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Research Progress on the Antitumor Effects of Individual Herbs in the Zhuang Medicine Formula Weiduqing

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Abstract: Gastric cancer is a prevalent malignant tumor that typically originates in the mucosal layer or near the gastric wall. If left untreated, it may spread to other organs, posing a severe threat to life. Currently, the primary treatment methods for gastric cancer are Western medical approaches, including surgical intervention, radiotherapy, chemotherapy, and biological targeted therapy. While these methods are highly targeted, they often come with significant adverse effects. Traditional compound formulas, with their multi-target and holistic regulatory advantages, can serve as primary or supplementary treatments for gastric cancer. They are also effective in mitigating side effects and are gaining increasing attention. In recent years, the research team has discovered that the Zhuang medicine formula Weiduqing demonstrates definitive efficacy in inhibiting gastric cancer tumors, with fewer toxic and side effects. This makes it a promising anti-cancer remedy with significant development potential. This article reviews the anti-tumor active components of individual herbs in the Weiduqing formula, providing a reference for its clinical promotion and further research.

Keywords: Zhuang medicine formula; Weiduqing; Anti-tumor ingredients; research progress

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1. Introduction

Gastric cancer is a common malignant tumor of the digestive tract, ranking among the top three in both incidence and mortality rates of malignant tumors in China. Over the past 30 years, the incidence and mortality rates of gastric cancer in the country have been on the rise, posing a severe threat to human health [1]. While modern medical treatments for gastric cancer are highly targeted, they often come with significant adverse effects. Therefore, finding effective treatments with minimal side effects has become a focus of research. With advances in molecular biology and traditional medicine extraction technologies, Chinese medicine and ethnic medical formulas have garnered attention for their efficacy and low toxicity. Weiduqing, a Zhuang medicine formula developed by Professors Yuzhou Pang and Yingcai Wei through over a decade of clinical

practice, has shown promise in treating various chronic gastric diseases. This formula comprises ten medicinal ingredients, including Jiubiying, *Curcuma zedoaria*, *Solanum lyratum*, *Scutellaria barbata*, *Panax notoginseng*, *Oldenlandia diffusa*, *Coptis chinensis*, with small amounts of *Corydalis yanhusuo*, *Pseudostellaria heterophylla*, and *Glycyrrhiza uralensis*. The formula integrates detoxification and immune enhancement, promoting gastrointestinal function recovery and exhibiting anticancer effects [2]. Experimental studies have confirmed that Weiduqing significantly inhibits tumor growth in nude mice with transplanted gastric cancer, with its mechanism potentially related to the expression levels of the key factors PTGS2, IL6, and ICAM1 mRNA [3]. Based on this, the present review organizes relevant literature to summarize the antitumor active ingredients in each component of Weiduqing, providing a reference for further research on this formula.

2. Research on the main antitumor components of individual herbs in Weiduqing

2.1. *Ilex rotunda*

Ilex rotunda Thunb., Zhuang name Maexndeihmeij, is included in the "Quality Standards for Zhuang Medicines in Guangxi Zhuang Autonomous Region (Volume 2)." It is the dried bark or root bark of the plant *Ilex rotunda* from the Aquifoliaceae family. The herb is cold in nature and bitter in taste, with functions including clearing heat and detoxifying, reducing swelling and relieving pain, expelling wind, and dispelling dampness. Clinically, it is often used to treat conditions such as throat swelling and pain, stomach pain caused by damp heat, and rheumatic pain. The main components of *Ilex rotunda* include saponins, terpenes, aromatic compounds, and flavonoids, among which the biologically active components are pentacyclic triterpenes and their glycosides, and phenylpropanoid glycosides [4]. Zhao [5] studied the antitumor effect of *Ilex rotunda* extract in C57 mice and found that high and medium doses of *Ilex rotunda* could significantly inhibit tumor growth, indicating that *Ilex rotunda* has a significant tumor inhibition rate. Xu [6] found that the triterpenoid compounds of *Ilex rotunda* have inhibitory activities on various human tumor cells such as the human nasopharyngeal carcinoma cell line, human cervical carcinoma cell line, human colon carcinoma cell line, human liver cancer cell line, human lung cancer cell line, and human breast cancer cell line *in vitro*. Nan *et al.* [7] showed through MTT experiments that *Ilex rotunda* acid derivatives have significant inhibitory activities on the proliferation of human malignant melanoma cells, human cervical cancer cells, human lung adenocarcinoma cells, and human liver cancer cells. According to current research, the antitumor effect of *Ilex rotunda* is mainly manifested in the treatment of liver cancer and lung cancer, while research on its anti-gastric cancer effect is relatively limited, and the specific mechanism of action still needs further investigation.

