Stroke. Gavestinel has been tried for its supposed neuroprotective properties in acute stroke, but two major multicentre, randomised controlled studies have failed to show any benefit over placebo in acute ischaemic stroke.[1,2] Analysis of the data from these two studies in patients with primary intracerebral haemorrhage found no benefit of gavestinel in this subgroup either.[3]

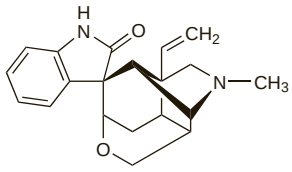
1. Lees KR, *et al.* Glycine antagonist (gavestinel) in neuroprotection (GAIN International) in patients with acute stroke: a randomised controlled trial. *Lancet* 2000; **355:** 1949–54.
2. Sacco RL, *et al.* Glycine antagonist in neuroprotection for patients with acute stroke: GAIN Americas: a randomized controlled trial. *JAMA* 2001; **285:** 1719–28.
3. Haley EC, *et al.* Gavestinel does not improve outcome after acute intracerebral hemorrhage: an analysis from the GAIN International and GAIN Americas studies. *Stroke* 2005; **36:** 1006–10.

Gelsemium

Gelsemium Root; Jessamine; Yellow Jasmine Root.

Корень Желтого Жасмина

CAS — 509-15-9 (gelsemine).



(gelsemine)

Profile

Gelsemium consists of the dried rhizome and roots of *Gelsemium sempervirens* (Loganiaceae). It contains toxic indole alkaloids including gelsemine ($C_{20}H_{22}N_2O_2$ = 322.4). It depresses the CNS and has been used mainly in neuralgic conditions, particularly trigeminal neuralgia and migraine.

Homoeopathy. Gelsemium has been used in homoeopathic medicines under the following names: Gelsemium sempervirens; Gels.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***Fr.:*** Coquelusedal; Coquelusedal Paracetamol.

Gene Therapy

Terapéutica génica.

Генотерапия

Profile

Gene therapy is a product of the increasing knowledge of genetic function and the availability of methods to examine and manipulate the genome. Exogenous genetic material, which may be synthetic or recombinant nucleic acids (p.2355), is introduced into somatic cells (transfection) in such a way that the cells are able to express the products of the new genes. It may be used for therapeutic, prophylactic, or diagnostic purposes. Gene therapy should be distinguished from the use of products derived from organisms (usually micro-organisms) whose genome has been manipulated by similar recombinant DNA technology, for example the use of recombinant cytokines, monoclonal antibodies, or antisense products.

Gene therapy is under investigation in three main areas:

- the replacement of abnormal or defective genes in patients with inherited disease
- the alteration of the characteristics of cells to change their relative susceptibility to other therapies (for example by making haematopoietic stem cells more resistant to the adverse effects of antineoplastics, or by making tumour cells selectively express an enzyme that converts an otherwise non-toxic prodrug into a cytotoxic agent)
- for localised production of a biologically active substance that cannot be given directly or would have unacceptable effects if used systemically.

To date, all gene therapy in humans has been of differentiated somatic cells. Alteration of the human genome in a manner transmissible to offspring, either by treating the germ cells or the early embryo, is considered at present to pose insuperable ethical problems.

Various methods for delivery of genetic material have been investigated, none of which is yet completely satisfactory. These include biological vectors (e.g. viruses or plasmids) or stem cells that have been genetically modified, oncolytic viruses, nucleic acids, either naked plasmids or carried by delivery vehicles, and genetic vaccines. Antisense techniques to modify, correct, or silence aberrant genes are also being developed, as is RNA interference. Xenotransplantation of animal cells may also be an option. Removal of donor cells from the patient followed by *ex vivo* transfer of the new gene (by physical or viral methods) and return of the modified cells may be feasible for modifying haematopoietic stem cells. However, for most tissues, methods of *in vivo* transfer are required. Modified viruses rendered incapable of replicating have been widely studied as vectors for gene therapy. Retroviruses have the advantage that the DNA they carry is integrated into the host genome, resulting in permanent expression of the gene, but there has been some concern that they may disrupt existing genetic material with possibly oncogenic effect; in addition, their small size limits the size of gene that they can carry, and they are largely ineffective in infecting non-dividing cells. Adenoviruses are more stable and can infect non-dividing as well as dividing cells, but their genetic freight is not integrated into the chromosome and transmitted to the cell's progeny, and the gene products are therefore only expressed transiently; they are also highly immunogenic which limits repeated use. Some other viral types, including herpes simplex viruses, adeno-associated viruses, and lentiviruses, are also under investigation. Viruses with tropisms for a particular tissue may be useful in producing localised effects.

