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Archives of Medical Research ■ (2018) ■

Archives of Medical Research

REVIEW ARTICLE

Hypolipidemic Components from Medicine Food Homology Species Used in China: Pharmacological and Health Effects

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Received for publication June 28, 2017; accepted January 12, 2018 (ARCMED-D-17-00389).

Hyperlipidemia is a systemic disease caused by abnormal human lipid metabolism. Dietary control and treatment on hyperlipidemia is now a popular therapy pathway. This paper focuses on the medicine food homology (MFH) species used in China with hypolipidemic function, and emphasizes on the active ingredients and their pharmacological effect. The single herbal and its hypolipidemic active ingredients are summarized through reviewing the relevant literatures published in the past twenty years. The ingredients are divided into polysaccharides, flavonoids, steroidal saponins, quinones, alkaloids and others, of which the related researches are described from the aspects of sources, model and method, result and mechanisms, respectively. MFH exerts treating hyperlipidemia through inhibiting the biosynthesis of endogenous lipids, promoting the catabolism of exogenous lipid, restraining lipid absorption, and anti-lipid peroxidation. It is concluded that some MFH species with low toxicity and small side effects can used to adjust the diet nutrition to prevent the occurrence of hyperlipidemia and cardiovascular disease.

Key Words: Medicine food homology, Traditional Chinese medicine, Hypolipidemic, Active ingredient.

Introduction

Hyperlipidemia is an unhealthy body condition that increases the risk of atherosclerotic disease (ASHD) and coronary heart disease (CHD) in human (1). Excessive lipid in blood, named hyperlipidemia, will block blood vessels and cause several diseases such as fatty liver, atherosclerosis, cardiovascular, and cerebrovascular diseases. It also increases the risk of hypertension, Alzheimer's disease, pancreatitis and hepatitis (Figure 1) (2). Hyperlipidemia is recognized as a vital risk factor contributing to the development of CHD, a leading cause of mortality in the western world (3).

In the past 20 years, the results of clinical studies have shown that lowering cholesterol levels and improving dyslipidemia can significantly reduce the incidence and mortality of CHD (4). The prevention of hyperlipidemia and the treatment of treatment-derived diseases are of great significance, which is primarily completed through lipid-lowering therapy (5). Research data shows that lowering blood lipids can significantly reduce the incidence of atherosclerosis and heart disease, and lowering total cholesterol levels can reduce the incidence of myocardial infarction (6).

There are many ways to prevent and cure hyperlipidemia, including diet control, lipid-lowering drug therapy, and exercise treatment (6). Statistically, Lipid-lowering medicines currently used in clinical mainly include statins, cholesterol absorption inhibitor, niacin, bert, etc. (7). Statins remain the major hypolipidemic drugs at present, and an increasing number of patients are treated with statins raises as well the numbers of patients suffering from side effects or not responding well to the therapy (8). Even though many established anti-hyperlipidemia agents are available, there are still many high-risk patients are far from attaining their lipid-lowering goals (9,10), indicating that new and more effective therapeutics, used alone or as combination agents with existing drugs, are urgently needed (3).

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0188-4409/$ - see front matter.
https://doi.org/10.1016/j.arcmed.2018.01.004

