

Application of Bioactive Natural Materials-based Products on Five Women's Diseases

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Women's health has been threatened by various diseases mainly including heart disease, breast cancer, osteoporosis, depression, and autoimmune disease. But development of medication for these diseases has been restricted by high development costs and low success rates. Herein the attempt to develop valid bioactive materials from a traditional natural material has been made. Resveratrol has been reported to be effective in treatment of breast cancer and heart disease. Goji berry has received attention as a natural based therapeutic material to treat a diabetes, cardiovascular disease, and osteoporosis. Leonurus family has been reported to be effective particularly in pregnant women due to high contents of vitamin as well as stimulation of uterine contraction. Annona family has effects such as anti-anxiety, anticonvulsant and recently it is proposed to be as a therapeutic material to cure depression based on its strong antidepressant effect. *Shiraiia bambusicola* has been utilized to cure angiogenesis-related disease from ancient China and furthermore recently it was proved to be effective in rheumatoid arthritis. Getting an understanding of utilization of these traditional natural materials not only enhances the interest in development of therapeutic materials for preventing and treating various women's diseases, but also makes it possible to develop novel therapeutic materials. (**J Menopausal Med 2015;21:121-125**)

Key Words: Annona, Antioxidants, Fruit, Leonurus

Introduction

Heart disease, breast cancer, osteoporosis, depression, and autoimmune disease have been reported to be five women's diseases that threaten women's health: i) heart disease which is the number one health risk to women is caused by genetic influences, age, smoking, hypertension,

diabetes, and obesity, ii) breast cancer has been known to result from genetic factor, precocious puberty, late menopause, alcohol, and obesity, iii) osteoporosis is caused by sex hormone unbalance, excessive diet, glucocorticoids, and anticonvulsants, iv) depression is due to psychological factors, medication for high blood pressure, and excessive stress, and v) although causes for autoimmune disease are

Received: September 20, 2015 **Revised:** October 12, 2015 **Accepted:** November 10, 2015

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not well known, but genetic, hormonal, and environmental factors may be implicated. Particularly approximately 75% of autoimmune diseases have been reported to occur in women.^{1–5}

Last decades the development of new drugs has been attempted to cure various diseases and a number of materials were discovered. Recently natural product-based pharmaceutical materials have been found to be effective in various diseases and comprehensive interests have been increased.^{6–8} Now natural product-based pharmaceuticals are estimated to be a huge market size of more than 20 trillion won^{9,10} and especially China and Japan provide excellent outcomes through practical application based on oriental medicine with a history of thousands of years.^{11,12} In addition, China and Japan have built a flexible licensing system through which the natural product-based materials are released in the form of medicines whereas a number of Western countries develop the natural materials just as dietary supplements. However, less than 10 of approximately 30 novel drugs launched have been derived from natural materials, although Korean traditional medicine has been regarded as the essence of oriental medicine based on traditional Chinese medicine and also has experience of a number of utilization of natural materials.^{13,14}

In this short review, it will be examined whether natural material-based products that recently are getting attention can be applied to women's diseases as therapies.

Resveratrol

Resveratrol (trans-3,4',5-trihydroxystilbene), a polyphenol-based substance, has been investigated since its effects on anti-oxidation, anti-inflammation, and neuroprotection have been reported to ameliorate the oxidative stress implicated in neurodegenerative diseases.¹⁵ Resveratrol is a type of phytoalexin that a large number of plants produce in order to protect themselves against the environmental challenges such as bacteria. To date it has been reported that resveratrol is found in about 70 species of plants including grapes, mulberry, and peanuts, and particularly relatively large amounts of resveratrols are produced from seeds and skins of grapes with high contents

of sugars to protect against pathogens like *Vitis vinifera*.^{16–18}

It has been well known that resveratrol plays a pivotal role on inhibition of apoptotic cell death manifested in various diseases through chemopreventive effect to control endoplasmic reticulum stress as well as mitochondrial oxidative stress.^{17,19,20} Recently it was also found that resveratrol has not only a protective effect against heart disease,²¹ but also a variety of anti-cancer efficacies on different cancers including breast cancer based on in vivo experimental data.²²

