Galsulfase *(BAN, USAN, rINN)*

BM-102; Galsulfasa; Galsulfasum; recombinant human arylsulfatase B; rhASB. *N*-Acetylgalactosamine 4-sulfatase.

Гальсульфас

CAS — 552858-79-4.

ATC — A16AB08.

ATC Vet — QA16AB08.

Profile

Galsulfase is recombinant human *N*-acetylgalactosamine 4-sulfatase used as enzyme replacement therapy in the treatment of mucopolysaccharidosis VI (see below). Galsulfase is given by intravenous infusion in a dose of 1 mg/kg once a week. Infusion reactions are common and patients should be pre-treated with antihistamines with or without antipyretics. Galsulfase should be reconstituted to a final volume of 250 mL in sodium chloride 0.9% and given using an infusion pump. The initial infusion rate should be 6 mL/hour for the first hour, which may then be increased to 80 mL/hour if well tolerated. The total infusion time should be at least 4 hours to minimise the risk of infusion reactions, but may be extended to up to 20 hours, or interrupted, if necessary, in the event of infusion reactions. Patients weighing 20 kg and under may be susceptible to fluid overload and a smaller infusion volume of 100 mL should be considered, in which case, the infusion rate should be decreased accordingly so that the total infusion time is not less than 4 hours.

Adverse effects. References.

1. Kim KH, *et al.* Successful management of difficult infusion-associated reactions in a young patient with mucopolysaccharidosis type VI receiving recombinant human arylsulfatase B (galsulfase [Naglazyme]). Abstract: *Pediatrics* 2008; **121:** 609. Full version: http://pediatrics.aappublications.org/cgi/content/full/121/3/e714 (accessed 01/05/08)

Mucopolysaccharidosis VI. Mucopolysaccharidosis VI (Maroteaux-Lamy syndrome) is a rare progressive disorder characterised by inherited deficiency of the enzyme *N*-acetylgalactosamine 4-sulfatase, which is necessary to catalyse the hydrolysis of the sulfate moiety of the glycosaminoglycan, dermatan sulfate. This results in accumulation of dermatan sulfate in the lysosomes producing widespread irreversible cellular and tissue damage, and organ dysfunction. There is a rapidly advancing form of the disease that presents in the first year of life characterised by short stature, skeletal and joint deformities, dysmorphic facial features, upper airway obstruction requiring tracheostomy, and recurrent ear infections. There is also a more slowly advancing form that progresses over many decades. Both forms result in significant morbidity and functional problems with a reduced lifespan.[1]

Treatment is supportive and symptomatic involving many body systems; physical and occupational therapy is also necessary.[1] Haematopoietic stem-cell transplantation to supply the deficient enzyme is of benefit to some patients, although it is associated with significant morbidity and mortality.[1] Enzyme replacement therapy with galsulfase has been reported to confer benefit with an acceptable safety profile.[1,2]

1. Giugliani R, *et al.* Management guidelines for mucopolysaccharidosis VI. *Pediatrics* 2007; **120:** 405–18.
2. Harmatz P, *et al.* Enzyme replacement therapy for mucopolysaccharidosis VI: a phase 3, randomized, double-blind, placebo-controlled, multinational study of recombinant human *N*-acetylgalactosamine 4-sulfatase (recombinant human arylsulfatase B or rhASB) and follow-on, open-label extension study. *J Pediatr* 2006; **148:** 533–9.

Preparations

Proprietary Preparations (details are given in Part 3)
Cz.: Naglazyme; ***Fr.:*** Naglazyme; ***Port.:*** Naglazyme; ***USA:*** Naglazyme.

Gamma-aminobutyric Acid

Ácido gamma-aminobutírico; Acidum Aminobutyricum Gamma; γ-Aminobutírico, ácido; Aminobutyric Acid; GABA; Gamma-aminosmörsyra; Gamma-aminovoihappo; Piperidic Acid. 4-Aminobutyric acid.

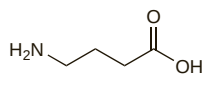
Гамма-аминобутировая Кислота

$C_4H_9NO_2$ = 103.1.

CAS — 56-12-2.

ATC — N03AG03.

ATC Vet — QN03AG03.



Profile

Gamma-aminobutyric acid is a principal inhibitory neurotransmitter in the CNS. It has been claimed to be of value in cerebral disorders and to have an antihypertensive effect.