Chemical or physical methods for DNA delivery have been extensively investigated. Such methods include direct injection of DNA, the use of DNA complexes bound to a ligand which can be taken up by cells, formulation of DNA in liposomes which can fuse with cell membranes and allow the DNA to enter the cell, and more exotic methods such as 'gene guns', in which DNA-coated gold particles are fired into the cells. Although gene expression can be achieved after use of such methods, it is again transient because the new genetic material is not integrated with that of the host, and physical methods are currently less efficient and more limited in scope than viral ones.

Numerous clinical studies are being carried out. The first successful therapy was for severe combined immunodeficiency, a single-gene disorder due to deficiency of the enzyme adenosine deaminase. Transfection of the gene for this enzyme into the patient's T-cells *ex vivo* and re-infusion of the modified T-cells has been shown to produce substantial clinical improvement, although therapy must be repeated periodically because of the limited lifespan of the lymphocytes.

Studies in patients with cystic fibrosis have also shown some success, and a number of other single-gene disorders, including alpha$_1$ antitrypsin deficiency, familial hypercholesterolaemia, Gaucher disease, the haemoglobinopathies and haemophilias, and Duchenne muscular dystrophy are being studied or have been proposed as possible candidates.

Gene therapy is also under investigation in various acquired diseases, particularly in the management of various types of cancer. Strategies being studied include modification of tumour cells either to increase their immunogenicity or to render them selectively sensitive to antineoplastics, and transfection of tumour cells with tumour suppressor genes. Other disorders being studied clinically include HIV infection, rheumatoid arthritis, Parkinson's disease and atherosclerosis.

◊ Some reviews and references concerning gene therapy are listed below. See also under the discussions of individual diseases for comments on gene therapy in the context of their conventional treatment.

1. Hu WS, Pathak VK. Design of retroviral vectors and helper cells for gene therapy. *Pharmacol Rev* 2000; **52:** 493–511.
2. WHO. Gene transfer medicinal products. *WHO Drug Inf* 2002; **16:** 275–82.
3. Tomanin R, Scarpa M. Why do we need new gene therapy viral vectors? Characteristics, limitations and future perspectives of viral vector transduction. *Curr Gene Ther* 2004; **4:** 357–72.
4. Department of Health. Recommendations of the GTAC/CSM working party on retroviruses. Internet Document: May 2005. Available at: http://www.advisorybodies.doh.gov.uk/genetics/gtac/FinalrecommendationsJune2005.pdf (accessed 11/02/08)
5. Basu J, Willard HF. Artificial and engineered chromosomes: non-integrating vectors for gene therapy. *Trends Mol Med* 2005; **11:** 251–8.
6. Barzon L, *et al.* Versatility of gene therapy vectors through viruses. *Expert Opin Biol Ther* 2005; **5:** 639–62.
7. Sinn PL, *et al.* Gene therapy progress and prospects: development of improved lentiviral and retroviral vectors—design, biosafety, and production. *Gene Ther* 2005; **12:** 1089–98.
8. Wierdl M, Potter PM. Update on gene therapy approaches for cancer. *Curr Hematol Rep* 2005; **4:** 294–9.
9. Hart SL. Lipid carriers for gene therapy. *Curr Drug Deliv* 2005; **2:** 423–8.
10. Kaplan JM. Adenovirus-based cancer gene therapy. *Curr Gene Ther* 2005; **5:** 595–605.
11. Ohlfest JR, *et al.* Nonviral vectors for cancer gene therapy: prospects for integrating vectors and combination therapies. *Curr Gene Ther* 2005; **5:** 629–41.
12. Dobson J. Gene therapy progress and prospects: magnetic nanoparticle-based gene delivery. *Gene Ther* 2006; **13:** 283–7.
13. Pelletier R, *et al.* RNA based gene therapy for dominantly inherited diseases. *Curr Gene Ther* 2006; **6:** 131–46.
14. Park F, Gow KW. Gene therapy: future or flop. *Pediatr Clin North Am* 2006 **Aug:** 621–38.
15. Lavigne MD, Gorecki DC. Emerging vectors and targeting methods for nonviral gene therapy. *Expert Opin Emerg Drugs* 2006; **11:** 541–57.
16. Chan S, Harris J. The ethics of gene therapy. *Curr Opin Mol Ther* 2006; **8:** 377–83.
17. Cavazzana-Calvo M, Fischer A. Gene therapy for severe combined immunodeficiency: are we there yet? *J Clin Invest* 2007; **117:** 1456–65.

