

## *Research progress in the treatment of dizziness based on gastrodia elata*

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**Abstract:** Gastrodia has the effects of calming wind and stopping spasm, calming liver-yang, expelling wind and clearing collaterals. It is widely used in the treatment of various vertigo diseases in clinical practice, with accurate efficacy and high safety. It belongs to the drug and food homology drugs. Based on the etiology and pathogenesis of vertigo, the pharmacological action and clinical application of Gastrodia gastrodia were reviewed.

Vertigo is a high incidence disease in clinical patients, with sudden onset, unconscious disorder and repeated occurrence as the main characteristics, which has obvious effects on physical and mental health. The causes of vertigo are various. From the perspective of Western medicine, the occurrence of vertigo is related to the dysfunction of lymphatic metabolism in the inner ear, labyrinthitis caused by middle ear disease, vestibular dysfunction, and insufficient vertebrobasilar artery blood supply. From the perspective of traditional Chinese medicine, vertigo is related to its own emotions, zang-fu organs, human Qi-blood movement, etc., and the emotions are not smooth, the diet is not proper to cause zang-fu disorders, endogenous stasis, coupled with the lack of kidney qi, liver qi stasis, and then cause vertigo. In the treatment of vertigo, traditional Chinese medicine believes that it is necessary to harmonize the zang-fu organs, comb phlegm and stasis, promote blood circulation and remove blood stasis, so as to achieve the therapeutic purpose of raising Yang and consolidating the root, thus intervening the pathogenesis and achieving fundamental treatment of the disease [1].

Gastrodia is an orchid plant, the dry tuber of Gastrodia, is a more common precious Chinese herbal medicine, also known as red arrow, ding Feng grass, god grass, water yam, sweet taste, flat, liver meridian. It has the effect of calming wind and stopping spasm, calming liver-yang, expelling wind and clearing collaterals. Pharmacological studies have shown that Gastrodia has sedative, analgesic, anticonvulsant, reducing coronary vascular resistance, increasing blood flow, inducing interferon and so on. The clinical application of gastrodia preparation in the treatment of epilepsy, brain injury syndrome, neurasthenia, nervous headache, vertigo and so on has a remarkable effect. Li Shizhen said in "Compendium of Materia Medica": Gastrodia, is the liver meridian qi medicine. "Su Wen" Clouds, all the wind dazzle, all belong to wood. So Gastrodia into Jueyin and cure all diseases. According to Luo Tianyi cloud: eye black head spin, wind vacuity inside, non-gastrodia cannot be treated. Gastrodia is a wind plant, so it is the god of wind medicine. Zhang Jingyue in the "Jingyue Book •

Volume 48 • Materia Medica" records: treating wind deficiency vertigo, head rotation, black eyes, headache, rheumatism, limbs, waist and knee, strong muscles and bones, calming the spirit, blood, stop panic and trance, killing ghosts and insects poison and children wind epilepsy. However, the sex is weak, the force must be doubled or accompanied by other drugs, and then see the work.

## 1. Chemical composition of Gastrodia

Gastrodia is very rich in chemical components, mainly phenols and their glycosides, polysaccharides, organic acids, sterols and a variety of amino acids and trace elements needed by the human body. Examples include gastrodin (p-hydroxymethylbenzoinol- $\beta$ -D-glucopyranoside), gastrodin (p-hydroxybenzoinol), p-hydroxybenzaldehyde, balisin C, balisin A, adenosine, carotenoside, p-hydroxybenzyl ethyl ether, p-hydroxybenzyl methyl ether,  $\beta$ -sitosterol, palmitic acid, dimethyl phthalate, etc. In addition, gastrodia polysaccharide components such as GBP-I, GBP-II. At present, gastrodin in phenols and gastrodin polysaccharide in polysaccharides have been reported more at home and abroad. Gastrodin and Gastrodin polysaccharide are also known as the main active components in Gastrodia gastrodia. The pharmacological effects of Gastrodia gastrodia are mainly concentrated in the central nervous system and cardiovascular and cerebrovascular system. It has sedative, hypnotic, analgesic, anti-epileptic, improving memory and anti-dementia, reducing blood pressure and peripheral vascular resistance, and enhancing immunity. [2] Gastrodia is an ideal drug for the treatment of vertigo. This article summarizes the mechanism of its therapeutic effect.

## 2. Pharmacological effects of Gastrodia gastrodia

### 2.1 Anti-dizziness effect

The AMinobutyric acid/benzodiazepine /el channel receptor complex is the most important inhibitory neurotransmitter receptor in mammalian intracranial. Gastrogenin can competitively inhibit the binding of diazepam and other drugs to this receptor, inhibit the transmission of nerve impulse to the lateral vestibular multisynaptic neurons, block or weaken the ascending activation system of brain stem reticular structure, and thus exert its role in cutting off adverse vestibular reflex and achieving anti-vertigo [3]. It has been reported that polysaccharide and gastrodin, the active components of Gastrodia gastrodia, have anti-dizziness effects [4,5]. Yu Lei et al. [4] studied the anti-vertigo effect of Gastrodia polysaccharides by using mechanical rotation to induce vertigo in mice, and then measured the time taken by vertigo mice in each group to escape electric shock through maze experiment and jump stage experiment, and observed the food intake of vertigo mice. It was found that Gastrodia polysaccharide can effectively shorten the time required by vertigo mice to escape electric shock ( $P < 0.01$ ), and increase the food intake of vertigo mice, and has a certain effect on vertigo caused by mechanical rotation. Cao Xiaoping [5] found in the clinical experiment that gastrodin injection had a significant effect on vertigo. In this experiment, 150 vertigo patients admitted were divided into observation group (Gastrodia injection treatment group)100 cases and control group (traditional treatment group)50 cases according to different clinical treatment methods, and the results showed that the total effective rate of gastrodin injection observation group in clinical treatment of vertigo was significantly higher Traditional treatment control group ( $P < 0.05$ ).