Preparations

Proprietary Preparations (details are given in Part 3)
Braz.: Gammar; ***Hong Kong:*** Gammalon; ***Port.:*** Mielomade†; ***Thai.:*** Bainto; Gammalon.

Multi-ingredient: ***Arg.:*** Butineuron; Cadencial Plus; ***Braz.:*** Complevit; Gaba†; Gabax; Id Sedin†; ***Chile:*** Actebral; Gamalate B6; ***Spain:*** Cefabol; Gamalate B6.

Gamolenic Acid *(BAN, rINN)*

Acide Gamolénique; Ácido gamolénico; Acidum Gamolenicum; GLA; γ-Linolenic Acid. (*Z,Z,Z*)-Octadeca-6,9,12-trienoic acid.

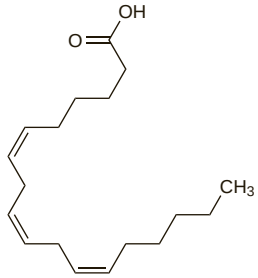
Гамоленовая Кислота

$C_{18}H_{30}O_2$ = 278.4.

CAS — 506-26-3.

ATC — D11AX02.

ATC Vet — QD11AX02.



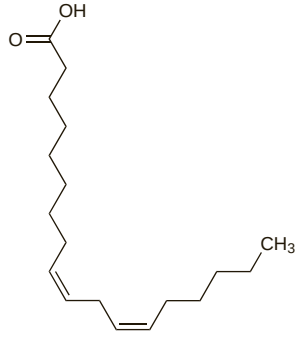
Linoleic Acid

Kwas linolowy; Linoleico, ácido; Linolic Acid; Linolsäure. (*Z,Z*)-Octadeca-9,12-dienoic acid.

Линолевая Кислота

$C_{18}H_{32}O_2$ = 280.4.

CAS — 60-33-3.



Adverse Effects and Precautions

Gamolenic and linoleic acids from evening primrose oil, and presumably other sources, can produce minor gastrointestinal disturbances and headache. They can precipitate symptoms of undiagnosed temporal lobe epilepsy, and should be used with caution in patients with a history of epilepsy or those taking epileptogenic drugs, in particular phenothiazines. Hypersensitivity reactions may also occur.

Uses and Administration

Gamolenic and linoleic acid are essential fatty acids of the omega-6 series that act as prostaglandin precursors. Endogenous gamolenic acid is derived from linoleic acid, which is present in many vegetable oils and is an essential constituent of the diet. The most widely-used source of these acids is evening primrose oil (see p.2302). Gamolenic and linoleic acids have been used in skin disorders and mastalgia, and have been investigated in other disorders including multiple sclerosis, rheumatoid arthritis, and the premenstrual syndrome.

Preparations containing essential fatty acids (formerly known collectively as vitamin F), including arachidonic acid, linoleic acid, linolenic acid (α-linolenic acid, p.1362), oleic acid, and their derivatives, have been used similarly. Conjugated linoleic acid (CLA), a mixture of isomers in which *cis*-9,*trans*-11-octadecadienoic acid and *trans*-10,*cis*-12-octadecadienoic acid predominate, has also been used.

Products containing gamolenic-acid rich plant oils are promoted in many countries as dietary supplements, often in combination with fish oils or other sources of omega-3 fatty acids (see p.1362).

A derivative of gamolenic acid, lithium gamolenate, has been investigated in pancreatic cancer.

Eczema. Atopic eczema (p.1579) may be due to a defect in essential fatty acid metabolism[1,2] and some beneficial symptomatic effects have been reported with evening primrose oil.[1,3] Meta-analysis of 9 studies involving 311 patients[4] has reported improvement in disease symptoms, especially itching, but a subsequent study in 123 patients found no therapeutic effect of evening primrose oil, alone or with fish oil.[5] Although the design and interpretation of this study has been criticised by the manufacturers of evening primrose oil,[6] the authors consider such criticism invalid,[7] and point out that an earlier large study yielded similar results.[8] No difference was found between placebo and evening primrose oil in a further study[9] in children with eczema, and there was also no effect on asthma symptoms in those patients suffering from both disorders. Studies[10,11] of borage oil (another source of gamolenic acid) also found no overall efficacy in adults or children with atopic eczema, although one study noted a suggestion of benefit in a subgroup of patients.[10] In a study[12] of a group of formula-fed infants with a high maternal familial risk of developing atopic eczema, borage oil supplementation did not prevent the expression of atopy, although it showed a tendency to alleviate the severity of the condition later in infancy.