Gentian

Bitter Root; Enzianwurzel; Genciana; Gencijonų šaknys; Gentian Root; Gentiana; Gentianae radix; Gentianarot; Gentiane; Gentiane, racine de; Genziana; Hořcový kořen; Katkeronjuuri; Korzeń goryczki; Raiz de Genciana; Tárnicsgyökér.

Горький Корень

Pharmacopoeias. In *Eur.* (see p.vii), and *Jpn.*

Jpn includes Japanese Gentian, from *G. scabra* and other species.

Chin. also specifies *G. scabra* and other species.

Ph. Eur. 6.2 (Gentian Root; Gentian BP 2008). The dried, fragmented underground organs of *Gentiana lutea* yielding not less than 33% of water-soluble extractive. It has a characteristic odour. Protect from light.

Profile

Gentian is used as a bitter. An alcoholic infusion of gentian, bitter-orange peel, and lemon peel has been used as an ingredient in a number of bitter mixtures.

Homoeopathy. Gentian has been used in homoeopathic medicines under the following names: Gentiana lutea; Gent. lut.

Preparations

BP 2008: Acid Gentian Mixture; Alkaline Gentian Mixture; Compound Gentian Infusion; Concentrated Compound Gentian Infusion;
Ph. Eur.: Gentian Tincture.

Proprietary Preparations (details are given in Part 3)

Ger.: Digestivum-Hetterich S†; Enziagil Magenplus†; Sern-SL.

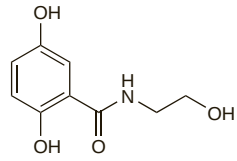
Multi-ingredient: ***Austral.:*** Calmo; Digest; Digestaid; Digestive Aid; Extralife Sleep-Care; Pacifenity†; Relaxaplex†; Sinulin†; ***Austria:*** Abdomilon N; Brady's-Magentropfen; China-Eisenwein; Mariazeller; Montana; Sigmann-Haustropfen; Sinupret; Solvopret; ***Braz.:*** Camomila; Digestar†; Estomafitino†; Gotas Digestivas; Xarope Iodo-Suma†; ***Canad.:*** Herbal Laxative; Herbal Laxative plus Yogurt; ***Cz.:*** Abdomilon†; Biotussil; Dr Theiss Schweden Krauter; Dr Theiss Schwedenbitter; Klosterfrau Melisana; Naturland Grosser Swedenbitter†; Original Schwedenbitter; Sinupret; ***Fr.:*** Elixir Grez†; Quintonine; ***Ger.:*** Abdomilon N; Amara-Pascoe; Amara-Tropfen; Anore X N†; Gallexier; Gastralon N†; Gastrol S†; Gastrosecur†; Hepaticum-Medice H†; Infi-tract†; Leber-Galle-Tropfen 83†; Majocarmin forte†; Majocarmin mite†; Montana N; Schwedentrunk Elixier; Sedovent; Sinupret; Stovalid N†; Unex Amarum†; ventri-loges N; ***Hong Kong:*** Sinupret; ***Hung.:*** Sinupret; ***Indon.:*** Sinupret; ***Ital.:*** Amaro Medicinale; Assenzio (Specie Composta)†; Caramelle alle Erbe Digestive; Centaurea (Specie Composta)†; Chinoidina†; Frerichs Maldifassi†; Genziana (Specie Composta)†; ***Mex.:*** Bisolsinus; ***Philipp.:*** Sinupret; ***Pol.:*** Dyspepsin; Kalms; Melisana Klosterfrau; Sinupret; ***Rus.:*** Herbion Drops for the Stomach (Гербион Желудочные Капли); Original Grosser Bittner Balsam (Оригинальный Большой Бальзам Биттнера); Sinupret (Синупрет); ***S.Afr.:*** Amara; Enzian Anaemodoron Drops; Helmontskruie; Lewensessens; Versterkdruppels; Wonderkroonessens; ***Singapore:*** Sinupret; ***Spain:*** Depurativo Richelet; ***Switz.:*** Demonatur Gouttes pour le foie et la bile; Gastrosan; Padma-Lax; Padmed Laxan; Sinupret; Strath Gouttes pour l'estomac; ***Thai.:*** Pepsitase; Sinupret; ***UK:*** Acidosis; Appetiser Mixture; Indigestion Mixture; Kalms; Quiet Tyme; Scullcap & Gentian Tablets; Stomach Mixture.

