

Mini Review

The Color of Diseases and Herbs-chromatic Illustrating the Yin-yang Regulation Theory in Traditional Chinese Medicine

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Abstract

Traditional Chinese medicine (TCM) has been used to serve people since antiquity in China, and still has an important role in today's healthcare. As the outbreak of coronavirus disease 2019 (COVID-19) globally, TCM has played an important role in the fight against COVID-19 in China and other countries. However, scientists outside China doubted TCM. The philosophy of TCM in the description of diseases and the use of herbal medicines is difficult to understand for Western scientists. This article explains the philosophy of TCM using chromatic analogies to make it easily understandable and visually intuitive.

Introduction

Traditional Chinese medicine (TCM) has been used to serve people since antiquity in China, and it is still widely used in today's healthcare. As the outbreak of coronavirus disease 2019 (COVID-19) globally, TCM has played an important role on the fighting against this epidemic disease [1]. However, the philosophy of TCM has been questioned by modern Western medicine (MWM) because the conceptual framework and application of TCM are difficult to interpret for MWM. For example, many concepts in TCM such as "qi", "blood", "yin-yang", "viscera (Zang-Fu)", etc. are abstract for scientists outside China. One widely accepted concept is "Yin-yang regulation", which has been accepted by scientists all over the world [2,3].

Generally, disease is diagnosed as the feature of "re" (heat) or "han" (cold) according to the syndrome diagnosis theory in TCM. Characteristics of the herb were indicated as "xing" (property) and "wei" (flavor). The property of herbs ranges from "han" (cold) to "re" (heat) and flavor ranges from "ku" (bitter) to "gan" (sweet) based on thousands of years practice. According to the Yin-yang regulation theory in TCM, disease

with the feature of "heat" could be "neutralized" (cured) by herbs with the property of "cold" and the flavor of "bitter" and vice versa. In chromaticity, heat is normally shown in red and cold in purple. People associate the taste of bitter with black in color psychology. So, the feature of disease, the properties and flavor of herbs, as well as the Yin-Yang regulation theory in TCM could be indicated by chromatic illustration (Figure 1 A).

The successful example of TCM in anti-malaria

Malaria, one of mankind's oldest diseases, was diagnosed as a "cold-heat complex" disease in TCM and could be cured by herbs with the property of cold and flavor of bitter. Thus, *Artemisia annua*, with these properties and flavor, was used by Hong Ge, a TCM scientist more than 1600 years ago, and found to have a significant anti-malaria effect (Figure 1B). Interestingly, more than 1600 years later, in the 1970s, a Chinese scientist named You-You Tu was inspired by Ge's report and successfully developed the most effective antimalarial drug: artemisinin [4]. The killing effect of artemisinin extracted from *Artemisia annua* on malaria parasites was proven by modern science and technology. However, it's notable that the use of *Artemisia annua* for the

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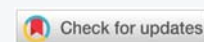
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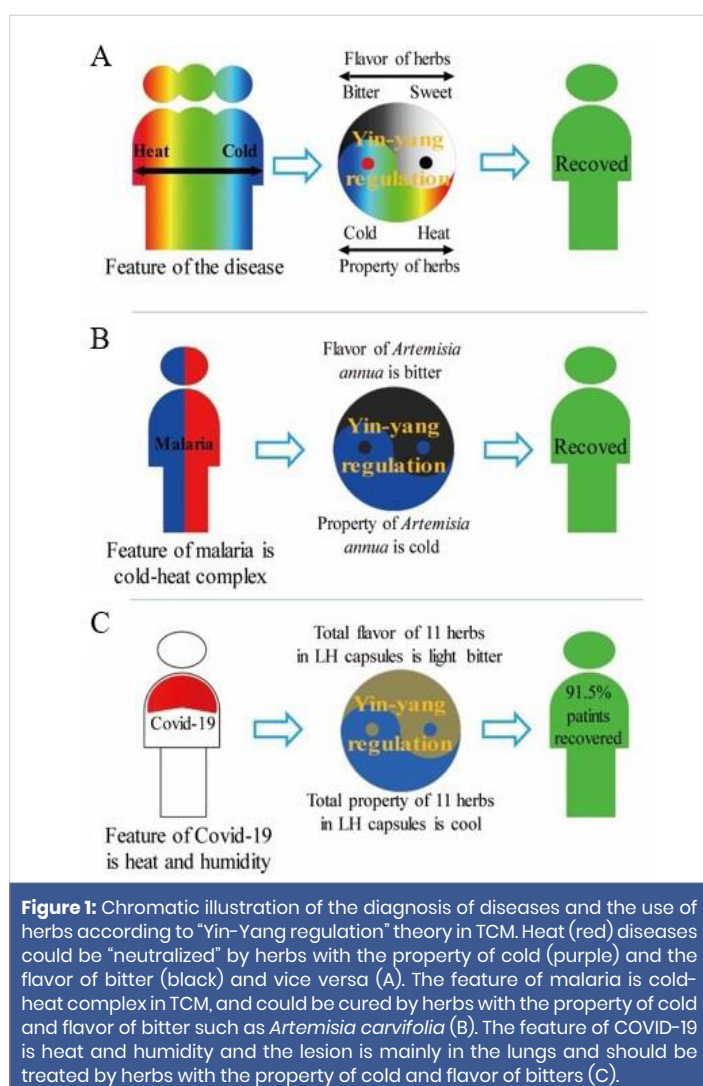
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treatment of malaria in TCM is based on neutralization the symptoms of this infectious disease by Yin-yang regulation theory, rather than targeting on the pathogen because people didn't know the existing of plasmodium 1600 years ago.