Benefit has been reported in infants with seborrhoeic dermatitis from local application of borage oil.[13]

1. Wright S. Essential fatty acids and the skin. *Br J Dermatol* 1991; **125:** 503–15.
2. Horrobin DF. Essential fatty acid metabolism and its modification in atopic eczema. *Am J Clin Nutr* 2000; **71** (suppl): 367S–372S.
3. Rustin MHA. Dermatology. *Postgrad Med J* 1990; **66:** 894–905.
4. Morse PF, *et al.* Meta-analysis of placebo-controlled studies of the efficacy of Epogam in the treatment of atopic eczema: relationship between plasma essential fatty acid changes and clinical response. *Br J Dermatol* 1989; **121:** 75–90.
5. Berth-Jones J, Graham-Brown RAC. Placebo-controlled trial of essential fatty acid supplementation in atopic dermatitis. *Lancet* 1993; **341:** 1557–60. Correction. *ibid.*; **342:** 564.
6. Shield MJ, *et al.* Essential fatty acid supplementation in atopic dermatitis. *Lancet* 1993; **342:** 377.
7. Berth-Jones J, *et al.* Essential fatty acid supplementation in atopic dermatitis. *Lancet* 1993; **342:** 377–8. Correction. *ibid.*; 752.
8. Bamford JTM, *et al.* Atopic eczema unresponsive to evening primrose oil (linoleic and gamma-linolenic acids). *J Am Acad Dermatol* 1985; **13:** 959–65.
9. Hederos C-A, Berg A. Epogam evening primrose oil treatment in atopic dermatitis and asthma. *Arch Dis Child* 1996; **75:** 494–7.
10. Henz BM, *et al.* Double-blind, multicentre analysis of the efficacy of borage oil in patients with atopic eczema. *Br J Dermatol* 1999; **140:** 685–8.
11. Takwale A, *et al.* Efficacy and tolerability of borage oil in adults and children with atopic eczema: randomised, double blind, placebo controlled, parallel group trial. *BMJ* 2003; **327:**1385–7.
12. van Gool CJ, *et al.* γ-Linolenic acid supplementation for prophylaxis of atopic dermatitis—a randomized controlled trial in infants at high familial risk. *Am J Clin Nutr* 2003; **77:** 943–51.
13. Tollesson A, Frithz A. Borage oil, an effective new treatment for infantile seborrhoeic dermatitis. *Br J Dermatol* 1993; **129:** 95.

Mastalgia. Gamolenic acid (usually given in the form of evening primrose oil) has fewer adverse effects than drugs such as danazol or bromocriptine and has been preferred for mastalgia (p.2092), especially in patients with less severe symptoms or those who require prolonged or repeated treatment. However, there is no clear evidence of efficacy.

Multiple sclerosis. There is some evidence that modifying the intake of dietary fats and supplementing the diet with omega-6 polyunsaturated fatty acids, such as linoleic acid, could influence the clinical course of multiple sclerosis (p.892) and many patients practise dietary modification, including taking evening primrose oil. One study[1] has shown a reduction in severity and duration of relapse in patients taking linoleic acid supplements (as sunflower oil), and another[2] has reported benefit in patients who limited their intake of dietary saturated fatty acids and supplemented their diet with polyunsaturated fatty acids. A systematic review[3] of the relationship between dietary interventions (including linoleic acid supplements) and MS concluded that there was insufficient evidence to determine their benefits or risks.

1. Millar JHD, *et al.* Double-blind trial of linoleate supplementation of the diet in multiple sclerosis. *BMJ* 1973; **1:** 765–8.
2. Swank RL, Dugan BB. Effect of low saturated fat diet in early and late cases of multiple sclerosis. *Lancet* 1990; **336:** 37–9.
3. Farinotti M, *et al.* Dietary interventions for multiple sclerosis. Available in The Cochrane Database of Systematic Reviews; Issue 1. Chichester: John Wiley; 2007 (accessed 22/04/08).

