

Ginkgo Biloba

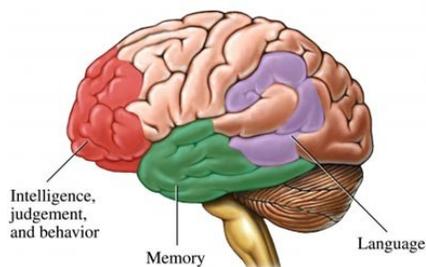


- For over 5,000 years, the fruits and seeds of the *Ginkgo biloba* tree have been used in traditional Chinese medicine for the treatment of various conditions such as asthma and cough.
- The first publication of the internal use of *G. biloba* leaves for medicinal purposes dates back to 1505 A.D.
- Since the early 1990s, the standardized extract of *G. biloba* leaves, EGb761, has become one of the most popular supplements for memory enhancement in the U.S.
- *G. biloba* is one of the top selling herbs in the U.S. and is usually consumed as tablets, capsules, or teas.

G. biloba Extract (GBE)

Depending on country of origin, time of harvest, and other factors, the amount of individual constituents found in *G. biloba* can vary considerably. Therefore, it is important to have a standardized preparation with known composition for the purposes of drug regulation, clinical trials, human consumption, and for reproducibility.

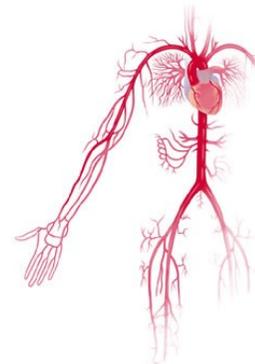
A standardized form of *G. biloba* leaf extract (EGb 761) has been approved by French and German companies, which contains 24% flavonoid glycosides, 6% terpene lactones, and less than 5 ppm ginkgolic acid (a component with possible allergenic properties).



Health Effects

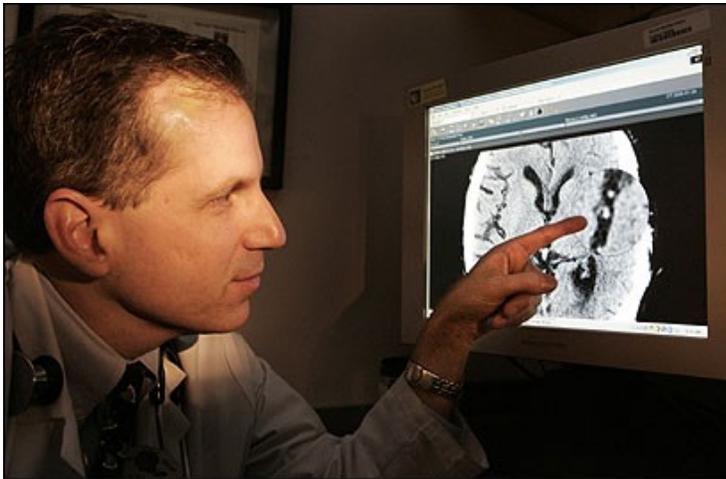
The current evidence suggests that *G. biloba* may have benefits in the following conditions:

- **Cardiovascular disease:** a heart and blood vessel disease with plaque formation and hardening of the arteries, high blood lipid levels, and possible hypertension.
- **Ischemic Stroke:** a stroke which occurs when a blood vessel that feeds the brain gets blocked from a blood clot causing injury to that part of the brain. The injury can be mild or severe.
- **Dementia:** a condition in which memory and behavior are altered and a person has difficulty coping and interacting with others.
- **Claudication:** a circulatory problem that causes lower leg pain during exercise and is usually associated with peripheral artery disease.



Acute Ischemic Stroke

- *Ginkgo biloba* extract has been widely used in the treatment of acute ischemic stroke in China and has been used occasionally in Europe.
- A survey of treatments used in routine practice in China showed that 75% of doctors surveyed believed that Chinese herbal products were effective treatments for acute stroke, and 66% of doctors used them routinely for most patients.
- Despite the routine use in Chinese medicine, the medicinal effectiveness of herbs remains uncertain.



Chronic Diseases and *G. Biloba*

- There is increasing evidence of the potential role of *G. biloba* extract (GBE) in treating and delaying the development of cardiovascular disease (CVD) and other chronic diseases. The underlying mechanism of action is not fully understood.
- GBE is believed to exert its effects in several ways:
 - as an antioxidant
 - in improving vasomotor function
 - in reducing cell adhesion
 - in reducing platelet activation
 - in inhibiting smooth muscle cell activation
 - in improving cell signal pathways

A recent publication (2006) reviewed all current randomized trials of *G. biloba* extract in patients with acute ischaemic stroke. The final review looked at 10 trials (N=792 patients). In nine of the trials, assessed to be of inferior quality, significant improvement in neurological deficit was used as the outcome measure.

