Study on the Mechanism of Hypoglycemic Effect of Single Chinese Herbal Medicine

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Abstract: With the collision of medical theories between two different systems of Chinese and Western medicine, the micro-theory of Western medicine is introduced into traditional Chinese medicine treatment, and the point of view of disease differentiation of Western medicine is used to further enrich the research of traditional Chinese medicine, thereby further tapping the value of traditional Chinese medicine. The advantage of traditional Chinese medicine is that it is based on syndrome differentiation and treatment based on clinical evidence. Combined with practice, it has been found that many patients with diabetes in the clinic use a single Chinese medicine to lower blood sugar, and the final curative effect is generally satisfactory. At the same time, during the clinical treatment of diabetic patients, traditional Chinese medicine is used to assist western medicine to lower blood sugar, and the results show that the clinical improvement effect is very significant. Based on this, this article analyzes the hypoglycemic effect of the single-traditional Chinese herbal medicine, analyzes the therapeutic effect of the single-traditional Chinese herbal medicine, promotes the development of various modern Chinese medicine preparations, and inherits the innovation of traditional Chinese medicine.

1. Introduction

With the current improvement of people's quality of life, the dietary structure of residents has also undergone profound changes, and the incidence of diabetes has also shown an upward trend. It has become one of the major chronic non-communicable diseases threatening human health globally. At present, oral hypoglycemic drugs and insulin are mainly used in the treatment of diabetes. The hypoglycemic effect of this treatment scheme is very significant and the administration is more convenient. However, it is clinically found that a series of adverse complications such as hypoglycemia and stomach are more likely to occur. Intestinal reactions, liver and kidney damage, etc. Ancient Chinese medicine has accumulated thousands of years of clinical application experience in the treatment of thirst (also known as diabetes), leaving many cases of single-traditional Chinese medicine to cure and improve diabetes. It has the advantages of western medicine that cannot be replaced. Therefore, this article analyzes the mechanism of hypoglycemic effect of single-flavored Chinese herbal medicine.

2. Mechanism and Mechanism of Hypoglycemic Effect of Single Chinese Herbal Medicine

2.1 Protect Islet B Cell Function and Promote Insulin Secretion

Insulin is the only hormone in the body that negatively regulates blood pools. Protecting, repairing and improving islet β-cell function by directly stimulating islet β-cell secretion of insulin or by regulating the balance of the internal and external environment of the body is one of the traditional Chinese medicine's hypoglycemic mechanisms. Through pharmacological experiments, it was found that Chinese wolfberry can significantly reduce blood sugar in diabetic model animals. It can reduce blood sugar and regulate blood sugar by increasing serum insulin levels, repairing damaged isletβcells, improving its function or promoting insulin secretion. . In addition, lily's anti-diabetic effect is related to the promotion of islet β-cell proliferation and insulin secretion. It

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may be through a variety of mechanisms, such as enzymes that regulate sugar metabolism, promote islet β-cell proliferation and insulin secretion, and resist free radical oxidative damage. And achieve.

2.2 Increase Insulin Sensitivity and Improve Insulin Resistance

Insulin resistance refers to a variety of reasons that reduce the efficiency of insulin in promoting glucose uptake and utilization, and the body's compensatory secretion of excessive insulin produces hyperinsulinemia to maintain blood glucose stability, resulting in a series of pathological changes and clinical symptoms. The active ingredients of a single Chinese medicine such as flavonoids, alkaloids, saponins, polysaccharides, etc. all have the effect of improving insulin resistance. The mechanism of action can be summarized as: stimulating β cells to secrete insulin; increasing the number of insulin receptors, improving reactivity and affinity; Inhibit the secretion of insulin antagonists and promote glucose degradation, and ultimately improve blood sugar.

2.3 Inhibition of A-Glucosidase Activity

Alpha-glucosidase from small intestinal epithelial cells can be absorbed after hydrolyzing polysaccharides in food into a single molecule of glucose. If the activity of this enzyme is inhibited, it will help relieve postprandial hyperglycemia. According to the research of 41 kinds of traditional Chinese medicine for diabetes, the results show that most of them have α-glucosidase or α-amylase inhibitory effect, which can be used as the enzymatic basis for Chinese medicine to treat diabetes.

2.4 Inhibit Gluconeogenesis and Promote Glycogen Synthesis

Increased gluconeogenesis, glycogen breakdown, and glucose utilization disorders are also among the factors that cause elevated blood sugar. Cinnamon can improve impaired glucose tolerance, increase liver and muscle glycogen storage, stimulate peripheral tissues to take up glucose, increase liver synthesis of glycogen, and enhance its glucokinase activity. Dogwood total terpenes can significantly increase liver glycogen content in model rats. It is speculated that one of the mechanisms of its hypoglycemic effect is to promote liver glycogen synthesis and increase liver glycogen content.