Premenstrual syndrome. Progressive improvement in premenstrual syndrome (p.2099) was reported over 5 cycles in an open pilot study in 19 patients receiving evening primrose oil.[1] However, subsequent results have not shown any benefit.[2-4] Evening primrose oil has been considered for cyclical mastalgia (see above).

1. Larsson B, *et al.* Evening primrose oil in the treatment of premenstrual syndrome: a pilot study. *Curr Ther Res* 1989; **46:** 58–63.
2. Khoo SK, *et al.* Evening primrose oil and treatment of premenstrual syndrome. *Med J Aust* 1990; **153:** 189–92.
3. Collins A, *et al.* Essential fatty acids in the treatment of premenstrual syndrome. *Obstet Gynecol* 1993; **81:** 93–8.
4. Budeiri DJ, *et al.* Is evening primrose oil of value in the treatment of premenstrual syndrome? *Control Clin Trials* 1996; **17:** 60–8.

Rheumatoid arthritis. Patients with rheumatoid arthritis (p.11) taking NSAIDs have shown subjective improvement after 12 months of treatment with evening primrose oil, with or without fish oil, when compared with placebo.[1] A clinically important reduction in signs and symptoms of disease activity has also been seen in patients treated with gamolenic acid in the form of borage oil.[2] During treatment with evening primrose oil patients with rheumatoid arthritis have increased plasma concentrations of gamolenic, dihomo-gamma-linolenic, and arachidonic acids, and decreased plasma concentrations of oleic and eicosapentaenoic acids and apolipoprotein B.[3] The increase in plasma-arachidonic acid and decrease in eicosapentaenoic acid might be unfavourable in such patients, since arachidonic acid is the precursor of inflammatory prostaglandins and eicosapentaenoic acid may have an anti-inflammatory role. However, a systematic review[4] of these and other studies concluded that there does appear to be some potential benefit for the use of gamolenic acid in rheumatoid arthritis, although optimum dosage and duration of treatment remains to be established.

1. Belch JJF, *et al.* Effects of altering dietary essential fatty acids on requirements for non-steroidal anti-inflammatory drugs in patients with rheumatoid arthritis: a double blind placebo controlled study. *Ann Rheum Dis* 1988; **47:** 96–104.
2. Leventhal LJ, *et al.* Treatment of rheumatoid arthritis with gammalinolenic acid. *Ann Intern Med* 1993; **119:** 867–73.
3. Jäntti J, *et al.* Evening primrose oil in rheumatoid arthritis: changes in serum lipids and fatty acids. *Ann Rheum Dis* 1989; **48:** 124–7.
4. Little CV, Parsons T. Herbal therapy for treating rheumatoid arthritis. Available in The Cochrane Database of Systematic Reviews; Issue 4. Chichester: John Wiley; 2000 (accessed 23/05/06).

Preparations

Proprietary Preparations (details are given in Part 3)
Austria: Vitamin F; ***Ger.:*** Cefafloria†; Linola-Fett 2000†; Sanyrene; ***Ital.:*** Ictage 6†; Normogam†; Triene; Vitef; ***Pol.:*** Dermovit F; Linola; Linomag; ***UK:*** Super GLA.

Multi-ingredient: ***Arg.:*** Exomega; KW; Quelodin F; ***Austria:*** Cehasol; Mamellin; Sulgan 99; ***Braz.:*** Glavit; Oleo de Primula; Primoris; ***Canad.:*** Bionagre plus E; ***Chile:*** Ureadin Pediatrics; ***Cz.:*** Linola; Linola-Fett; ***Fr.:*** Exomega; ***Ger.:*** Hydro Cordes; Linola; Linola-Fett; Lipo Cordes; Unguentacid; ***Hong Kong:*** Aderma Exomega†; Eye Q; Welsan Lipocream; ***Hung.:*** Linola; Linola-Fett N†; ***Ital.:*** Derman-Oil; Dermana Crema; Dermana Pasta; Efagel; Granoleina†; Neuralfa; Osteolip; Pasta Dicofarm; Secril; Tiofort; Topialyse; Trofinerv Antiox; ***Mex.:*** Nutrem; ***NZ:*** Efamast; ***Port.:*** Geriso; Zolium†; ***S.Afr.:*** Efamol G†; ***Spain:*** Amplidermis; Doctofril Antiinflamat; Mahiou†; Nutracel; Vitamina F99 Topica; Wobenzimal†; ***Switz.:*** Kerodermt†; Linola; Linola gras; Linola mi-gras; Linoladiol†; Sulgan N; Vitafissan N; Vitamine F99†.