When the trials were analyzed together, *G biloba* extract was shown to be associated with a significant increase in the number of improved patients; however, the evidence was not convincing.

In addition, in one placebo-controlled trial assessed to be of good quality, no improvement in neurological deficit was noted at the end of the treatment.

High quality, large-scale, randomized clinical trials, including a control group, are needed to examine the potential relationship between *G. biloba* and stroke recovery.

Clinical Use in Peripheral Artery Disease

Clinical trials have demonstrated certain therapeutic benefits of GBE in the treatment of peripheral vascular diseases, especially of intermittent claudication—pain in the legs caused by peripheral artery disease (PAD).

- One of the largest randomized double-blind clinical trials on claudication and *G. biloba* was conducted in Germany. The trial, involving 111 patients with symptoms of intermittent claudication, showed that although Doppler indices (which examine blood flow in the legs) remained nearly unchanged during the therapy, walking distance improved substantially in patients treated with GBE.

Several other studies have also reported significant improvements in GBE treated subjects when compared with placebo.

Clinical Use in Small Vessel Disease

Ischemic vasculopathy involving small vessels may affect multiple organs and systems. Clinical trials have demonstrated the clinical efficacy of *G. biloba* in Raynaud's syndrome, retinopathy, and nephropathy associated with the insufficiency of various vascular beds.

Clinical Use in Venous Insufficiency

GBE has also been reported to have a beneficial effect in patients with chronic venous insufficiency. *G. biloba* is effective by preventing the first step of the endothelium activation cascade leading to epithelial growth and vessel narrowing.

Alzheimer's Disease

- In Europe, *GBE* is registered for the treatment of memory impairment, dementia, tinnitus (ringing in the ears), and intermittent claudication.
- Alzheimer's disease (AD) is the most common cause of dementia in the elderly, affecting 4% of those over 65, and 20% of those over 80 years of age. AD is a chronic, slowly progressive neurodegenerative disease with deterioration of memory and intellectual capacity.
- Several nutrients and chemicals have been shown to slow down the progression of the cognitive decline related to AD. These include antioxidants such as vitamin E, monoamine oxidase inhibitors (MAOIs), anti-inflammatory drugs, cholinergic agents, estrogens or neurotrophic factors.
- Many of these chemotherapeutic drugs have side effects, some of which are severe. And, up to now, none are fully effective in the prevention or treatment of neurodegenerative disorders.



Clinical Use in the Prevention of Thrombosis

Thrombosis is the formation of a clot or thrombus inside a blood vessel, which in turn obstructs the flow of blood through the circulatory system. Enhanced platelet function, particularly in response to collagen, is a known risk factor for cardiovascular disease and thrombotic complications. Studies have shown that by decreasing blood viscosity and preventing platelet aggregation, GBE can be useful in the prevention of thrombosis.

Findings on the *G. biloba* extract, EGb 761

- Many studies have used *G. biloba* extract EGb 761.
- Animal studies revealed that EGb 761 is able to facilitate acquisition and retention of memory, with one of the major protective actions taking place in the hippocampus (which is related to the acquisition of new memories).
- In 2000, several mechanisms were proposed in explaining how EGb 761 may be useful in AD and other age-related, neuro-degenerative disorders.
- In animals, EGb 761:
 - Possesses antioxidant and free radical scavenging activities
 - Reverses age-related loss in brain receptors
 - Protects against ischemic neuronal death
 - Preserves the function of the part of the brain that is involved in memory
 - Increases activity of cells for chemical synthesis of compounds needed for memory
 - Preserves chemical receptors that may decay due to aging
 - Enhances neuronal plasticity
 - Counteracts the cognitive deficits that follow stress or traumatic brain injury

Mechanisms by which *G. biloba* extract has been shown to improve the effects of AD

G. biloba extract can prevent the formation of an amylose protein precursor, a key event in the progression of AD.

Side Effects and Cautions

- Side effects of *Ginkgo biloba* may include the following: gastrointestinal distress, such as diarrhea and nausea; dizziness; headaches; or allergic skin reactions.
- *G. biloba* may increase the risk for excess bleeding. This is particularly important for individuals on anticoagulant drugs, with bleeding disorders, or those planning to schedule a surgery or a dental procedure.
- It is important to always inform your health care provider on the intake of any herbal or dietary supplements.

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Edited : October 2009



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