Breviscapine is a 100% natural, non-GMO, standardized botanical ingredient extracted from *Erigeron Breviscapus*.
LifeFlower® Breviscapine is a U.S. patented crude extract of several flavonoids from Erigeron breviscapus (Vant.) Hand.-Mazz, standardized to contain more than 90% scutellarin as the main active compound.

Known as Deng Zhan Hua in China, Erigeron breviscapus is a species of flowering plant in the daisy family and can only be found in the provinces of Yunnan, Guangxi, Guizhou, Sichuan, and Tibet. It is a perennial, clump-forming herb from 0.4 to 20 inches tall. As small as this flower may be, it has a great spectrum of health benefits including promoting the brain and cardiovascular system.

First documented in the Ming Dynasty (1436), the whole plant of Erigeron Breviscapus has been used as a Chinese herbal medicine to treat middle ear infection in children, paralysis caused by stroke, and joint pain from rheumatism by the Yi minority people of Southwest China for generations.

In the late 70s, people successfully extracted breviscapine from the plant, in which scutellarin was identified as the primary active flavone. Since then, breviscapine has been used as a microcirculation promoter for the treatment of cardio- and cerebrovascular diseases and has a large market share in China. Currently, it is widely utilized as a freeze-dried powder (I.V. injectable in saline solution) and over the counter (OTC) tablets with a gross revenue of over $42 million thanks to its efficacy and safety. With growing attention on breviscapine, more scientific studies and evidence have revealed more benefits of breviscapine owing to its multiple beneficial effects, such as anti-oxidant, anti-inflammation, vascular relaxation, anti-platelet, anti-coagulation, and myocardial protection.
BENEFITS OF BREVISCAPINE

CEREBROVASCULAR HEALTH

Cerebrovascular disease is the 2nd most common cause of death in the world and 6th most common cause of
disability. The current therapy is to immediately resupply the blood to the ischemic tissue. However, this may
introduce reperfusion damage that may cause additional harm to the tissue. Due to its ability to complement
reperfusion by providing neural protection and by targeting multiple abnormalities in ischemia, breviscapine is
widely used in clinical practice in China. In an early study, a total effective rate of 92% was shown among 100
patients with acute cerebral infraction under the treatment of breviscapine. Furthermore, a clinical study found
that breviscapine treatment reduced the death rate in a total of 21,498 patients with cerebral infarction.

NEUROPROTECTIVE

Neurodegeneration is the progressive loss of the structure and function of neurons in the affected brain, which
provides the underlying basis for many neurodegenerative diseases, exemplified by Alzheimer’s disease,
Parkinson’s disease, and amyotrophic lateral sclerosis.

As the 6th leading cause of death in the U.S., Alzheimer's Disease is a severe, progressive, neurodegenerative,
terminal and incurable disease. It is estimated that 5.7 million Americans of all ages are living with Alzheimer's
dementia in 2018, including an estimated 5.5 million people ages 65 and older as well as approximately 200,000
individuals under the age of 65 who have younger-onset Alzheimer’s.

Several studies revealed the potential therapeutic effects of breviscapine in protecting the neural system. A
mouse model was created for Amyotrophic lateral sclerosis (ALS) induced by cuprizone. The result showed that
scutellarin can alleviate the behavioral deficits, while improve motor function and other deteriorating parameters
of ALS. Another in vivo rat model suggested that scutellarin protects against the development of Alzheimer’s
disease induced by Aβ. In a rat model evaluating the protective effect of breviscapine against ischemic dementia,
breviscapine improved the performance of the learning and memory functions of the rats. Additionally, it
decreased lipid peroxidation and the levels of free radicals, as well as pathological alterations, such as nuclear
shrinking, cellular edema, and the irregular arrangement of the pyramidal cells in the hippocampal CA1 region.

CARDIOVASCULAR AND HEART HEALTH

As the leading cause of death in the U.S. and the world, cardiovascular disease accounts for 31% of all global
deaths. Accumulating evidence from various in vivo and in vitro studies has shown that breviscapine exerts a
broad range of cardiovascular protective effects, including vasodilation, protection against ischemia/reperfusion
(I/R), anti-inflammation, anticoagulation, antithrombosis, endothelial protection, myocardial protection, reduction of smooth muscle cell migration and proliferation, antcardiac remodeling, antiarrhythmia, blood lipid reduction, and improvement of erectile dysfunction.\(^{[12]}\) In a meta-analysis consisted of 1,505 patients with angina pectoris from 16 randomized controlled trials between 2001 to 2012, 92% of patients treated with breviscapine experienced an improvement in angina pectoris symptoms, compared to 76% of patients treated with Western medicine alone.\(^{[13]}\)

In a randomized controlled trial that involved 76 patients suffering from essential hypertension, the combined therapy of breviscapine and anti-hypertensive drugs decreased blood pressure and improved renal function more effectively and significantly than the anti-hypertensive drugs alone. \(^{[14]}\)

Furthermore, breviscapine also showed positive results for the therapy of hyperlipidemia, decreasing levels of total serum cholesterol, low density lipoprotein (LDL) cholesterol, and triglycerides while increasing the level of High-Density Lipoprotein (HDL) cholesterol. \(^{[15]}\)

