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## Chinese traditional medicine - The fruitful approach to new drug discovery

Aihua Liang

China Academy of Chinese Medical Sciences, China

Traditional Chinese medicine is an ancient remedy with a long history of thousands of years in China. The application experiences of Chinese medicines (CMs) have been recorded in a large number of ancient and current literatures, but the mechanism of its treatment is not clear. Impacted by modern medical research in recent decades, the chemical composition and therapeutic mechanism of CMs have been studied, so as to develop many new drugs with better curative effects. In China, CMs are the important ways to develop new drugs. The development of artemisinin and arsenic preparations are the typical examples. In the 70s of last century, Prof. Tu Youyou led a research team that aimed to discover antimalarial drugs. When they retrieved the Chinese ancient medical literatures, they found that southernwood appeared in the prescriptions for malaria treatment with highest frequency. After determination of the plant origin of southernwood by textual research, they tested the extract of *Artemisia annua* Linn for anti-malaria effect on animal malaria models. The initial experiments were not optimistic in antimalarial activity. By reviewing an ancient medical book "Zhou Hou Bei Ji Fang" which was written by Ge Hong, a Chinese ancient doctor in one thousand and eight hundred years ago, Prof. Tu was enlightened by the preparation method recorded in this book in which southernwood was prepared as fresh juice and orally administered to treat malaria. She changed the preparation methods from hot extraction to maceration, and successfully found Artemisinin, a powerful anti-malaria lead compound. Artemisinin was approved to market in China in 1986. Since then, various derivatives of artemisinin have been marketed and benefited hundreds of millions of people. Another example is the development of arsenic preparations in the treatment of acute myeloid leukemia. Arsenics have been used in Chinese traditional medicine for more than 2000 years. Although arsenics have been abandoned in clinic worldwide because of consideration of their toxicity in the last few decades, they are always in use in China until now. In 1970s, Chinese doctors noticed that a formula containing three toxic Chinese materia medica, arsenic, calomel and venenum bufonis was very popular in cancer patient which was used in a folk clinic. The doctors processed this formula to be a compound injection and used it for the treatment of leukaemia. Surprisingly, it had a good effect. Subsequently, they screened the efficacy of each ingredient in the formula and found that arsenic trioxide had the best effect on leukemia with a good tolerance in patients. Science then, various clinical studies have shown that arsenic trioxide had a prominent targeted efficacy for acute promyelocytic leukemia (APL). Now, FDA already approved the first line treatment of arsenic trioxide combined with retinoic acid for treatment of APL with t (15, 17) translocation or PML/RAR alpha gene expression. Today, prognoses in the treatment of APL have drastically improved. A standard treatment of ATRA in combination with arsenic trioxide can result in a clinical remission in approximately 90% of patients. In addition, a formula, Compound Huang Dai tablets containing realgar has also been used to treat leukemia for more than 40 years in China. It also shows good curative effect. From the examples mentioned above we can conclude that traditional Chinese medicine is a valuable source for new drug discovery, because there are plenty of clinical and pharmaceutical experiences to support the efficacy and safety. It should be a cost saving and effective way to develop new drugs.

ahliang@icmm.ac.cn