it changed acute promyelocytic leukemia from a highly lethal disease to a highly curable leukemia. Acupuncture has also shown a potential in treating tumor itself. Tumor microenvironment might be a promising direction for TCM to improve its therapeutical effectiveness.

**Keywords:** Cancer; Traditional Chinese Medicine; Tumor Microenvironment; Acupuncture

**Abbreviations:** TCM: Traditional Chinese Medicine; APL: Acute Promyelocytic Leukemia; NCI: National Cancer Institutes

## Introduction

Traditional Chinese medicine (TCM) has a long history of treating cancer. As early as the Song Dynasty (before 1170), the Dongxuan Jushi's Wei Ji Bao Shu (treasure book of health improving) first listed cancer as a disease name [1]. However, the systematic study of cancer in TCM began in the 1950s, marked by the establishment of the Department of TCM in the Cancer Hospital of the Chinese Academy of Medical Sciences in 1958 [2]. Subsequently, the clinical and basic research of TCM for cancer treatment has been gradually and systematically carried out throughout the country, and certain achievements have been made.

## Etiology, Pathogenesis and Treatment Principle

At present, the consensus of the Chinese medicine community on the etiology and pathogenesis of cancer is that it is a mixture of deficiency and excessiveness. Deficiency includes the deficiency of qi and blood, yin and yang, and the excessiveness (Evil Qi) is mainly phlegm, toxin, and blood stagnation. The treatment principle is mainly strengthening the righteous Qi and removing the evil Qi. In different stages of cancer progression, strengthening the righteous Qi and removing the evil Qi or both will be used in practice [1].

## Iconic and Potentially Milestone Contributions

### Changed the Concept of Cancer Treatment

In the 60s and 70s of the 20<sup>th</sup> century, TCM followed the concept of conventional medicine at that time in the treatment of tumors, pursuing cancer-free, and using more traditional Chinese medicines that could effectively kill cancer but had certain toxicity. However, in clinical practice, the majority of TCM physicians have found that if they only pursue the killing of tumors without preventing side effects, the life expectancy of patients is often significantly shortened while the tumor is in remission, and patients' life quality is low. Subsequently, it was found that the addition of principle of strengthening righteous Qi can effectively improve the quality of life and prolong the life expectancy of patients, so combination of strengthening the righteous Qi and removing the evil Qi have gradually become the mainstream therapy in the circle of traditional Chinese medicine. Conventional medicine, especially immunotherapy, now uses the prolong of life expectancy as a primary measure of efficacy, rather than just assessing whether the cancer is in complete or partial remission [3].

## Clinical efficacy

To date, the greatest achievement of Chinese medicine in cancer treatment is the treatment of leukemia with Pishuang. Pishuang (arsenic trioxide), together with all-trans retinoic acid, can provide a clinical cure rate of 95% for acute promyelocytic leukemia (APL), making the latter the first curable leukemia [4]. Decoction Huangqin, (PHY906, or YIV-906) is likely to be the first FDA-approved botanical medicine for cancer treatment in the conventional medical system in the United States [5,6]. Minnelide [7-10], derived from the traditional Chinese medicine Leigongteng (*Tripterygium wilfordii*), is currently in phase II clinical trials at the National Cancer Institutes (NCI), and is likely to be marketed soon for the treatment of pancreatic cancer.

In terms of TCM formulas, the results of most clinical trials have shown that adding TCM to conventional treatment can improve the quality of life and prolong life expectancy. For example, Piao B. et al. reported that 399 cases of lung cancer were treated with traditional Chinese medicine formula of Feiliuping (lung tumor remover ointment), and the results showed that the TCM group had certain advantages in improving symptoms, quality of life and immune function. In terms of tumors, the progression free rate of the Feiliuping group was significantly higher than that of the chemotherapy group. In terms of survival, the 1, 2, and 3-year survival rates of the Feiliuping group were 50.00% (14/28), 15.38% (4/26), and 20.00% (3/15) respectively, with an average survival of 15 months and a median survival of 11 months, and the 1, 2, and 3-year survival rates of the chemotherapy group were 17.65% (3/17), 0 (0/13), and 0 (0/8) respectively, with an average survival of 7.6 months and a median survival of 6 months, and the difference in the 2-year survival rate between the two groups was significant ( $P < 0.001$ ) [11]. Liu J. et al. treated 127 cases of non-small cell lung cancer with a Yifeikangliu decoction (tonifying lung and antitumor drink) (basic composition: Huangqi (*Astragalus membranaceus*), Tianmendong (*Asparagus*), Beisha Shen (*Glehniae Radix*), nvzhezi (*Ligustrum ligustrum*), Chonglou (*Paris polyphylla*), Shishangbai (*Paris polyphylla*), etc.), and the results showed that there were 14 cases of partial remission (PR), 89 cases of no change (NC), 24 cases of progression (PD), the clinical benefit rate [(PR+NC)/total number of cases] was 81.10% (103/127), and the 1, 3, and 5-year survival rates were 73.21%, 13.93%, and 11.17%, respectively, and the median survival was 406 days. In the chemotherapy group, there were 64 cases [mitomycin + doxorubicin + cisplatin (MAP) regimen], 7 cases with PR and 39 cases with NC, the clinical benefit rate was 71.88% (46/64), the 1, 3, and 5-year survival rates were 40.54%, 11.06%, and 5.53% respectively, and the median survival was 267 days. In addition, the post-treatment life quality scores, symptom improvement, and immune markers improvement were also better than those in the chemotherapy group [12].

In terms of acupuncture, current clinical reports mainly focus on the treatment of symptoms, such as nausea, vomiting, pain, fatigue, dry mouth, and peripheral neuropathy caused by chemo/

radiotherapy [13]. However, there are some clinical reports suggesting that acupuncture may also have a therapeutic effect on tumor itself. For example, peritumor electroacupuncture can promote vascular normalization of tumors, thereby inhibiting tumor growth [14].

## Challenges and Future Directions

The clinical and research work of the majority of TCM practitioners has undoubtedly confirmed that the integration of TCM with conventional medicine is of great benefit to cancer patients. However, since the introduction of tonifying righteous Qi therapy in cancer treatment, no impressive progress in TCM has been observed in terms of improved clinical efficacy. This suggests that there is a need for a new direction for theoretical breakthroughs. In addition, almost all kinds of traditional Chinese medicine treatments are integrated into conventional treatment, and then compared with conventional treatment alone. However, the comparison of the efficacy of different TCM treatment methods is still lacking. This fact would be detrimental to the development of the TCM discipline as a whole.

In the 60-70s of the 20<sup>th</sup> century, tumor immunotherapy was almost in infancy. Current data suggest that most of Chinese herb medicine with functions of tonifying righteous Qi is related to the improvement of immune function, which suggests that Chinese medicine is actually ahead of conventional medicine in the treatment direction of tumors. At present, most of the research on the treatment of cancer in conventional medicine focuses on killing cancer cells, but there are no officially marketed drugs for the improvement of the tumor microenvironment. This should be one of the breakthrough directions of TCM in the treatment of tumors. Based on the hypoxia, acidic microenvironment, and cachexia of the tumor, our clinic is trying to use some TCM which may make the microenvironment unsuitable for tumor growth. We name it "Siege therapy". The results so far have shown good promise in terms of improving quality of life and prolonging life expectancy.

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