TCM in the fight against COVID-19

According to the syndrome diagnosis theory in TCM, the feature of COVID-19 are heat and humidity and it belongs to epidemic disease. Thus, herbal medicines with the property of cold and flavor of bitter should be used for treating COVID-19 patients according to the syndrome differentiation and Yin-yang regulation theory in TCM. For examples, a medical team in China reported a Chinese herbal product, Lianhuaqingwen (LH) capsule was reported to improve the recovery rate of COVID-19 to 91.5% (Figure 1C) [5]. There are 13 components in the LH capsule, and 11 of them are herbs, except two chemicals, gypsum and 1-menthol. It can be found that most of the herbs in the LH capsule have the property of cold and flavor of bitter such as *Isatis indigotica*, *Rheum palmatum*, *Dryopteris crassirhizoma*, etc. However, the diagnostic and regulatory philosophy in TCM is highly complex, such as neutralizes and complements of property and flavor of herbs.

Thus, some herbs with warm property, such as *Pogostemon cablin*, *Ephedra sinica* and *Prunus sibirica* are also used in LH capsule. But the sum percentage of herbs with cold property and bitter flavor is much higher than that of warm property and sweet flavor (Table 1).

Practically, the combination of several herbs was needed to achieve the desired clinical results and the reductionist approach of isolation of a single bioactive compound is not always appropriate for TCM. Available data suggest that the composite formulas have greater efficacy than single ingredients in TMC and it is difficult to explain its benefits as the effect of a single ingredient [6]. For example, in the prevention of liver cancer and treatment of skin disease by TCM, there are 7 and 10 herbs in the composite formulas, respectively [7,8], and the same thing for LH capsule.

Other practical applications

Practically, some ailments are still treated using this method nowadays in and even outside China. For example, "get inflamed/inflammation-like symptoms" is a physical discomfort with the specific symptoms such as red eyes, oral erosion, toothache, sore throat and so on. It is usually caused by hot weather or taking in spicy food. The dialectical diagnosis of "inflammation-like symptoms" is "heat" disease in TCM. Thus, "inflammation-like symptoms" should be treated by herbs with cold property and bitter flavor according to "Yin-yang regulation" theory in TCM. People in China have drunk herbal tea to relieve the physical discomfort caused by "inflammation-like symptoms" for very long time and it has proven to be effective. The common properties of herbs used in herbal tea is cold or light cold, such as *Chrysanthemum*, *Lonicera japonica*, *Dendranthema morifolium*, *Morus alba* L., etc. Interestingly, most herbs used in herbal tea have the flavor of bitter except *Lonicera japonica*, which has the flavor of sweet. This may be to blend the taste of herbal tea and make it more palatable (Figure 2A).

