Bioactive components from herbs used in Traditional Chinese Medicine as potential anticancer adjuvants

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Introduction

The most important disadvantages of conventional anticancer treatment today, namely non-predictive therapeutic effect, development of chemotherapeutic resistance of cancer cells, and high expenses per treatment, have attracted wide attention for searching of new treatment opportunities. Herbal products used in Traditional Chinese Medicine (TCM) shows special interest because they have been identified to possess multi-effect on cancer cells: cytotoxicity, immunomodulation, anti-angiogenesis and anti-metastatic effect.

Materials and methods

We analysed 12 scientific papers found in the base of National Centre for Biotechnology Information's library (NCBI) and made a classification of possible targets from Chinese Herbal Medicines (CHMs) in terms of their anticancer potential.

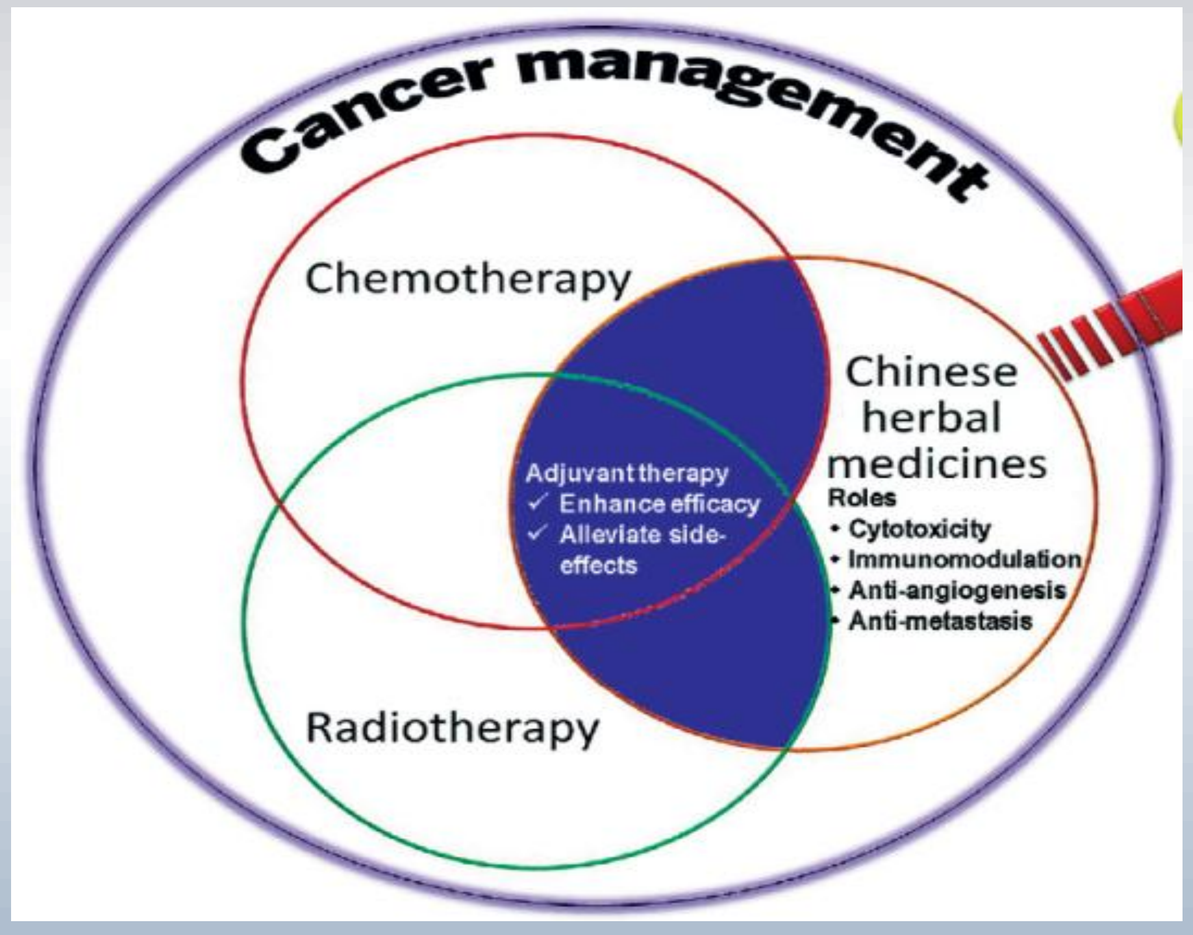

Fig. 1: **The value of CHM in cancer management**

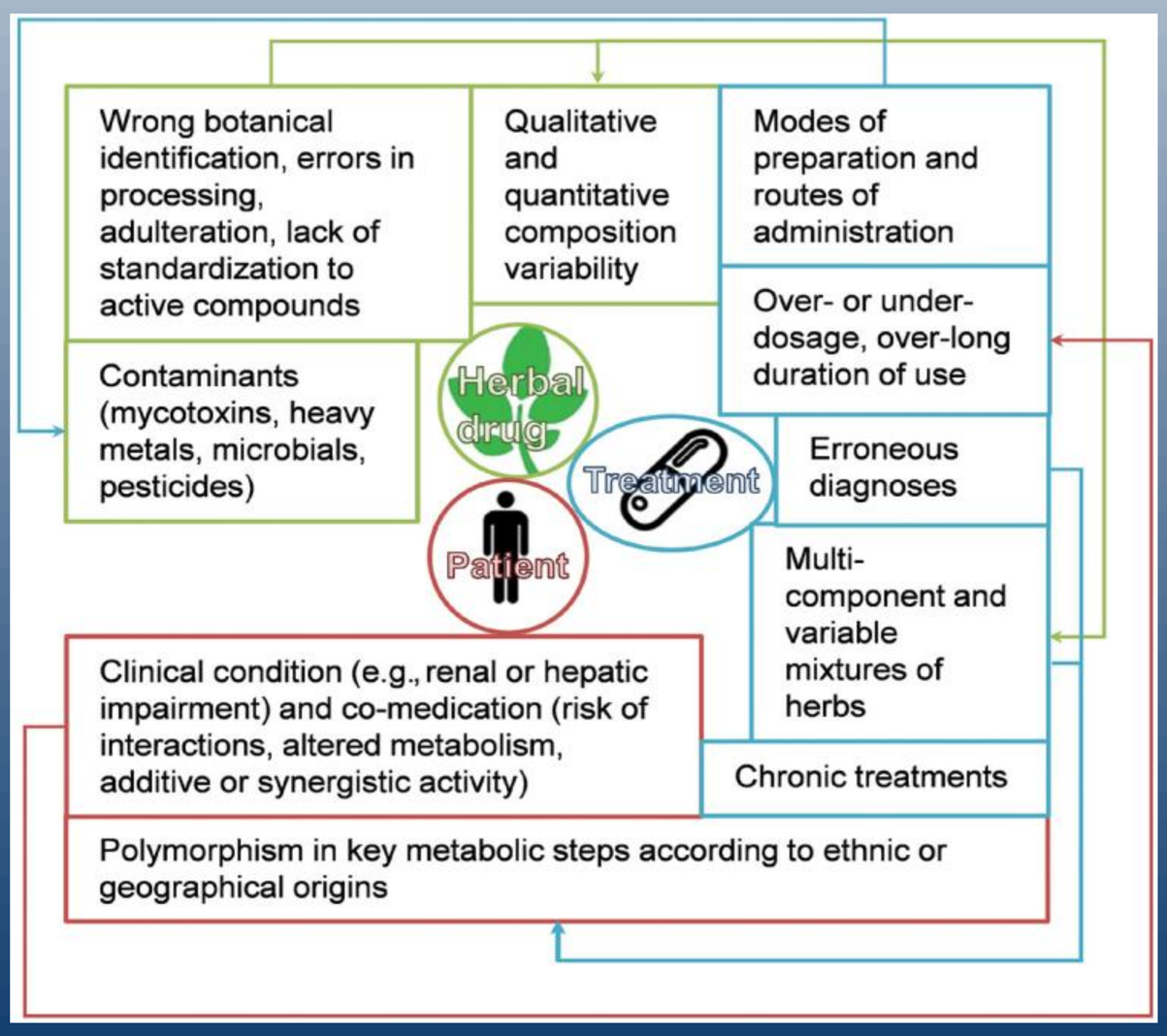

Fig. 2: **Factors influencing toxicity of herbal medicines**

Possible targets	Examples of CHM or isolated compounds	Implications
Cytotoxicity	Curcumin, camptothecine, artemisinine, berberine, oridonin, emodin, wogonin, shikonin	Inhibit tumor growth at primary site and improve chemotherapy efficacy
Immunomodulation	*Curcumae radix, Astragali radix, Astragalus membranaceus, Panax ginseng*	Improve immune response; strengthen attack system of immune cells against cancer cells