Goji Berry

Goji berry is the fruit of *Lycium barbarum* and *Lycium Chinese* and has been used for a long time as a traditional Chinese medication because it exhibits a variety of effects.²³ Recently it was demonstrated that polysaccharides extracted from *Lycium barbarum* fruits are able to neutralize free radicals through a strong antioxidant effect derived from their hydrogen donating capacity.²⁴ Given that *Lycium barbarum* extracts have been proved to stabilize blood sugar as well as lipid metabolism by studying with diabetes animal models, it has been proposed that Goji berry can be utilized as therapeutic materials to treat diabetes and cardiovascular disease.^{25,26} In addition, polysaccharides extracted from *Lyceum barbarum* fruit have been shown to have a therapeutic effect for osteoporosis via increases of bone mineral density and bone mineral content.²⁷

Leonurus Family (Chinese Motherwort)

As the name implies, Chinese motherwort also known as *Leonurus japonicus* Houtt is well known to have beneficial effects for women in oriental herbal therapies and especially because of its high contents of vitamins as well as the effect of uterine contraction, the study of Chinese motherwort has been focused on its beneficial effect for pregnant women.²⁸

Recent studies using rat models found that Chinese motherwort extracts inhibit acetylcholine-induced relaxation, resulting in inducing vasoconstriction, consequently suggesting that Chinese motherwort should be effective for

treatment of cardiovascular disease.²⁹ The solvent extract of Chinese motherwort has been reported to have anti-cancer effects to inhibit the cell proliferation through regulating cytotoxicity and cycle arrest.³⁰ By studying with rat models, it has been also demonstrated that treatment with *Leonurus heterophyllus* extracts decreases the neutrophil accumulation in cerebral cortex of the brain, consequently inducing neuroprotection by decreasing cerebral ischemic damage.³¹ Schmidt et al.³² also demonstrated that the insulin secretion ability of INS-1E cells increases by treatment with *Leonurus sibiricus* extracts, suggestive of their application as a potential therapeutic agent for diabetes.

Annona Family

Various types of *Annona* have been utilized as traditional Mexican medicines because of their activities of anti-anxiety, anticonvulsant, and tranquilizing effect. Furthermore since it has been found that the *Annona* contains abundant alkaloid-based compounds which are able to bind to 5-hydroxytryptamine receptor 1A (5-HT_{1A}), inducing dopamine production.³³ Recent studies demonstrated that the aerial parts of *Annona cherimolia* have a strong antidepressant effect and by high performance liquid chromatography (HPLC) analysis 1,2-dimethoxy-5,6,6a,7-tetrahydro-4H-dibenzoquinoline-3,8,9,10-tetrol, anonaine, nornuciferine, and liriodenine are contained in *Annona cherimolia*, suggesting that it can be utilized as a new antidepressant.³⁴

Shiraia Bambusicola

Shiraia bambusicola is a fungus that is parasitic on twigs of bamboo and is widely grown in Southern China and Japan.³⁵ It is reported that *Shiraia bambusicola* extracts have been derived by treatment with 95% ethanol, followed by consecutive purification into four fractions. These extracts have been used to treat angiogenesis-related diseases.³⁶

Recently it has been shown that an active ingredient Shiraiachrome A not only has a strong effect of anti-angiogenesis but also inhibits autophosphorylation of four

receptor tyrosine kinases, which consequently suggesting that Shiraiachrome A can be used as anti-cancers and therapeutic material for rheumatoid arthritis.³⁶

Acknowledgements

This work was carried out with the support of "Cooperative Research Program for Agriculture Science & Technology Development (Project No. PJ01104601)" Rural Development Administration, Republic of Korea.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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