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# Research Progress of Chinese Herbal Monomers in the Treatment of Diabetic Retinopathy

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***Abstract:*** *Diabetes mellitus is an endocrine, metabolic disease characterized by excessive drinking, excessive eating, excessive urination, and weight loss. In recent years, People's diets and entertainment conditions have become better and better, and there has been a huge lifestyle change, but at the same time, the number of people suffering from diabetes has also shown explosive growth. The disease usually causes some complications. One of the most serious symptoms is diabetic retinopathy, as shown below in Dr. It will not only greatly harm patients but also bring serious economic burden to their families and become a world public health problem threatening human health. At present, western-style therapies such as retinal photocoagulation and anti-VEGF drug injection are mainly used in clinical diabetic retinopathy. In addition, the efficacy of traditional Chinese medicine is also remarkable. In the existing research results, many traditional Chinese medicine monomers and related components are used as the research content. In this paper, we have collected a large number of literature, made a comprehensive discussion on the treatment of DR with traditional Chinese medicine monomers, carried out a specific discussion on the related research, and further put forward the prospect. We hope that it can form a favorable basis for the development of new drugs so as to better prevent Dr. Disease.*

***Keywords:*** *Diabetes; Diabetic retinopathy; Chinese herbal monomer; Active ingredient*

## 1. Introduction

Diabetes is a metabolic disease, one of its biggest characteristics is chronic hyperglycemia. In recent years, the incidence of this disease has gradually increased and has become a global focus of high-risk diseases. People with the disease cannot properly metabolize sugars, lipids, and proteins, which can wreak havoc on their systems and further affect their daily lives [1]. DR is one of the most common eye disease complications in diabetes, and it is also increasing each year rapidly. DR belongs to the "Xiao Ke Mu disease" category in traditional Chinese medicine (TCM), which has no definite name for Dr in past dynasties [2-3]. DR is a complication of DM manifested in the eyes, but its related symptoms and characteristics of the disease, previous people, have long known: "Six books in the river," pointed out that the long-term thirst can be "Into the eye and cataract"; "Confucian close": "Husband thirst, deaf and blind" [4]. According to traditional Chinese medicine (TCM), the syndrome of DR is characterized by a deficiency in origin and excess in superficiality, mixed with deficiency and excess, dryness-heat due to yin deficiency, deficiency of liver and kidney, deficiency of both yin and yang are its main pathogenesis, and stagnation of Qi and blood is its main pathogenic factor. According to the secret recipe of syndrome and treatment of three diseases, "After three treatments, the essence and blood will be lost or ignored, or the limbs will become useless like wind and disease..." In a word, DR accords with the basic pathogenesis of "Yin-deficiency dryness-heat, collateral stasis". How to effectively use traditional Chinese medicine to prevent and treat DR and improve patients' quality of life is one of the problems to be solved. Pueraria montana, Salvia miltiorrhiza, Hirudo, Astragalus, Pollen typhae, Red ginseng, honeysuckle, Dendrobium and other traditional Chinese medicines can effectively combat Dr. This article is based on this point to launch the study on the treatment of DR monomers of traditional Chinese medicine, we hope to provide new ideas for the prevention and treatment of diabetic retinopathy, and discover the further potential effects of related drugs.

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## 2. The Therapeutic Effect of Monomers of Traditional Chinese Medicine

### *2.1. Kudzu Root*

Pueraria Montana is a common Chinese medicine, mainly used for raw and simmering. Its effect has a lot, including pass meridian activating collaterals and through rash, etc. , pueraria flower can also play the role of detoxification. The medicine mainly contains flavonoids, puerarin is a kind of representative flavonoid glycoside extracted from pueraria lobata. Total flavone extract of Pueraria Montana may achieve the goal of treating DR by lowering blood glucose, inhibiting the levels of AGEs and inflammation, and inhibiting the levels of retinal VEGF [5]. From the existing research can know that puerarin can play a very good inhibition of retinal neovascularization, and also can produce a certain improvement of insulin resistance in the body, but the exact mechanism has not been clearly stated [6-7]. Chen Fang et al. through the study found that rats with DM in the early stage have appeared two kinds of changes one is the functional changes of the nerve and retina, and the other ultrastructural changes. With Puerarin, NF-KB activation can be effectively inhibited, and apoptosis of retinal nerve cells can be alleviated, which are the ways to protect the nerve retina [8]. Puerarin also up-regulates gene expression of Vascular endothelial growth factor (VEGF) and hypoxia-inducible factor-1(hif-1α) , a very significant amelioration of diabetic retinopathy in STZ-induced rats, [9] and a significant increase in vitreous and aqueous fluids in the eyes of PDR patients, [10]; Puerarin has the effect of slowing down the rate of apoptosis of (RPE) cells, [11-12] and reducing oxidative stress damage in the retina, [13] so we can consider Pueraria Montana as a potential drug for the treatment of diabetic retinopathy.