Anti-angiogenesis	Artemisinin, wogonin, ursolic acid, silibinin, triptolide, curcumin	Inhibit new blood vessels formation towards and inside the tumor
Antimetastasis	Artemisinin, wogonin, ursolic acid, silibinin, triptolide, curcumin, ginsenoside Rg3	Prevent migration of tumor cells from primaty site to other organs

Table 1. **Possible targets of Chinese herbal medicines (CHMs) and their implications**

Results and discussion

Curcumin, camptothecine, artemisinine, berberine, oridonin, emodin, wogonin and shikonin are the most commonly investigated bioactive components from CHMs that cause cytotoxic effect over cancer cells. Immunomodulation is effect detected in studies where use of herbal product based on *Curcumae radix*, *Astragali radix*, *Astragalus membranaceus* and *Panax ginseng* were performed. Artemisinin, wogonin, ursolic acid, silibinin, triptolide, and curcumin also have been identified to have blockage effect over angiogenesis, and all compounds previously listed with ginsenoside Rg3 additionally, shows antimetastatic effect over cancer cells. Curcumin is the only bioactive component involved in the reviewed CHMs that causes all four listed anticancer effects.

Conclusions

In the terms of search of effective bioactive compounds with anticancer effect, identification, characterization, pharmacological and toxicological evaluations, authenticity of the specific herbal components must be provided to assure traditional use of the herb and also reveal possibility of new drug development.

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