Gentisic Acid Ethanolamide

Etanolamida del ácido gentísico. 2,5-Dihydroxybenzoic acid ethanolamide.

$C_9H_{11}NO_4$ = 197.2.

CAS — 61969-53-7.



Profile

Gentisic acid ethanolamide has been used as a complexing agent in the manufacture of pharmaceutical preparations.

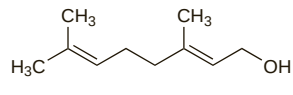
Geraniol

Lemonol. (*E*)-3,7-Dimethyl-2,6-octadien-1-ol; .

Гераниол

$C_{10}H_{18}O$ = 154.2.

CAS — 106-24-1.



Profile

Geraniol is a constituent of several essential oils and is used in insect repellent preparations. It was formerly used as an anthelmintic. Geraniol is also used as a flavour and in perfumery. Contact dermatitis has been reported.

◊ References.

1. Yamamoto A, *et al.* Contact urticaria from geraniol. *Contact Dermatitis* 2002; **46:** 52.

2. Murphy LA, White IR. Contact dermatitis from geraniol in washing-up liquid. *Contact Dermatitis* 2003; **49:** 52.
3. Tamagawa-Mineoka R, *et al.* Allergic contact cheilitis due to geraniol in food. *Contact Dermatitis* 2007; **56:** 242–3.

Preparations

Proprietary Preparations (details are given in Part 3)
USA: Cholestin.

Multi-ingredient: ***Canad.:*** Natrapel; ***Fr.:*** Biolau; Moustidose.

Geranium Oil

Aetheroleum Pelargonii; Geranii Etheroleum; Geranio, aceite esencial de; Geraniová silice; Oleum Geranii; Pelargonium Oil; Rose Geranium Oil.

Гераниевое Масло

Profile

Geranium oil is a volatile oil obtained by distillation from the aerial parts of various species and hybrid forms of *Pelargonium* (Geraniaceae). It contains geraniol (p.2310). It is used to perfume various preparations and has been included in insect repellent preparations. It is also used in aromatherapy.

Adverse effects. Allergic reactions have been reported[1] with herbal preparations containing extracts of *Pelargonium sidoides* and *P. reniforme* used for respiratory-tract infections.

1. de Boer HJ, *et al.* Allergic reactions to medicines derived from Pelargonium species. *Drug Safety* 2007; **30:** 677–80.

Postherpetic neuralgia. A study[1] involving 30 patients has indicated that topically applied geranium oil is of benefit in the management of the pain of postherpetic neuralgia. Pain relief was obtained within a few minutes but further study is required to determine the duration of effect beyond 1 hour. Adverse effects were considered to be minor and included burning in the eye, skin rash, and lightheadedness.

1. Greenway FL, *et al.* Temporary relief of postherpetic neuralgia pain with topical geranium oil. *Am J Med* 2003; **115:** 586–7.