2.5 Promote Glucose Utilization in Peripheral Tissues

Mulberry bark, mulberry branch, and mulberry parasitic extract can promote glucose consumption in isolated liver in the presence of insulin, and promote glucose uptake by organ tissues. Morus parasitica can increase glucose consumption per unit cell and can synergize with the action of insulin, and promote glucose metabolism in peripheral tissues, especially the liver. This may be one of the mechanisms of Morus parasitica prevention and treatment of type 2 diabetes. The 4-hydroxybenzoic acid component in pandanus odorus can reduce blood glucose in STZ diabetic rats, but has no effect on plasma insulin levels and liver glycogen content, suggesting that the compound can promote glucose utilization in peripheral tissues.

2.6 Scavenge Free Radicals and Improve Antioxidant Activity

Oxidative stress and the generation of reactive oxygen species are one of the causes of insulin resistance, β-cell dysfunction, and impaired glucose tolerance caused by diabetes, further promoting insulin resistance. Glutathione peroxidase, superoxide dismutase, and catalase have important effects on scavenging free radicals or promoting the repair of damaged beta cells. Therefore, increasing the content and activity of these enzymes is important for diabetes and complications. The prevention and control has a great impact. Experiments have shown that the formulas of Xiaoyin Fang and Huoxue Huayu of Shenyin Shenyang Shuangbu have a strong ability to inhibit free radical activity, that is, the ability to scavenge free radicals, indicating that Chinese herbal medicine can treat diabetes through antioxidant effects.

2.7 Other Mechanisms

Regulating receptors: Because long-term hyperglycemia may glycosylate red blood cell insulin receptors, reduce sensitivity and shorten red blood cell life; impaired granulocyte function, reduce

its chemotaxis, phagocytosis, and bactericidal capacity; cell-mediated immune Damage, T lymphocytes' response to mitogens is reduced. Coix seed as an immunomodulator can improve the immune function of red blood cells, and can increase CD3 +, CD4 +, CD8 + and improve the function of T lymphocyte subsets, thereby improving the immune function of patients with diabetes.

3. Single-Flavored Chinese Herbal Medicine Used to Lower Blood Sugar

3.1 Single Chinese Herbal Medicine

Each flavor of traditional Chinese medicine has a variety of ingredients and medicinal effects. In a sense, a single flavor of medicine is also a small compound. The main medicinal ingredients of single-traditional Chinese medicine for lowering sugar are mostly flavonoids, alkaloids, polysaccharides, and saponins. Therefore, from the perspective of improving the scientificity and rationality of the prescription, exploring the principle of drug action, and even developing new drugs for the treatment of diabetes, it is necessary to conduct in-depth research on the single-flavored Chinese herbal medicine.

1. Momordia Charantia linn is a plant belonging to the genus Momordica of the Cucurbitaceae family. The main medicinal substances of bitter melon for reducing sugar are bitter melon polypeptide, bitter melon polysaccharide and various amino acids. In vitro and in vivo experiments show that bitter melon extract increases liver glucose metabolism and presents a certain dose-effect relationship. Pharmacological studies have shown that total saponins of Momordica charantia have significant hypoglycemic effects.

2. Panax ginseng is the dried root of Panax ginseng C. A Mey. It has a slightly bitter taste, a mild temperature, and is beneficial to qi and vitality. The main medicinal ingredients of ginseng are ginsenosides, ginseng polypeptides, and ginseng polysaccharides, which have been used for a long time to treat thirst syndrome. Numerous clinical studies have fully suggested that ginseng has a safe and stable hypoglycemic effect and can be used in the clinical treatment of diabetes and its complications.

3.Radix Puerariae is the dried root of leguminous kudzu. It has sweet taste, cool sex, anti-muscle and antipyretic, rash, vitality and thirst, and Yangyang Diarrhea. Pueraria root's main hypoglycemic effect components are puerarin and pueraria polysaccharide. In pharmacological experiments, puerarin polysaccharide can effectively improve related indexes of diabetic rats, increase SOD, CAT in the liver, and reduce MDA levels; puerarin can also promote insulin secretion, β-endorphin synthesis in pituitary and pancreatic tissues, and up-regulate fat Skeletal muscle GLUT4 gene expression to promote glucose uptake and utilization.

4.Coptis chinensis Franch. Belongs to Ranunculaceae and Coptis chinensis is a perennial herbaceous plant. Coptis chinensis has been used for the treatment of diabetes for a long time, and its “Medicine Special Record” first recorded its “stopping thirst”. Berberine (berberine), the main medicinal component of Coptis chinensis, can inhibit liver gluconeogenesis, promote muscle glycolysis and inhibit aldose reductase, reduce glucagon levels, repair islet β-cell damage, and lower blood pressure and other pharmacology. effect.