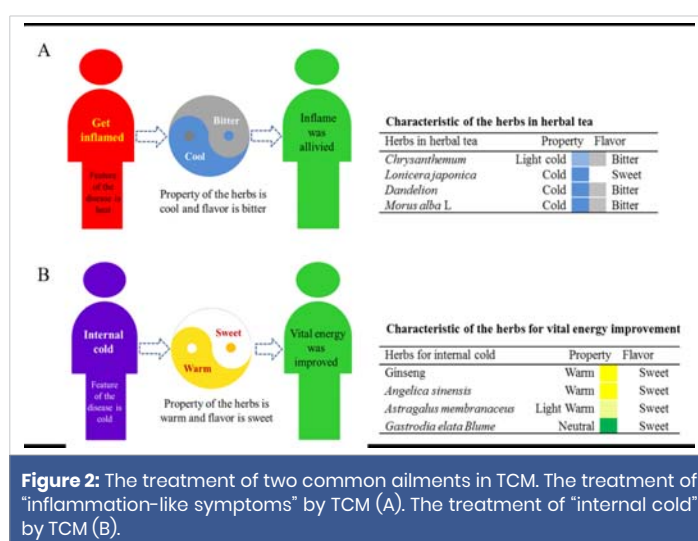
Conversely, "internal cold" is the deficiency of vital energy caused by disease, postpartum or aging etc. The dialectical diagnosis of "internal cold" is "cold" disease in TCM. The "vital energy" should be improved by the use of herbs with the properties of warm and flavor of sweet, such as Ginseng, *Angelica sinensis*, *Astragalus membranaceus*, *Gastrodia elata* Blume, etc (Figure 2B).

Prospective and future directions

Unlike MWM generally prescribes treatments for specific diseases and often on the basis of their pathophysiological cause, TCM focuses on symptoms and uses plant and/or other treatments such as acupuncture, cupping, etc. In most cases, herbal medicines are mixtures of ingredients and concocted on the spot according to a patient's syndromes. For these reasons, the whole theory system of TCM is not fully recognized within modern biomedical paradigms. It might be

Table 1: Components and chromatic analogy of property and flavor in LH capsule (0.35 g/capsule). The components in LH capsule were from Chinese Pharmacopoeia-2015.

Components of LH capsule	Property	Flavor	Percentage	Bioactive chemicals
Gypsum	Very cold	Sweet	0.127	CaSO ₄
<i>Isatis indigotica</i>	Cold	Bitter	0.127	Sanzuotong ketones
<i>Rheum palmatum</i>	Cold	Bitter	0.025	Emodin and chrysophanol
<i>Dryopteris crassirhizoma</i>	Cold	Light bitter	0.127	Filicic acids
<i>Lonicera japonica</i>	Cold	Sweet	0.127	Luteolin, inositol and saponins
<i>Rhodiola crenulata</i>	Cold	Sweet	0.042	Rosavin
<i>Houttuynia cordata</i>	Light cold	Light bitter	0.127	DeCanoy acetaldehyde
1-menthol	Cool	Light bitter	0.004	C ₁₀ H ₂₀ O
<i>Forsythia suspensa</i>	Neutral	Bitter	0.127	Forsythol and Phillyrin
<i>Glycyrrhiza uralensis</i>	Neutral	Sweet	0.042	Saponin G2
<i>Prunus sibirica</i>	Light warm	Bitter	0.042	Amygdalin
<i>Pogostemon cablin</i>	Light warm	Light bitter	0.042	Patchoulicolcohol
<i>Ephedra sinica</i>	Warm	Light bitter	0.042	Ephedrine
Total	Cool	Light bitter	1.000	



due to the different treatment philosophy, the lack of high-quality scientific evidence or different culture [9-13]. To bring the ancient practice of TCM into line with modern standards, the modernization of TCM is necessary "to reconcile the knowledge-oriented, deductive process of Western medicine with the empirically-driven, inductive approach of TCM" [14-17]. But it's worth noting that simple or rough practice on the modernization of TCM will distort its essence because after thousands of years of practice and development, TCM represents a refined traditional system developed over millennia [6].

Conclusion

In some respects, TCM is not conventionally validated within Western biomedicine. Therefore, there are still a lot of things remains unknown for us although modern science has expanded our knowledge significantly with the development of modern science and technology. TCM is not just a medical system, but a branch of philosophy and healing art that is an important part of Chinese culture. Devoid of that cultural context, it would become a tree without roots. Anyway, "Regardless of origin, all medical systems share the goal of improving human health" [18].

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