Preparations

Proprietary Preparations (details are given in Part 3)
Braz.: Kaloba; Umckan; ***Ger.:*** Umckaloabo; ***Ital.:*** Entom Nature; ***Mex.:*** Umckaloabo; ***Rus.:*** Umckalor (Умкалор); ***UK:*** Kaloba; ***Venez.:*** Kaloba.

Multi-ingredient: ***Fr.:*** Acarcid†; Sedermyl Actifroid; ***Ger.:*** Rosatum Heilsalbe; ***Ital.:*** Air Citronella†; Dentosan Azione Intensiva; Dentosan Mese; Mistick Verde; Otosan Natural Ear Drops†; ***NZ:*** Mr Nits; ***UK:*** Medicated Extract of Rosemary; Nostroline; Teenstick.

Germanium

Germanio.

Ge = 72.64.

CAS — 7440-56-4.

Profile

Germanium compounds have been used in dietary supplements promoted for conditions including cancer, chronic fatigue syndrome, and immunodeficiency disorders. However, germanium compounds can produce severe renal damage and their use should be discouraged.

Germanium has also been used in dental alloys and has various industrial uses.

Effects on the kidneys. In the UK the DOH has recommended that germanium should not be taken as a dietary supplement because of a significant incidence of renal toxicity. There have been a number of reports of severe renal damage, including fatalities, resulting from germanium ingestion.

References.

1. Okada K, *et al.* Renal failure caused by long-term use of a germanium preparation as an elixir. *Clin Nephrol* 1989; **31:** 219–24.
2. van der Spoel JI, *et al.* Dangers of dietary germanium supplements. *Lancet* 1990; **336:** 117. Correction. *ibid.* 1991; **337:** 864.
3. Schauss AG. Nephrotoxicity in humans by the ultratrace element germanium. *Ren Fail* 1991; **13:** 1–4.
4. Hess B, *et al.* Tubulointerstitial nephropathy persisting 20 months after discontinuation of chronic intake of germanium lactate citrate. *Am J Kidney Dis* 1993; **21:** 548–52.
5. Tao SH, Bolger PM. Hazard assessment of germanium supplements. *Regul Toxicol Pharmacol* 1997; **25:** 211–19.
6. Swennen B, *et al.* Epidemiological survey of workers exposed to inorganic germanium compounds. *Occup Environ Med* 2000; **57:** 242–8.

Ginkgo Biloba

Árbol de los cuarenta escudos; EGB-761; Fossil Tree; GBE-761; Ginkgo, feuille de (ginkgo leaf); Ginkgo folium (ginkgo leaf); Ginkgoblad (ginkgo leaf); Ginkmedžių lapai (ginkgo leaf); Jinanový list (ginkgo leaf); Kew Tree; Maidenhair Tree; Neidonhiuspuunlehti (ginkgo leaf); Páfrányfenyőlevél (ginkgo leaf); *Salisburia adiantifolia.*

Гинкго Билоба

ATC — N06DX02.

ATC Vet — QN06DX02.

Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), and *US. Eur.* (see p.vii) also includes Ginkgo Dry Extract, Refined and Quantified. *US* includes a powdered extract.

Ph. Eur. 6.2 (Ginkgo Leaf). The whole or fragmented dried leaf of *Ginkgo biloba* containing not less than 0.5% of flavonoids, calculated as flavone glycosides with reference to the dried drug. The leaf is greyish or yellowish-green or yellowish-brown.

USP 31 (Ginkgo). The dried leaf of *Ginkgo biloba* (Ginkgoaceae) containing not less than 0.5% of flavonoids, calculated as flavonol glycosides, with a mean molecular mass of 756.7, and not less than 0.1% of terpene lactones, both on the dried basis. The leaf is khaki green to greenish-brown. Protect from light and moisture.

Adverse Effects

Adverse effects include headaches, dizziness, palpitations, gastrointestinal disturbances, bleeding disorders, and skin hypersensitivity reactions.

Poisoning. Reports[1,2] of convulsions induced by ingestion of large amounts of ginkgo seeds. Convulsions were thought to be due to the presence of 4-metoxypyridoxine, a competitive antagonist of pyridoxine; giving suitable quantities of a vitamin-B_6 source may be of benefit in preventing such convulsions.[2]

1. Miwa H, *et al.* Generalized convulsions after consuming a large amount of gingko nuts. *Epilepsia* 2001; **42:** 280–1.
2. Kajiyama Y, *et al.* Ginkgo seed poisoning. *Pediatrics* 2002; **109:** 325–7.