2.2. *Coptis chinensis*

Coptis chinensis, derived from the dried rhizomes of plants in the Ranunculaceae family (*Coptis chinensis*, *Coptis deltoidea*, or *Coptis teeta*), is cold in nature and bitter in taste. It is a common herb for clearing heat and drying dampness, purging fire, and detoxifying. It is often used clinically to treat damp-heat syndromes and carbuncles and abscesses. With the development of modern pharmacological experimental research methods and technologies, a substance called berberine, also known as berberine hydrochloride, has been extracted from *Coptis chinensis*, and its antitumor effect has received widespread attention and research. The experimental results conducted by Ren [8] showed that silencing the *IL6* gene in MKN-45 cells could significantly inhibit the proliferation of gastric cancer cells, induce cell apoptosis, and cause G0/G1 phase arrest, confirming that

berberine can inhibit the growth of gastric cancer cells through the IL-6/JAK2/STAT3 signaling pathway. Tian *et al.* [9] stated that berberine hydrochloride can induce autophagy in gastric cancer SGC-7901 cells through the P38 MAPK signaling pathway, promoting the death of gastric cancer cells. Wang *et al.* [10] elaborated that berberine can also inhibit various tumor cells such as colon cancer, esophageal cancer, liver cancer, bladder cancer, and brain tumors, indicating that berberine has significant anti-tumor activity against multiple tumor types.

2.3. *Solanum lyratum*

Solanum lyratum, also known as Baimaoteng or Zhuang name Gaeubwnhgauh, is included in the "Quality Standards for Zhuang Medicines in Guangxi Zhuang Autonomous Region." This medicinal herb belongs to the Solanaceae family and is a perennial vine. The medicinal properties of this herb are slightly cold and bitter, and it has the effects of clearing heat and detoxifying, dispelling wind and removing dampness, and fighting cancer. It is often used clinically to treat breast abscesses, malignant sores, damp-heat jaundice, and ascites. Wu *et al.* [11] observed the inhibitory effect of *Solanum lyratum* water extract on human gastric cancer SGC-7901 cells and found that with increasing doses of *Solanum lyratum*, the number of cells gradually decreased while the number of apoptotic cells gradually increased, indicating that *Solanum lyratum* water extract induces apoptosis of human gastric cancer SGC-7901 cells in a concentration-dependent manner. Liu *et al.* [12] found through experiments that *Solanum lyratum* steroidal saponins have varying degrees of inhibitory effects on human cervical cancer HeLa cells, human ovarian cancer HO-8910 cells, human leukemia K562 cells, mouse primary ascites sarcoma S180 cells, and mouse liver cancer H22 cells *in vitro*, providing a basis and direction for further exploration of *Solanum lyratum* in the treatment of multiple cancer types. Clinically, *Solanum lyratum* is often used as a single agent or in combination with other prescriptions to treat gastric cancer and other cancers. Professor Jiuyi Xi, a famous doctor of traditional Chinese medicine in Shanghai, summarized that the Baihe Formula with *Solanum lyratum* as the main ingredient is a clinically proven prescription for the treatment of advanced gastric cancer, which has significant efficacy in treating gastric cancer, can significantly prolong the survival time of patients, and improve their clinical symptoms [13]. Additionally, Professors Yuanfu Qi and Cunren Yu also frequently use *Solanum lyratum* compounds to treat gastrointestinal tumors [14,15], which affirms the anti-gastric cancer effect of *Solanum lyratum* to some extent.

2.4. *Hedyotis diffusa*

Hedyotis diffusa (*Scleromitrion diffusum*), Zhuang name Nyarinngoux, is included in the "Quality Standards for Zhuang Medicines in Guangxi Zhuang Autonomous Region (Volume 1)." It belongs to the Rubiaceae family and refers to the entire plant of *Hedyotis diffusa*. The medicinal properties of this herb are cold and slightly bitter, and it has the effects of clearing heat and detoxifying, promoting urination, dispersing carbuncles and resolving masses, and diuresis. It is clinically used in the treatment of various tumors, especially gastrointestinal and lymphatic tumors [16]. Liu *et al.* [17] identified 12 key targets such as CA isoenzymes, P53, CDK2, PIK3CA, BCL2, AKT1, MAPK1, and VEGFA for the treatment of gastric cancer using *Hedyotis diffusa*, and pointed out that its pharmacological mechanism may be closely related to multiple biological pathways such as the VEGF signaling pathway and the PI3K/Akt/mTOR signaling pathway. Other data indicate [18] that gastric cancer cells BGC-823 treated with total flavonoids from *Hedyotis diffusa* show typical cell apoptosis, suggesting that total flavonoids from *Hedyotis diffusa* have a strong inhibitory effect on gastric cancer cells. Another active component