3.2 Various Modern Chinese Patent Medicine Preparations

The development of modern Chinese patent medicine is based on the syndrome differentiation and treatment of traditional Chinese medicine, and the modified pharmacological effects of the decoction are retained to facilitate its application in clinical treatment. The current Chinese Medicines List of the National Drug Administration roughly includes 84 kinds of proprietary Chinese medicine preparations such as Xiaokeling tablets, Jiangtangshu tablets, Jinqi Jiangtang capsules, and Yangyin Jiangtang granules. Into a medicament. The hypoglycemic effect of Liuwei Dihuang Wan and Gegen Qinlian Decoction on blood sugar reduction is analyzed as follows:

4. Liuwei Dihuang Wan

Among the many traditional Chinese medicine prescriptions for treating diabetes with traditional Chinese medicine, the most widely used clinically is Liuwei Dihuang Pills. Liuwei Dihuang Pills are mainly for liver and kidney, which can be used to treat sub-health states, improve immunity, and delay aging. In recent years, the treatment effect of this prescription on diabetes and its complications has been further confirmed. Basic research has determined the main pharmacological action direction and effective ingredients of Liuwei Dihuang Pills, which is of great significance to improve the clinical application level.

Table 1 Clinical Effect Of Liuwei Dihuang Wan on Blood Glucose

Dosage, prescription	time	Experimental results
27g/day group and Placebo group	3 months	blood sugar ↓
2. 28g/day + Ginkgo leaves 28. 8mg/day and Placebo group	6 months	blood sugar ↓ HDL - C ↑
2. 4g/kg,Gavage	36 weeks	bcl -2 and BaxmRNA expression ↓ Pancreas / weight ratio ↑
2. 4g/kg,Gavage	32 weeks	Fasting blood glucose and insulin ↓ Adiponectin ↓
26g/kg,Gavage	10 days	Delayed islets with daily 1.5U / kg insulin injections Prime resistance
26g/kg,Gavage	--	blood sugar ↓

5. Pueraria Root Soup

Gegen Qinlian Decoction is a classic Chinese traditional medicine prescription. It consists of Pueraria, Scutellaria baicalensis, Coptis chinensis and Licorice. It is usually used to treat dampness, heat and diarrhea. Modern Chinese medicine practitioners trace the source and seek the source, and the new prescription is used in the early treatment of diabetes. The results show that the clinical effect is exact. Clinical studies of traditional Chinese medicine suggest that Gegen Qinlian Decoction can reduce the symptoms of fatigue, dry mouth, dryness and other complications while reducing blood sugar and blood lipid in diabetic patients. Gegen Qinlian Decoction is used clinically in the study of diabetes treatment, and provides theoretical basis and clinical medication guidance for the widespread application of Gegen Qinlian Decoction in the prevention and treatment of diabetes and its complications. The clinical effects are shown in Table 2.

Table 2 Clinical Effect Of Gegen Qinlian Decoction

Dosage, prescription	time	Experimental results
Clinical large / medium / small dose	--	FBG,PBG,HbAlc ↓
2. 28g/day + Ginkgo leaves 28. 8mg/day and Placebo group	8 weeks	27. 01 ~1. 09g/kg ↓ blood sugar,Glycated hemoglobin,Glycated serum protein, insulin and insulin resistance index ↓
(1. 65,4. 95,8. 25,11. 55,14. 85, 18. 15,21. 45,24. 75,28. 05)g/kg,Gavage	12 weeks	Renal organ index, serum creatinine, urea nitrogen ↓
Gavage	12 weeks	Blood glucose, glycated hemoglobin, glycated serum protein, insulin ↓ Glucose consumption and adiponectin expression in adipocytes ↑
Gavage	12 weeks	Liver lipid accumulation, islet cell lipid particles ↓ HDL - C,Number of islet cells ↑
Gavage	6 weeks	FBG,TG ↓

Traditional Chinese medicine compound preparations are used to lower blood sugar in patients. Although the efficacy of single-traditional Chinese medicine is very precise, the single-taste medicines cooperate with each other, which can give full play to the efficacy of single-taste medicines while reducing toxic and side effects. In the future, the field of traditional Chinese

medicine needs to continue to study the mechanism of hypoglycemic effect of traditional Chinese medicine compounds, which has high clinical research value.

6. Conclusion

In summary, for the diabetic condition, in order to control the patient's blood sugar within a reasonable range, strict diet control must be performed. This condition requires long-term treatment, even life-long treatment, such as improper daily control. It is easy to cause various complications and affect patients' normal life and mental health. In the theory of Chinese medicine, there are various dialectical methods and prescriptions for the treatment of diabetes, that is, thirst. It lowers blood sugar, improves clinical symptoms, delays the occurrence of complications, and treats complications, which is consistent with the goals of diabetes treatment. In recent years, Chinese medicine has played a significant advantage in the treatment of diabetes and its complications, and the clinical symptoms of hypoglycemia. It inherits development, develops innovation based on inheritance, overcomes difficulties, avoids misunderstandings, and uses western medicine for Chinese medicine. People's health is guaranteed.

7. Acknowledgment

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