Interactions

It has been suggested that ginkgo biloba should be used with caution in patients receiving anticoagulants or drugs that affect platelet aggregation. For reference to a possible interaction with *warfarin*, see p.1431.

Uses and Administration

An extract from the leaves of *Ginkgo biloba* has been used in cerebrovascular and peripheral vascular disorders. It is also being investigated in Alzheimer's disease, multi-infarct dementia, and in tinnitus. *Ginkgo biloba* is a source of ginkgolides (below).

Homoeopathy. Ginkgo biloba has been used in homoeopathic medicines under the following names: Ginkgo.

Cerebrovascular disorders. A systematic review[1] of 10 randomised or quasi-randomised studies concluded that the routine use of ginkgo biloba extracts to promote recovery after ischaemic stroke was not supported by any convincing evidence, and that larger better quality studies were required.

1. Zeng X, *et al.* Ginkgo biloba for acute ischaemic stroke. Available in the Cochrane Database of Systematic Reviews; Issue 4. Chichester: John Wiley; 2005 (accessed 23/05/06).

Dementia. Ginkgo biloba extracts have been tried in the treatment of dementia including Alzheimer's disease (p.362). Meta-analyses[1-3] have found the extracts to be more effective than placebo in some cases but results are inconsistent and unconvincing[3] and the authors of all analyses commented that further investigation is needed to establish any clinical value. A subsequent study found no evidence of benefit.[4] Another study assessing whether ginkgo biloba can prevent cognitive decline in very elderly people with normal memory function found positive effects only after adjustment for noncompliance.[5] In this study[5] a greater number of cases of stroke or transient ischaemic attacks was noted in those given ginkgo biloba but further study is required to confirm any link to use of ginkgo.

1. Oken BS, *et al.* The efficacy of ginkgo biloba on cognitive function in Alzheimer disease. *Arch Neurol* 1998; **55:** 1409–15.
2. Ernst E, Pittler MH. Ginkgo biloba for dementia: a systematic review of double-blind, placebo-controlled trials. *Clin Drug Invest* 1999; **17:** 301–8.
3. Birks J, Grimley Evans J. Ginkgo biloba for cognitive impairment and dementia. Available in The Cochrane Database of Systematic Reviews; Issue 2. Chichester: John Wiley; 2007 (accessed 02/05/08).
4. McCarney R, *et al.* Ginkgo biloba for mild to moderate dementia in a community setting: a pragmatic, randomised, parallel-group, double-blind, placebo-controlled trial. *Int J Geriatr Psychiatry* 2008. Available at: doi: 10.1002/gps.2055
5. Dodge HH, *et al.* A randomized placebo-controlled trial of Ginkgo biloba for the prevention of cognitive decline. *Neurology* 2008; **70:** 1809–17.

Peripheral vascular disorders. Ginkgo biloba extracts have been tried in the treatment of peripheral vascular disorders (p.1178). A meta-analysis[1] found the extracts to be more effective than placebo in the symptomatic treatment of intermittent claudication, although the authors considered the size of the effect to be modest and of uncertain clinical relevance.

1. Pittler MH, Ernst E. Ginkgo biloba extract for the treatment of intermittent claudication: a meta-analysis of randomized trials. *Am J Med* 2000; **108:** 276–81.

Tinnitus. Ginkgo biloba extracts have been tried in the treatment of tinnitus (p.1866). A systematic review[1] of 5 randomised controlled studies cautiously concluded that these results were favourable, although a later systematic review[2] failed to show benefit.

1. Ernst E, Stevinson C. Ginkgo biloba for tinnitus: a review. *Clin Otolaryngol* 1999; **24:** 164–7.
2. Hilton M, Stuart E. Ginkgo biloba for tinnitus. Available in The Cochrane Database of Systematic Reviews; Issue 2. Chichester: John Wiley; 2004 (accessed 23/05/06).

Preparations

USP 31: Ginkgo Capsules; Ginkgo Tablets.