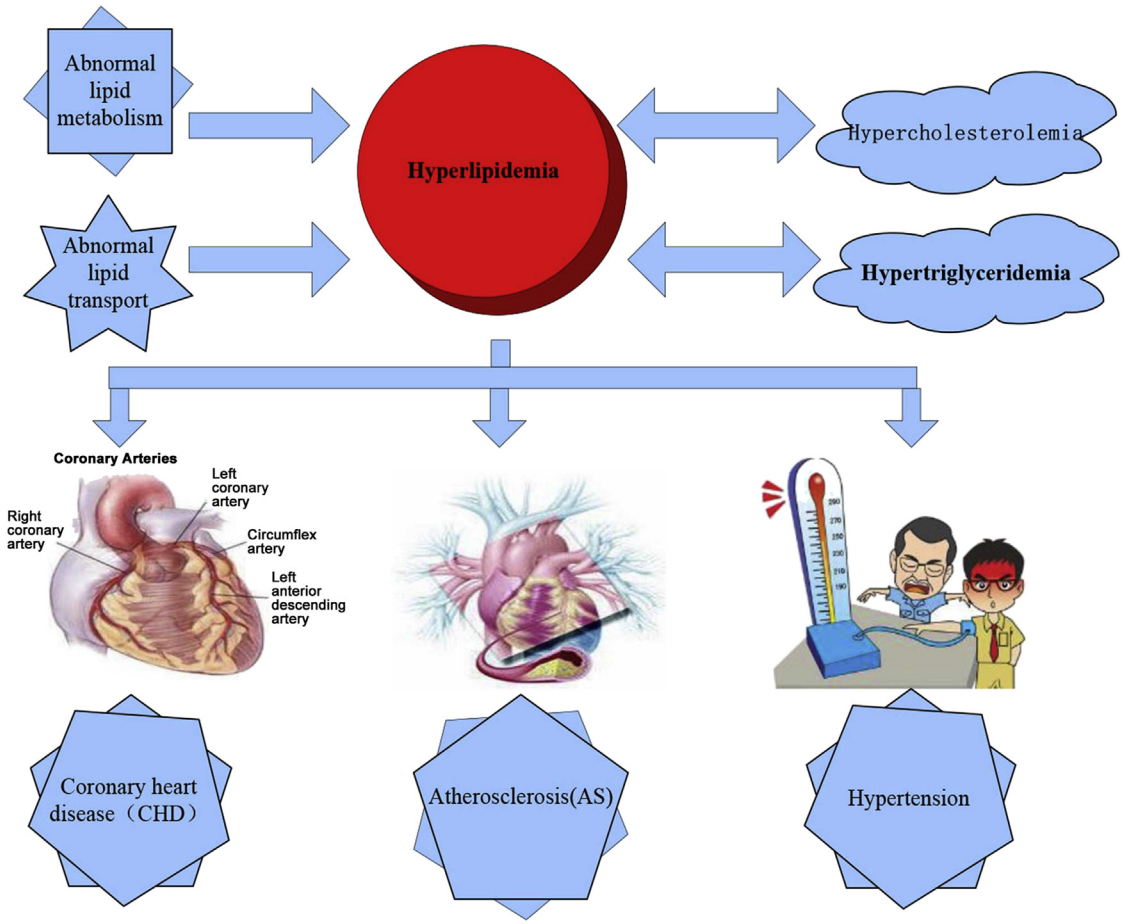

Figure 1. Hyperlipidemia is a chronic disease caused by abnormal lipid metabolism or abnormal functioning, characterized by hypercholesterolemia, hypertriglyceridemia, or both. Sometimes hyperlipidemia can lead to coronary heart disease, atherosclerosis or hypertension. (A color figure can be found in the online version of this article.)

Decreasing blood lipids is an effective measure and also a necessary way to prevent cardiovascular and cerebrovascular diseases. In the era where green concept and health care are advocated, it has become a new trend to search for safe and effective hypolipidemic drugs (6). Traditional Chinese medicine (TCM) has clear advantage over western medicine in resource richness. Over 30 effective active ingredients, found in various TCM, have been reported to have lipid-lowering effect, the major mechanisms of which includes inhibiting cholesterol absorption, regulating lipid metabolism and promoting the excretion of cholesterol. The lipid-lowering effect of TCM is definite, continuous and with small side effects (11).

The viewpoints of medicine food homology (MFH) conform to today's trend of advocating the concept of green and health care (12). In China, MFH refers to the fact that there are a group of foods that can also be used as drugs, regular consumption of those foods can prevent or cure diseases. The most significant difference between food and medicine is dose on which humans can tolerate while maintain safety. In other words, highly toxic TCM is used in small consumption, and TCM with low toxicity can be used for mass consumption. Overall, the side effects of food are mild while the side effects of drugs are stronger.

Historically, MFH has made a significant contribution to the prevention and treatment of various diseases. Many diseases have been alleviated or cured with the consumption of MFH food in the diet, people's health has thus improved significantly. In recent years, research on MFH has become popular, a lot of investigations have been carried out to search for effective components to reduce blood lipids. The ingredients of MFH can be divided into five categories: polysaccharides, flavonoids, Steroidal saponins, quinones and alkaloids. MFH is of great importance in the lipid-lowering research field. The authors reviewed and evaluated the recent progress in the research of the effective components of MFH.