### 2.2 Scavenging free radicals and protecting cell membrane

Free radicals produced in the body are normally cleared by protective enzymes such as superoxide dismutase (SOD) and glutathione peroxidase (GPX). After cerebral ischemia and reperfusion, the body produces a large number of free radicals, and the reduction of the number and function of

scavenging enzymes will lead to a large amount of free radicals. A large number of free radicals can cause cell damage, mainly by attacking polyunsaturated fatty acids on the cell membrane, and can promote the production of lipid peroxides (LPO). Studies have shown that in the model of PC12 cell damage caused by H<sub>2</sub>O<sub>2</sub>, gastrodin can reduce the damage caused by H<sub>2</sub>O<sub>2</sub> to PC12 cells and reduce the content of H<sub>2</sub>O<sub>2</sub> in cells, thus having a neuronal protective effect [6]. Xue Liuhua et al. [7] proved that gastrodin can reduce the leakage of LDH in nerve cells injured by "ischemia reperfusion" in vitro, and has a certain effect on maintaining the fluidity of cell membranes. The production of LPO was significantly reduced, indicating that gastrodin had the function of scavenging excessive free radicals and protecting cell membrane.

### 2.3 Sedation and hypnosis

A large number of studies have shown that Gastrodia has sedative and hypnotic effects. Zou Ning et al. [8] found that gastrodin has obvious sedative and hypnotic effects, significantly inhibits the autonomic activities of mice, and has a synergistic effect on sodium barbiturate, which can shorten the time required for mice to fall asleep and increase the number of mice to fall asleep. Liu Weiliang et al. [9] investigated the sedative, hypnotic and anti-convulsive effects induced by central stimulants in mice with different doses of gastroetin injection, and the results showed that gastroetin injection could reduce the spontaneous activity of normal mice, had a certain synergistic promoting effect on the sleep promotion of animals with glutarbarbital sodium, and had a good anti-convulsive effect on the convulsive response induced by various convulsants. Cui Guimei et al. [10] conducted three experiments, including the effects of TMZX on spontaneous activities of mice, the effects of sleep latency and time induced by pentobarbital sodium in mice, and the effects of subliminal hypnotic dose of pentobarbital sodium, showing that Tianma Zhantian granules can significantly reduce the number of autonomous activities of mice, shorten the time of falling asleep and prolong the sleep time of mice, and improve the sleep rate of mice It has a very good calming effect.

### 2.4 Analgesia

Mo Yunqiang et al. [11] concluded that acetyl-gastrodin has analgesic effect through experiments of hot plate method and chemical stimulation method in mice. Xu Min [12] has shown through studies that gastrodin can alleviate diabetic neuropathic pain in rats, and its mechanism may be related to inhibiting the activation of p-ERK1/2 pathway of spinal dorsal horn and DRG neurons. Hu Yibing et al. [13] believe that compound Gastrodia preparation has analgesic effect. The mechanism of analgesic action may be to reduce the transmission of pain-causing substances, reduce the afferent of nerve impulses, activate the analgesic system, release analgesic substances, and inhibit the expression of pain genes. Compound Gastrodia preparation can affect the contents of indoles and catecholamines in analgesic substances, inhibit the expression of pain gene c-fos, and produce analgesic effect has been confirmed.

## 3. Conclusion

The motherland medicine believes that the liver is the main storage of blood, the kidney is the main storage of essence, the kidney is insufficient, the liver qi stasis in the interior, will cause vertigo, need to reconcile the viscera, strengthen the essence of qi, blood circulation to achieve the purpose of treatment. As early as ancient times, Gastrodia has been studied to have sedative analgesic, calming and dizziness and other effects, and has achieved remarkable curative effect in the clinical practice of traditional Chinese medicine. With the deepening of modern research on traditional Chinese medicine, the pharmacological mechanism of Gastrodia gastrodia has been further studied, and modern medical

research has provided a strong theoretical support for *Gastrodia gastrodia* to treat a series of brain diseases such as vertigo, headache and epilepsy. However, the mechanism of *Gastrodia* in treating vertigo still needs further study. This paper summarizes the pharmacological mechanism of *Gastrodia*, which is helpful for the modern treatment of dementia, epilepsy and headache. With the emergence of more research results in the future, it needs to be further improved. Chinese traditional medicine is extensive and profound, so clinicians should study *Gastrodia* in many aspects and deep level on the basis of previous studies, in order to better apply in clinical practice.

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