**DIABETIC COMPLICATIONS PROTECTION**

Diabetic nephropathy and retinopathy result from damage to the microcirculation from high glucose. A rat model shows that breviscapine can ameliorate the diabetic renal injury induced by streptozotocin (STZ), a diabetogenic agent. \(^{[16]}\) Diabetes induces a disordered arrangement of ganglion cells and inner nuclear layer cells in the retinal cell layers, which is eased by treatment with scutellarin and more effectively with vitamin B12 modified amphiphilic chitosan derivatives of scutellarin. This therapeutic effect correlates with an improved blood flow velocity in the retina and a better resistivity index of the central retinal artery, in addition to down-regulation of the expression of angiogenesis proteins in the retina. \(^{[4]}\)

In a meta-analysis, data from a total of 2,260 patients in stages III-IV of diabetic nephropathy from 34 randomized and controlled studies was gathered, with 1,158 patients receiving treatment with breviscapine plus conventional medicine and 1,102 receiving conventional medicine only. The findings suggested that breviscapine protects against diabetic kidney complications by reducing urine proteins, improving renal function, and improving dyslipidemia associated with diabetes. \(^{[17]}\)

Furthermore, breviscapine was found to have protective effect against diabetic peripheral neuropathy. A total of 17 clinical randomized and controlled studies were included in a meta-analysis with 1,398 patients suffering from diabetic peripheral neuropathy. Breviscapine combined with vitamin B12 significantly improved the nerve conduction velocity for diabetic peripheral neuropathy. \(^{[18]}\)

**ANTICANCER EFFECT**

Increasing scientific evidence shown that breviscapine exerts anti-cancer effects through multiple pathways. One experimental study indicated that scutellarin sensitized HCT116 human colon cancer cells to resveratrol and 5-
fluorouracil evoked apoptosis in a p53-dependent manner. \[^{[19]}\] It was also found that scutellarin induced the apoptosis of HepG2 cells, a human hepatocellular carcinoma cell line, by inhibiting the STAT3 pathway. \[^{[20]}\]

Several liver, lung, and oral cancer animal studies indicated that scutellarin inhibited the lung and intrahepatic metastases and the growth of implanted HCC in mice, significantly reducing the growth of the lung cancer cells A549 and NCL-H460. \[^{[21]}\] Scutellarin diminished the proliferation of B-lymphoma Namalwa cells in vitro and inhibited the growth of lymphoma in Namalwa cell-xenotransplanted mice without causing apparent toxicity. \[^{[22]}\]

**SUPPLY**

LifeFlower® Breviscapine is offered exclusively by Farlong, which is vertically integrated with Good Agricultural Practices (GAP) certified farms (over 20,000 acres) located in Yunnan–Guizhou Plateau and current Good Manufacturing Practice (cGMP) certified pharmaceutical manufacturing facilities. We use third party laboratory to independently verify and ensure that all the residuals are meeting U.S. standards. Quality and sustainability are our strength.

While scutellarin is naturally very low in the plant (less than 3% by weight combined), our U.S. patented extraction technology enable us to offer product of high purity that contains a minimum of 98% scutellarin.
PRODUCT APPLICATIONS

Lifeflower® Breviscapine is self-affirmed GRAS. It is a 100% natural, botanical extract and is non-GMO.

The science behind Lifeflower® Breviscapine supports many new formulation opportunities which are driven by its very potent activities of antioxidant, anti-inflammation, vascular relaxation, anti-platelet, anti-coagulation, neural and myocardial protection, which make it especially helpful in age-related health condition. Meanwhile, it is also suitable for knowledge workers because the improvement of brain blood circulation and neuroprotection lead to an enhancement of focus, clarity, memory, and resistance against ischemic disorders in brain.

In supplements, LifeFlower® Breviscapine can be made into tablets, capsules, liquid, liposome, etc. It is odorless with neutral taste and has a five-year bulk shelf life, making it an excellent ingredient to be added in foods such as:

- Baked Foods
- Sports Nutrition
- Smoothies and Shakes
- Yoghurt

The suggested doses for daily intakes are:

- 200mg/day as dietary supplement
- 84mg/person as food & beverage ingredient

Use this new functional ingredient to reinvigorate an existing product or launch a new product using only LifeFlower® Breviscapine.

LifeFlower® Breviscapine is produced to cGMP pharmaceutical standards. The vertical integration advantage ensures traceability, quality and sustainability.
Based on its broad-spectrum health benefits as well as extensive human clinical data and animal researches, LifeFlower® Breviscapine can be positioned in Brain Health and Heart Health formulations. Examples are listed below:

- Improves Brain and Heart Health
- Promotes Healthy Cerebrovascular and Cardiovascular Circulation
- Enhances Memory, Focus, Clarity, and Cognition

Additional studies of breviscapine or scutellarin are documented on the PubMed.gov website, NCBI (US National Library of Medicine National Institute of Health).

ABOUT FARLONG

Farlong is a California based nutraceutical company established in 1998 and specializes in condition specific natural products and botanical ingredients. We are vertically integrated with GAP certified herb cultivation farms, cGMP certified manufacturing facilities with independently verified quality. With the ongoing commitment to traceability, purity, quality and sustainability, Farlong has been supplying customers with the finest nutraceutical products and ingredients all over the world.

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