### *2.2. Salvia Miltiorrhiza Bunge*

Salvia miltiorrhiza is also an extremely common life of traditional Chinese medicine and can be used in general raw or wine. Salvia miltiorrhiza belongs to cold Chinese medicine and tastes bitter, and its efficacy is mainly the following several: first, blood stasis; two is to eliminate upset; three is to ease dysmenorrhea. In treating diseases, its danshensal and water-soluble danshensu are extremely effective components, especially the latter, which can improve the body's anti-coagulation and prevent the formation of thrombosis. It also reduces whole blood viscosity, thereby eliminating the adverse condition of microcirculation disturbance [14-18]. Yang Mingming et al. . The experimental study shows that Salvia Miltiorrhiza has a preventive and therapeutic effect on diabetic retinopathy and can slow down the progress of DR to a certain extent. The mechanism may be related to the improvement of microcirculation and inhibition of oxidative stress [19]. Wang and others considered that compound salvia miltiorrhiza dropping pills combined with Dobes are effective drugs for the treatment of DR and DN, [20] while Deng and others indicated that the existing compound salvia miltiorrhiza dropping pills can play a very good role in the treatment of Dr, in particular, it is helpful for the absorption of retinal microangioma and further improves the visual field of the patient [21]. The main ingredients of this medicine include: the first is Salvia miltiorrhiza; the second is Sanqi; the third is borneol. Salvia miltiorrhiza plays a key role in activating the fibrinolytic system and further degrading the fibrin. In short, it is the role of swelling, bleeding, and so on. The use of these effects can be produced in the retinal microcirculation effect so as to prevent DR in order to find its further medicinal value [22].

### *2.3. Astragalus Membranaceus*

Astragalus belongs to a warm medicine, can be used in general, and can also be used in honey. Its effect is very many, in treating many diseases can play a role, such as health and nourishing blood, as well as Qi and Yang, and so on. When the patient appears with diabetes eye disease, it shows that blood stasis appears in the Qi and blood and is accompanied by the phenomenon of yin deficiency, dryness and heat. The treatment of qi-deficiency type of eye disease with astragalus membranaceus is recorded in detail in the ancient book "Criterion of syndrome and treatment". The specific therapeutic mechanism is as follows: first of all, Astragalus membranaceus has the function of replenishing qi and blood, which can make the patient's Qi and blood work better so as to achieve the goal of treatment of dizziness [23]. In fact, we often refer to Astragalus as a tonic Chinese medicine, is now circulating in the market as an anti-diabetic Chinese medicine compound. Most will use this flavor is important. Many components of astragalus membranaceus can fight diabetes, the most typical are saponins (ASS) , flavonoids (ASF), which can well inhibit complications [24]. Astragalus polysaccharide is a kind of polysaccharide and has the strongest activity and the most content among the three active components of Astragalus. From multiple studies, it can be concluded that astragalus polysaccharides can play an anti-tumor role, and not only that, it plays an extremely active role in the fight against viruses as well as in the regulation of the

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human immune system [25]. In addition, Astragalus can reduce the occurrence of diabetic retinopathy in rats and effectively inhibit the MDA content/SOD activity. When patients are in a high-glucose environment, their cell membrane is likely to be damaged, moreover, the microvasculature may be damaged to some extent, and the inhibitory function of astragalus membranaceus is embodied in this [26].

### *2.4. Leeches*

Leeches leech family animals can generally live and sometimes need to use talc powder after scalding. Leech belongs to neutral medicine and tastes salty and a little bitter. The main function is to break blood circulation. Leeches are rich in protein components, in their saliva can also be extracted from hirudin, heparin, antithromboxane, and histamine-like substances. Traditional Chinese medicine classifies diabetic retinopathy as a collateral disease. Leeches are animal medicines that are "Flesh-and-blood", in his book "Questions and answers of materia medica", Tang Rongchuan mentioned that a leech's most remarkable feature is moving without dwelling, which can go deep into the context [27]. If suffering from collateral disease, then it is necessary for microcirculation and another effective improvement. Usually selected treatment is the leech. The most powerful dabigatran is hirudin, which is normally extracted from the saliva of blood-sucking leeches. The substance has been shown to help patients with type 2 diabetes [28]. Following a series of studies, Zhou et al. found that leeches were particularly effective in preventing retinopathy in early diabetic Rats [29]. The production of Endothelium in the human body needs to be regulated properly, and leech leachate can play an active role in this regard. In particular, the secretion of enzymes such as MMPs formed a good inhibitory effect. Simply put, the microenvironment in which cells grow can be regulated so that Endothelium does not proliferate [30-32].

## 3. Conclusion

We hope you find the information in this template useful in preparing your manuscript. In addition to the monomers mentioned above, many other traditional Chinese medicines and their active ingredients have been gradually proven useful in improving and treating diabetic retinopathy. But we should pay attention to the use of traditional Chinese medicine monomers in the treatment of DR. there are still some problems. For example, the mechanism of traditional Chinese medicine monomers in the treatment of DR. In the future, we should continue to explore the traditional prescriptions, not only to obtain more and more in-depth inspiration but also to further explore the new Traditional Chinese medicine monomer for the prevention of DR. In addition, the existing treatment of DR is not comprehensive enough, the active components of traditional Chinese medicine monomers still need to be continued to explore, in order to obtain more clinical samples. It is believed that with the development of drug screening and research, more traditional Chinese medicine monomers for the treatment of DR.

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