of *Hedyotis diffusa*, polysaccharides, can promote cancer cell apoptosis by affecting the expression levels of *BCL2* mRNA and *P53* mRNA in human gastric cancer 7901 cells [19]. Additionally, *Hedyotis diffusa* polysaccharides have a significant effect on promoting apoptosis in nasopharyngeal carcinoma CNE2 cells [20], non-small cell lung cancer A549 cells [21], human laryngeal carcinoma Hep-2 cells [22], and skin squamous carcinoma A431 cells [23], indicating that *Hedyotis diffusa* also has strong antitumor activity.

2.5. *Scutellaria barbata*

Scutellaria barbata, Zhuang name Nomjsoemzsaeh, is listed in the "Quality Standards for Zhuang Medicines in Guangxi Zhuang Autonomous Region (Volume 2)." It belongs to the Lamiaceae family and refers to the entire plant of *Scutellaria barbata*. The medicinal properties of this herb are cold, pungent, and bitter, and it has the effects of clearing heat and detoxifying, dispersing blood stasis, and promoting blood circulation. It is often used in clinical practice in combination with *Hedyotis diffusa* as a common treatment for tumors [24]. Modern research has shown that flavonoids, polysaccharides, and diterpenes in *Scutellaria barbata* have good antitumor activity and have significant inhibitory effects on malignancies such as lung cancer, liver cancer, gastric cancer, colorectal cancer, breast cancer, sarcoma, and leukemia [25]. Chen *et al.* [26] observed that *Scutellaria barbata* polysaccharides can exert their anticancer effects by increasing P21 and reducing VEGF levels in the peripheral blood serum of gastric cancer mice, indicating that *Scutellaria barbata* polysaccharides have the ability to inhibit cancer cell proliferation and diffusion in gastric cancer mouse models. Zhang *et al.* [27] demonstrated that *Scutellaria barbata* extract has anti-gastric cancer SGC-7901 cell proliferation and pro-apoptotic effects, and can reduce uPA expression, slowing cancer progression and metastasis. Zhang *et al.* [28] found that total flavonoids from *Scutellaria barbata* can significantly inhibit gastric cancer cell proliferation and induce cancer cell apoptosis, and improve radiosensitivity. The mechanism of action may be related to the upregulation of MIIP expression. These studies have laid a theoretical foundation for the anti-gastric cancer effects of *Scutellaria barbata* and provided references for better developing its anticancer applications.

2.6. *Curcuma phaeocaulis*

Curcuma phaeocaulis, Zhuang name Guighunh, is included in the "Quality Standards for Zhuang Medicines in Guangxi Zhuang Autonomous Region (Volume 1)." It belongs to the Zingiberaceae family and refers to the dried rhizome of *Curcuma phaeocaulis*, which is one of the commonly used Zhuang medicines in clinical practice. Its medicinal properties are warm and pungent, and it has the effects of promoting qi circulation and breaking blood stasis, eliminating food stagnation, and relieving pain. It is often used for symptoms such as blood stasis-induced amenorrhea and food stagnation-induced abdominal distension. The active ingredients in the volatile oil of *Curcuma phaeocaulis*, such as curcumin and β-elemene, can affect multiple aspects of tumor cell growth, proliferation, apoptosis, and metastasis by inhibiting and regulating Ki-67, PCNA, mTOR, and miRNA, thereby slowing the progression of the tumor [29]. Some studies [30] have pointed out that the active ingredient curcumol extracted from the volatile oil of *Curcuma phaeocaulis* can significantly inhibit the proliferation of human gastric cancer BGC-823 cells and promote cancer cell apoptosis. Zhang *et al.* [31] confirmed that curcumol can upregulate the expression of AIF and EndoG, inducing apoptosis of gastric cancer SGC-7901 cells through a non-caspase-dependent pathway. Other studies [32] have found that gastric cancer AGS cells treated with curcumol have a good proliferation inhibition rate and apoptosis rate, and can simultaneously induce G0/G1 and G2/M phase arrest in gastric cancer AGS cells, slowing down their migration