Proprietary Preparations (details are given in Part 3)
Arg.: Clarvix; Herbaccion Cerebral†; Kalter; Tanakan; ***Austral.:*** Proginkgo†; Tavonin†; ***Austria:*** Cerebokan; Ceremin; Gingohexal; Gingol; Tebofortan; Tebonin; ***Belg.:*** Memfit; Tanakan; Tavonin; ***Braz.:*** Binko†; Bioflavin; Clibium†; Dinaton; Equitam; Gibilon; Ginbiloba; Gincobem; Gincolin; Ginkoba; Ginkobil†; Ginkofarma†; Ginkogreen; Ginkolab; Ginkomed; Ginkoplus; Gyncobem; Kiadon†; Kirsan; Mensana†; Oxian; Tanakan; Tebonin; ***Chile:*** Kiadon; Memokit; Ment Vital†; Nokatar; Rokan; Tebokan†; ***Cz.:*** Gingio; Ginkgium†; Tanakan; Tebokan; ***Fr.:*** Ginkoginк; Tanakan; Tramisal; ***Ger.:*** Alz†; Duogink; Gincuran†; Gingiloba; Gingium; Gingobeta; Gingopret; Ginkobil; Ginkodilat; Ginkokan†; Ginkopur; Isoginkgo; Kaveri; Rokan; Tebonin; ***Gr.:*** Tanacain; Tebokan; ***Hong Kong:*** Ebamin; Ginkolin; Tanakan; ***Hung.:*** Bilobil; Gingium; Ginkgold; Tanakan; Tebofortan; Tebonin†; ***Indon.:*** Brenax; Gingkan; Ginkgoforce; Ginkona; Lanaginkola; ***Ital.:*** Ginkoba; Novel Ginkgo†; ***Malaysia:*** Appeton Memocap†; Giloba; Gincare; Ginkocer†; Tanakan; ***Mex.:*** Bilogink†; Kolob†; Nemoril; Tanakan†; Tebonin; Vasodil; ***Neth.:*** Tavonin; ***Philipp.:*** Ginkocer; Tebokan; ***Pol.:*** Bilobil; Geriacaps; Ginkgomax; Ginkofar; Herbabiloba; Memoplant; Tanakan; ***Port.:*** Abolibe; Biloban; Gincoben; Ginkoftal†; Vasactife; ***Rus.:*** Bilobil (Билобил); Ginos (Гинос); Memoplant (Мемоплант); Tanakan (Танакан); ***Singapore:*** Gincare; Ginexin-F†; Ginkapran; Ginkosen; Gitako; Neuroxin; Tanakan; Tebonin; ***Spain:*** Fitokey Ginkgo; Normocir†; Tanakene; ***Switz.:*** Demonatur Ginkgo; Geriaforce; Gingosol; Oxivel†; Symfona; Tanakene; Tebofortin†; Tebokan; Valverde Vitalite dragees†; ***Thai.:*** Tanakan; ***Turk.:*** Gingobil; Tanakan; ***UK:*** Ginkovital; ***USA:*** BioGinkgo; ***Venez.:*** Kiadon; Neukob; Tanakan; Tebokan; Varginko.

