



Figure 1. germinated seedlings of *Gentiana manshurica* Kitag.



Figure 2. callus of *Gentiana manshurica* Kitag.

**Conclusions** The results showed that 8 min is the best timing for surface sterilization on germination of seeds of *Gentiana manshurica* Kitag. Short time of surface sterilization can not entirely kill the microorganism, and long time lasting will also hurt the seeds. Appropriate proportion of hormone contained in medium was the key factor for callus growth.

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### EFFECTS OF GINSENG ON ALZHEIMER'S DISEASE IN CENTRAL NERVOUS SYSTEM

Honglei Gao, HuiSun, Aihua Zhang, Guangli Yan, Xijun Wang\*

Sino-America Chinmedomics Technology Collaboration Center, National TCM Key Laboratory of Serum Pharmacology, Chinmedomics Research Center of State Administration of TCM, Laboratory of Metabolomics, Department of Pharmaceutical Analysis, Heilongjiang University of Chinese Medicine, Heping Road 24, Harbin, China. E-mail: xijunwangls@126.com

**Abstract:** Alzheimer's disease (AD) is a progressive neurodegenerative disease that is the most common form of dementia in the elderly. It is characterized by a cognitive decline, usually marked by loss of potential memory, followed by overall damage to the higher cortical function. Ginseng, as a traditional Chinese medicine (TCM) has long been used to alleviate many diseases, especially diseases associated with aging and memory deterioration. Ginseng has an impact on multiple action sites and is an ideal choice for the development of multi-target drugs. Therefore, Ginseng and its active substance ginsenosides are becoming more and more popular in neurological protection. This article reviews the effects and mechanism of ginseng and ginsenosides in the central nervous system (CNS) associated with Alzheimer's disease.

**Key words:** Alzheimer's disease, ginseng, ginsenosides, central nervous system

Alzheimer's disease is the most typical dementia disease, accompanied by neurodegeneration<sup>1</sup>. It is estimated that there are more than 35 million AD patients worldwide, with about 36 million expected by 2050<sup>2</sup>. Ginseng is a traditional Chinese medicine which considered a magic plant that effectively treats many health problems. Ginsenosides, the active compounds of ginseng, are widely used in the pharmacological examination of ginseng. And it was increasingly accepted that ginseng and ginsenosides have some effects on central nervous system diseases. In the central nervous system diseases, one of the typical symptoms is Alzheimer's disease. And at present, ginseng and its related compounds have been widely used in the study of AD.

By referring to the relevant literatures, the pharmacological effects and mechanism of ginseng and ginsenosides in CNS have been summarized as follows:

**Effects on neurite outgrowth.** By screening neurite outgrowth activities of several ginseng drugs in human neuroblastoma SK-N-SH, Tohda et al. proved that ginsenoside Rb1 and its intestinal metabolite M1 restored the damaged space memory by the induction of synaptic vesicles through intraventricular injection of Aβ<sub>25-35</sub> in the AD animal model<sup>3</sup>.

**Neuroprotection.** Tu et al. in human neuroblastoma cells SY5Y, using cyclosporin A (CsA) inhibit calcineurin (CN) induced multiple sites of tau hyperphosphorylation, accompanied by oxidative stress. Results show that leaves of Panax ginseng (GSL) induced the increase of SOD activity and SH content. Indicating that GSL may have some effects on neuroprotection on certain features of AD<sup>4</sup>.

**Anti-inflammatory effects.** Wang et al. demonstrated the neurological and anti-inflammatory effects of gin-

seng Rb1 in Alzheimer's Disease Rat Model by comparing the Morris water maze learning and memory behavior of the rat model of ventricle injection of A $\beta$ 1-42 with the group with administration of ginseng Rb15.

Effects on A $\beta$  production. To detect A $\beta$  accumulation, a cell-based model system was used to the Chinese hamster ovary (CHO) cell line, in which human APP 695wt was transfected. Chen et al. proved that some ginsenosides, with a dose-dependent manner, reduced the concentration of A $\beta$  in the culture supernatant6.

Effectsoncholinergicsystem.InPC12cells,Xueetal.haveshownthatRb1andRg1increasedthereleaseofneurotransmitters by means of regulating the phosphorylation of synaptophysins in PKA-dependent and independent ways, respectively7.

In summary, ginseng and ginsenosides have many effects to the central nervous system which closely related to Alzheimer's disease. Due to the multi-target effect of ginseng and ginsenosides, they have become the ideal candidates for the treatment of AD. Nowadays, here are already many prescriptions have been applied to the study of Alzheimer's disease. Kai-Xin-San(KXS)8 and Sheng-Mai-San(SMS)9, which have been shown to take ginseng as the main drug, have been widely used in the study of AD and have achieved encouraging results.

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### CHINMEDOMICS IN PRECISION TREATMENT OF TRADITIONAL CHINESE MEDICINE

Honglian Zhang, Hui Sun, Xiaohang Zhou, Xijun Wang\*

Sino-America Chinmedomics Technology Collaboration Center, National TCM Key Laboratory of Serum Pharmacology, Chinmedomics Research Center of State Administration of TCM, Laboratory of Metabolomics, Department of Pharmaceutical Analysis, Heilongjiang University of Chinese Medicine, Heping Road 24, Harbin, China. E-mail: xijunwangls@126.com

**Abstract** Syndrome differentiation is the basic method of Traditional Chinese Medicine treatment and symptom is basis of syndrome differentiation in the framework of holistic view, which provides flexible treatment for different person with the aid of TCM diagnosis and treatment. And the individualized administration is consistent with requirements of clinical precision treatment. However, the fuzziness of TCM syndromes greatly reduces the accuracy of TCM treatment. How to explore the nature of the disease, to achieve precise prevention and precise treatment becomes a hot topic, which is eager to have its own research methods and technical systems in line with its own characteristics. In 2012, Mr. Wang put forward methodology named Chinmedomics that can be used as a link between traditional Chinese medicine and modern medical science. Chinmedomics provides an effective way for accurate diagnosis and accurate evaluation of formula effectiveness by discovering syndrome biomarkers based on technical research. Finally, precise prevention and precise treatment can be achieved.

**Key words:** Chinmedomics, Precision Medicine, precise prevention, precise treatment

**Introduction** "Precision Medicine" (PM) program has become the focus of global attention, the majority of researchers and doctors to support it, and the core is precision. [1] The goal of individualized treatment plan proposed by TCM is also in order to achieve accurate and effective prevention as well as precise treatment. [2] As an applied science that integrates both the theory and technology from systems biology and serum pharmaceutical chemistry, Chinmedomics can identify syndrome biomarkers and establish effective formula evaluation system, and simultaneously find pharmacodynamic substance basis. [3] Utilization of Chinmedomics can effectively reveal the biological markers, which improves the scientific value of Chinese medicine theory and clinical practice by revealing the common clinical syndromes and formula as well as promoting the accurate diagnosis and clinical treatment experience. [4]