and repair abilities. The realization of its effect may be related to the regulation of PI3K, p-Akt, and p-mTOR proteins, as well as the relative expression of caspase-3 and Bax, through the PI3K/Akt/mTOR signaling pathway. Wang *et al.* [33] observed that gastric cancer patients who received curcuma oil injection during the perioperative period had slower growth rates of gastric cancer cells and less severe inflammatory reactions caused by surgery. Additionally, relevant literature and research have shown that curcumol also has significant inhibitory and pro-apoptotic effects on colon cancer [34], nasopharyngeal carcinoma CNE-2 cells [35], ovarian cancer [36], and leukemia L1210 cells [37].

2.7. *Corydalis yanhusuo*

Corydalis yanhusuo is a tuberous root belonging to the genus *Corydalis* in the family Fumariaceae. This medicine has warm properties, a pungent and bitter taste, and has the effects of promoting blood circulation, regulating qi, and relieving pain. Clinically, *Corydalis yanhusuo* is mainly used to alleviate various types of pain, including cancer pain in patients with advanced tumors, cardiovascular diseases, and menstrual pain [38]. Modern research has shown that components such as corydaline, tetrahydropalmatine, berberine, coptisine, d-glaucine, and d-isoboldine in *Corydalis yanhusuo* alkaloids have certain antitumor effects. Zhang *et al.* [39] reported that the total alkaloids of *Corydalis yanhusuo* significantly inhibit the proliferation of six human gastric cancer cell lines, especially AGS and MKN-28 cells. Wan [40] found that *Corydalis yanhusuo* alkaloids have strong inhibitory effects on the proliferation of four tumor cell lines: HepG2 liver cancer cells, A549 non-small cell lung cancer cell line, LOVO human colon cancer cells, and BGC-823 human gastric adenocarcinoma cells. It is believed that *Corydalis yanhusuo* alkaloids may affect VEGF expression in A549 cells through the Akt pathway. Additionally, Sang *et al.* [41] confirmed that various components of *Corydalis yanhusuo* alkaloids inhibit the proliferation of liver cancer cells SMMC-7721. Data analysis suggests that *Corydalis yanhusuo* extract can inhibit the metastasis and development of breast cancer cells by regulating the mitogen-activated protein kinase signaling pathway, demonstrating good anticancer activity [42].

2.8. *Panax notoginseng*

Panax notoginseng, Zhuang name Godienzcaet, is included in the Quality Standards for Zhuang Medicines in Guangxi Zhuang Autonomous Region (Volume 1).” It is the dried root and rhizome of the plant *Panax notoginseng* belonging to the family Araliaceae. This medicine has warm properties, a sweet and slightly bitter taste, and has the effects of regulating fire and dragon channels, stopping bleeding, nourishing blood, dispelling blood stasis, and relieving pain. It is commonly used in clinical practice to treat hematemesis, hematochezia, metrorrhagia and metrostaxis, external bleeding, and trauma-induced swelling and pain. Besides these effects, the antitumor effect of *Panax notoginseng* has also attracted the attention of many experts and scholars. Shi *et al.* [43] found through experiments that the active ingredient of *Panax notoginseng*, total saponins of *Panax notoginseng*, can inhibit the proliferation, invasion, and migration of gastric cancer cell lines through the WNT/β-catenin pathway and induce apoptosis in gastric cancer cell lines. Cai *et al.* [44] discovered that total saponins of *Panax notoginseng* can delay the malignant progression of gastric mucosal tissue and reduce damage to the gastric mucosa of rats with precancerous lesions by inducing activation of the JNK/ERK signaling pathway. Gao *et al.* [45] found that total saponins of *Panax notoginseng* can also inhibit the proliferation of SGC-7901 cells, induce cell cycle arrest and apoptosis. Wu *et al.* [46] elucidated that total saponins of *Panax notoginseng* can inhibit proliferation and induce apoptosis in human gastric cancer MKN-28 cells *in vitro,* and initially

inferred that the induction of gastric cancer cell apoptosis by total saponins of *Panax notoginseng* is related to its upregulation of death receptor 5 expression activity. Additionally, Dr. Lijuan Liang from Jilin Provincial Hospital of Traditional Chinese Medicine used *Panax notoginseng* combined with various traditional Chinese medicinal ingredients to create medicinal diets such as Huaiqi Sanshen Decoction to prevent and treat tumors, further clarifying the antitumor effect of *Panax notoginseng* [47]. These are all relevant elaborations on the anti-gastric cancer effects of *Panax notoginseng*, indicating that it has great potential in the treatment of gastric cancer. Furthermore, total saponins of *Panax notoginseng* have significant inhibitory effects on breast cancer tumor models in mice [48], pancreatic cancer MIA PaCa-2 and PANC-1 cells [49], and lung cancer cells in mice [50].

