

Editorial

Herbal Medicine on High Impact Disease: The Current Progress and Application

According to World Health Organization, the high-impact disease (HID), including cancer, cardiovascular disease and digestive dysfunction, are the world's biggest killers. More than 36 million people die annually from HID (63% of global deaths) [1]. This high residual mortality and morbidity has mandated an investigation of novel therapeutic strategies for HID.

Great efforts and progress have been made for the management of HID. Statin is the inhibitor of low density lipoprotein-cholesterol and is believed to be the milestone for the arteriosclerosis treatment [2]. Inhibitors of angiotensin-converting-enzyme (ACE) and Proprotein convertase subtilisin/kexin type 9 (PCSK9) are also considered to be the hallmark for treating heart failure (HF) [3-5]. Radiotherapy and chemotherapy are the standard treatments for most cancers, although they could cause severe side effects [6, 7]. In spite of the progress, some diseases, such as inflammatory bowel disease (IBD), irritable bowel syndrome (IBS), depression and nonalcoholic fatty liver disease (NAFLD), remain refractory to medical interventions [8-10].

In recent years, herbal medicine especially Chinese herbal medicine (CHM) has drawn great attention from medical community around the world and has been playing important roles in the prevention and treatment of HID. There are a great number of structurally diverse natural compounds with anti-HID properties [11]. The pharmacological effects and mechanisms of CHM have been reported in many studies. The main focus of this special issue is on current pharmacological treatment strategies and trends of Chinese herbs in the management of HID.

In this special issue, the beneficial effects of herbal medicine on regulating lipid disorder are discussed by Dumolt and Rideout [12], and Zhang *et al.* [13]. Dumolt highlighted that as effective triglyceride (TG)-lowering agents, Phytosterols (PS) interfere with absorption of cholesterol and TG through modulating the expressions of liver X receptor, adenosine triphosphate binding cassette G8 and apolipoprotein E [12]. Zhang reviewed the synergistic effects of Chinese formula on lipid deposition, inflammation, endothelial cell damage and platelet aggregation. These effects are delivered in multi-targets and multi-components mechanism [13]. Furthermore, Wang *et al.* [14] summarized that flavonoid rich corn silk has beneficial effects on blood glucose, hypertension, and dyslipidemia in the treatment of metabolic syndrome without serious side effects.

Dysfunction of myocardial contractility is a key pathological component of HF. Ekrem *et al.* [15] reviewed the medical uses and pharmacology of genus *Digitalis*, which are commonly used as cardiotonic compounds. *Digitalis* extracts increase cardiac contractility by inhibiting the Na⁺/K⁺-ATPase pump and elevating intracellular Ca²⁺ level in the muscle cells. Wang *et al.* [16] further summarized the Chinese herbs that have been applied in the treatment of HF. *In vivo* and *in vitro* studies demonstrated that Chinese herbs exert cardio-protective effects by attenuating fibrosis, inflammation, oxidation and apoptosis as well as promoting angiogenesis and energy metabolism. Among these herbs, Danshen (*Salvia miltiorrhiza* Bunge) as a star drug is most frequently prescribed. Chen and Chen [17] presented a review about the absorption and metabolism of the predominant bioactive compounds in Danshen. Interestingly, different compounds in Danshen target different components of the pathology in heart failure. For instance, tanshinone IIA has the effect on lipid disorder whereas danshensu and salvianolic acid A could enhance cardiac function and inhibit cardiac hypertrophy.

Chinese herbs also have advantages on treating digestive diseases including NAFLD, IBD and IBS. Liu *et al.* [18] summarized fifty-nine active compounds for NAFLD treatment. The effects are mediated by reduction in lipogenesis, increase in fatty acids oxidation, improvement in insulin signaling and inhibition of adipokine production. Both Bi *et al.* [19] and Zhao *et al.* [20] focused on the efficacy and potential mechanisms of CHM on bowel diseases. They concluded that herbal medicines exert their effects *via* multifold mechanisms, which include promotion of epithelial barrier defense, restoration of gut microbiota homeostasis, and suppression of pro-inflammatory immune response.

Imbalance in monoamine transmission systems is the critical changes on mental diseases especially in depression. Wang *et al.* [21] emphasized the importance of enhancement of monoamine transmission systems as well as regulation of hypothalamic-pituitary-adrenal axis activity in treatment of depression with Chinese herbs.

We are pleased to present to the scientific community this collection of papers, which update our knowledge on preclinical and clinical pharmacological targets in HID treatments by herbal medicine. We hope that the reviews in this special issue could provide pharmaceutical and translational scientists with insights into the discovery of novel therapeutics for HID.

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