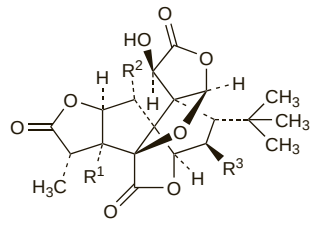
Multi-ingredient: ***Arg.:*** Centellase de Centella Queen; Flebitol; Garcinol Max†; GB 100; Ginkgo Biloba Forte; Ginkgo Biloba Memo Diates; Ginkgo Forte; Herbaccion Celfin; Herbaccion Memory; Neuroton; SCV 300; Snell Patch; Snell Progress; Top Life Memory†; Venoful; VNS 45; ***Austral.:*** Bilberry Plus Eye Health; Bioglan Vision-Eze; Bioglan Zellulean with Escin; Clements Tonic; Extralife Extra-Brite; Extralife Eye-Care; Extralife Leg-Care; Eye Health Herbal Plus Formula 4; For Peripheral Circulation Herbal Plus Formula 5; Gingo A†; Ginkgo Biloba Plus†; Ginkgo Complex†; Ginkgo Plus Herbal Plus Formula 10†; Herbal Arthritis Formula†; Herbal Capillary Care†; Lifechange Circulation Aid†; Lifechange Multi Plus Antioxidant†; Lifesystem Herbal Formula 6 For Peripheral Circulation†; Lifesystem Herbal Plus Formula 11 Ginkgo†; Lifesystem Herbal Plus Formula 5 Eye Relief†; Prophthal†; Vig; ***Braz.:*** Composto Anticelulitico†; Derm'attive Solaire†; Traumed†; ***Canad.:*** Ginkoba†; ***Chile:*** Celltech Gold; Gincosan; Gingo-Ther†; Mentania; Sebium AKN; ***Cz.:*** Gincosan; Ginkor Fort; ***Fr.:*** Ginkor; Ginkor Fort; Photoderm Flush†; Sebium AKN; ***Ger.:*** Perivar†; Veno-Tebonin N†; ***Hong Kong:*** Flavo-C; Ginkgo Plus Vivo-Livo†; Ginkgo-PS†; Ginkor Fort; ***Hung.:*** Ginkor Fort; ***Indon.:*** Cereton; Ginokan; Hemaviton Brain Nutrient; Proseval; ***Ital.:*** Angioton; Angiovein; Forticrin; Ginkoba Active; Ginkoftal; Ginkoret; Memoactive†; Memorandum; Neuralta Migren; Pik Gel; Pollingel con Ginkgo Biloba†; Pulsalux; Varicofit; Vasobrain; Vasobrain Plus; Vasopt; Venalta; Vertiginkgo; ***Malaysia:*** Cerestar†; Circarol; Ginkor Fort; Total Man†; ***Mex.:*** Maxibiloba; ***Philipp.:*** Circulan; Nutrotal; ***Pol.:*** Bioginko; Cardiobonisol; Ginkgocard; Intelektan; Passibil; Venoforton; ***Rus.:*** Ginkor Fort (Гинкор Форт); Ginkor Gel (Гинкор Гель); ***Singapore:*** Ginkgo-PS; Memoloba†; ***Switz.:*** Allium Plus; Arterosan Plus; Capsules-vital; Gincosan; Triallin; ***Thai.:*** Ginkor Fort; ***UK:*** ProBrain; ***USA:*** Aphrofem; Cavigen; Dorofen; Gentaplex; ***Venez.:*** Sebium AKN; Sengobil.

Ginkgolides

Ginkgólidos.

Гинкголиды

CAS — 15291-75-5 (ginkgolide A); 15291-77-7 (ginkgolide B); 15291-76-6 (ginkgolide C).



		R^1	R^2	R^3
ginkgolide	A	OH	H	H
ginkgolide	B	OH	OH	H
ginkgolide	C	OH	OH	OH

(ginkgolide A)

Description. Ginkgolides A, B, and C (BN-52020, BN-52021, and BN-52022 respectively) are isolated from *Ginkgo biloba* (Ginkgoaceae) (see above).

Profile

Ginkgolides are terpenoid molecules isolated from *Ginkgo biloba* (above), with platelet-activating factor (PAF) antagonist properties. They have been investigated as BN-52063, a mixture of ginkgolides A (BN-52020), B (BN-52021), and C (BN-52022), for asthma and other inflammatory and allergic disorders, and also in immune disorders such as endotoxic shock and graft rejection; ginkgolide B, which has the most potent PAF antagonist properties, has been tried alone in similar conditions.

Other ginkgolides, including ginkgolide M (BN-52023) and ginkgolide J (BN-52024), have also been identified.

◊ References.

1. Braquet P. The ginkgolides: potent platelet-activating factor antagonists isolated from Ginkgo biloba L: chemistry, pharmacology and clinical applications. *Drugs Of The Future* 1987; **12:** 643–99.
2. Chung KF, *et al.* Effect of a ginkgolide mixture (BN 52063) in antagonising skin and platelet responses to platelet activating factor in man. *Lancet* 1987; **i:** 248–51.