2.9. *Pseudostellaria heterophylla*

Pseudostellaria heterophylla is the dried tuberous root of the plant *Pseudostellaria heterophylla* belonging to the family Caryophyllaceae. It has neutral properties, a sweet and slightly bitter taste, and has the effects of nourishing qi and blood, invigorating the spleen, benefiting the lungs, and relieving cough. It is commonly used in clinical practice to treat symptoms such as qi and blood deficiency, lung deficiency cough, and spleen and stomach weakness, including qi and blood deficiency syndromes caused by various types of tumors in the middle and late stages. Wang *et al.* [51] analyzed prescriptions used by Kequn Chai in the treatment of gastric cancer and identified that *Pseudostellaria heterophylla* was one of the high-frequency herbs in these prescriptions. Common herb combinations with *Pseudostellaria heterophylla* included "*Pseudostellaria heterophylla* and licorice (*Glycyrrhiza uralensis*)," "*Pseudostellaria heterophylla* and *Atractylodes macrocephala*," and "*Pseudostellaria heterophylla* and *Pinellia ternata*." Additionally, the chemical constituent pseudostellarin B from *Pseudostellaria heterophylla* has been confirmed to have a certain anticancer effect. Its mechanism of action is to inhibit the PI3K/AKT signaling pathway and affect PD-L1 expression by binding to the key target CXCR4, thereby controlling the development of gastric cancer and prolonging the survival period of tumor patients [52]. Xue *et al.* [53] found through research that pseudostellarin B can significantly inhibit gastric cancer cell proliferation and tumor growth by activating endoplasmic reticulum stress, increasing the expression of IRE1, CHOP, and GRP78, and inhibiting the expression of Bcl-2. This suggests that pseudostellarin B may be a potential therapeutic drug for gastric cancer. Therefore, the main component of *Pseudostellaria heterophylla* with anti-gastric cancer activity is pseudostellarin B. Other studies [54] have shown that pseudostellarin B can significantly inhibit the adhesion and invasion abilities of ECA-109 human esophageal cancer cells. Furthermore, the polysaccharide H-1-2 extracted from *Pseudostellaria heterophylla* can also inhibit the invasion and migration of pancreatic cancer cells by inhibiting hypoxia-induced AGR2 expression, which can control the progression of pancreatic cancer to some extent [55].

2.10. *Glycyrrhiza uralensis*

Glycyrrhiza uralensis is the dried root and rhizome of the plants *Glycyrrhiza uralensis*, *Glycyrrhiza inflata*, or *Glycyrrhiza glabra* belonging to the family Fabaceae. This medicine has neutral properties and a sweet taste, and is a relatively common traditional Chinese medicine in clinical practice. It can harmonize various medicines, relieve cough and dispel phlegm, alleviate pain, clear heat, and detoxify. Modern pharmacological research has shown that the effective antitumor components of *Glycyrrhiza uralensis* mainly come from triterpenoid compounds such as glycyrrhizic acid, glycyrrhetinic acid, and glycyrrhizin, as well as flavonoid compounds such as liquiritin, isoliquiritin, and glabridin [56]. Glycyrrhetinic acid can induce apoptosis in a dose-

dependent manner in gastric cancer HGC-27 cells [57] and inhibit the growth of human gastric cancer SGC-7901 cells [58], indicating that glycyrrhetinic acid has a certain anti-gastric cancer effect. Niu *et al.* [59] found through research that isoliquiritin can down-regulate the expression of proteins in the PI3K/AKT signaling pathway and up-regulate the downstream apoptotic protein Bax to induce apoptosis in gastric cancer SGC-7901 cells. Zhang *et al.* [60] found through experiments that high doses of licorice flavonoids have a strong inhibitory effect on the growth of transplanted gastric cancer in nude mice and can down-regulate the expression of PCNA in gastric cancer tissues, thereby controlling the malignant progression of gastric cancer. Studies [61] have shown that glabridin can inhibit the proliferation rate of human gastric cancer MKN-45 cells, improve the efficiency of 5-fluorouracil, and propose that P16 and the potential P16/cyclin-dependent kinase 4/cyclin D1 pathway are likely to be new targets for gastric cancer treatment. Ma *et al.* [62] observed through clinical observation that compound glycyrrhizin injection combined with chemotherapy drugs for the treatment of gastrointestinal cancer can significantly reduce toxic reactions during chemotherapy, thereby reducing the damage of chemotherapy drugs to patients' bodies. Chen *et al.* [63] screened Chinese medicinal ingredients that bind best to estrogen receptor α and verified their anti-gastric adenocarcinoma effects. They found that liquiritin has the strongest ability to bind to estrogen receptor α and confirmed its target and good anticancer ability. This provides further experimental evidence for the treatment of gastric adenocarcinoma with liquiritin combined with estrogen receptor α. Wang *et al.* [64] observed that not only do glycyrrhizic acid and glycyrrhetinic acid have inhibitory effects on multiple cancers such as liver cancer, lung cancer, and breast cancer, but they can also be used in combination with chemotherapy drugs to achieve synergistic effects and reduce toxicity.

3. Thoughts on the anti-tumor components and effects of Weiduqing

According to literature research, the main components with anti-tumor effects in Weiduqing include triterpenoids, berberine, total flavonoids, polysaccharides, volatile oil from *Curcuma zedoaria* and its curcumol, alkaloids, and total alkaloids, as well as total saponins from *Panax notoginseng*. These components may promote cancer cell apoptosis and affect protein expression by regulating pathways such as IL-6/JAK2/STAT3, P38 MAPK, PI3K/Akt/mTOR, and WNT/β-catenin, thereby achieving the goal of treating tumors. Clinically, it can be used to treat tumors of the digestive system, such as esophageal cancer, gastric cancer, liver cancer, pancreatic cancer, and intestinal cancer; respiratory system tumors, such as lung cancer and nasopharyngeal carcinoma; and reproductive system tumors, such as cervical cancer and ovarian cancer.

In clinical practice, traditional compound decoctions usually require a certain amount of time for decoction. During this process, the chemical components of individual herbs may react with each other, generating new substances, and the content of various components may also change [65]. Different chemical components and contents have various therapeutic effects in clinical practice. Therefore, in the anti-tumor research of the Zhuang medicine formula Weiduqing, it is necessary not only to study the effective components of individual herbs but also to pay attention to factors such as whether the chemical components of various herbs have synergistic effects during the decoction process and whether new compounds are generated. It is necessary to use drug-containing serum as a basis, screen out the effective blood components of the formula through methods such as high-performance liquid chromatography combined with mass spectrometry, and evaluate the pharmacological activity of each component, including binding ability to specific targets and biological activity, by combining modern research methods such as *in vitro* and *in vivo* experiments and bioinformatics, to finally reveal its

mechanism of action.

4. Conclusion and outlook

In summary, scholars at home and abroad have conducted a lot of basic research on the anti-tumor effects of individual herbs in the Zhuang medicine formula Weiduqing, and the research results show that the individual herbs of this formula have certain anti-tumor effects, laying a solid foundation for subsequent research on this formula. At the same time, the current research also has certain deficiencies, which are specifically manifested as follows: (1) The current research on individual herbs focuses on single compounds or certain types of compounds, but Chinese medicine and ethnic medicine have diverse and complex components, emphasizing the overall synergistic effect. Therefore, it is necessary to proceed from the overall perspective and discover more appropriate research models for conducting research on Chinese medicine and ethnic medicine. (2) Most of the current research on individual herbs is conducted through *in vitro* experiments (cell experiments), and some are conducted through animal experiments *in vivo.* However, there are significant differences between these experiments and the actual situation and environment after the drug enters the human body. The results of *in vitro* experiments and animal experiments have certain limitations. Therefore, it is necessary to develop models that are closer to the actual situation or conduct higher-level research (human experiments). (3) The current research focuses on the efficacy of individual herbs in Weiduqing, and there are still many gaps in toxicology research. Therefore, in future research, developing more appropriate research models, improving toxicology research, and better elucidating the anti-tumor mechanism of individual herbs in the Zhuang medicine formula Weiduqing will be of great significance.

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