Gangliosides

Gangliósidos.

Гангиозиды

Profile

Gangliosides are endogenous substances present in mammalian cell membranes, especially in the cortex of the brain. They are glycosphingolipids composed of a hydrophilic oligosaccharide chain, characterised by sialic acid residues, attached to a lipophilic moiety. The four major gangliosides found in the mammalian brain are referred to as G_{M1}, G_{D1a}, G_{D1b}, and G_{T1b}.

Experimental studies have reported that gangliosides may have a neuroprotective effect on the CNS and peripheral nervous system. Preparations of gangliosides from bovine brain have been given for peripheral neuropathies and cerebrovascular disorders and their role in spinal cord injury has also been investigated. The modified ganglioside siagoside has been studied in patients with Parkinson's disease.

Concern was expressed about the development of Guillain-Barré syndrome and other motor neurone disorders in some patients, and it was suggested that gangliosides were contra-indicated in Guillain-Barré syndrome and all auto-immune disorders. Subsequently these concerns over safety and doubts about efficacy led to the withdrawal of ganglioside preparations in many countries.

◊ References.

1. Geisler FH, *et al.* Recovery of motor function after spinal-cord injury—a randomized, placebo-controlled trial with GM-1 ganglioside. *N Engl J Med* 1991; **324:** 1829–38.
2. Raschetti R, *et al.* Guillain-Barré syndrome and ganglioside therapy in Italy. *Lancet* 1992; **340:** 60.
3. Figueras A, *et al.* Bovine gangliosides and acute motor polyneuropathy. *BMJ* 1992; **305:** 1330–1.
4. Roberts JW, *et al.* Iatrogenic hyperlipidaemia with GM-1 ganglioside. *Lancet* 1993; **342:** 115.
5. Landi G, *et al.* Guillain-Barré syndrome after exogenous gangliosides in Italy. *BMJ* 1993; **307:** 1463–4.
6. Nobile-Orazio E, *et al.* Gangliosides: their role in clinical neurology. *Drugs* 1994; **47:** 576–85.
7. Candelise L, Ciccone A. Gangliosides for acute ischaemic stroke. Available in The Cochrane Database of Systematic Reviews; Issue 4. Chichester: John Wiley; 2001 (accessed 23/05/06).
8. Fredman P, *et al.* Gangliosides as therapeutic targets for cancer. *BioDrugs* 2003; **17:** 155–67.
9. Govoni V, *et al.* Is there a decrease in Guillain-Barré syndrome incidence after bovine ganglioside withdrawal in Italy? A population-based study in the Local Health District of Ferrara, Italy. *J Neurol Sci* 2003; **216:** 99–103.
10. Chinnock P, Roberts I. Gangliosides for acute spinal cord injury. Available in The Cochrane Database of Systematic Reviews; Issue 2. Chichester: John Wiley; 2005 (accessed 23/05/06).

Preparations

Proprietary Preparations (details are given in Part 3)
Braz.: Sinaxial; Sygen.

Garcinia Cambogia

Brindleberry; Malabar Tamarind.

CAS — 90045-23-1 (Garcinia cambogia extract).

Profile

Extracts of Garcinia cambogia (*Garcinia gummi-gutta*, Clusiaceae) are a source of hydroxycitric acid and are included in preparations for the treatment of obesity.

Several species of *Garcinia* are used in traditional medicine, as a food source, and as a source of the pigment gamboge.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Citrimax†; ***Mex.:*** Terocaps.

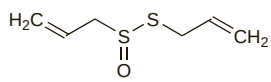
Multi-ingredient: ***Arg.:*** Garcinia Cambogia Compuesta; Garcinol Max; Mermelax; Metabolic; Reductase; Redudiet; Silueta Plus; Top Life Diet†; ***Austral.:*** Bioglan 3B Beer Belly Buster; Citri Slim+Trim; Pro-Shape†; ***Canad.:*** Biotrim†; ***Indon.:*** Betaslim; Combes; Vitaslim; ***Ital.:*** Altadrine; Snell Cell; ***Mex.:*** Slim-D; ***Port.:*** Fit Form 3†; ***Singapore:*** Chitosano; Colenon.

Garlic

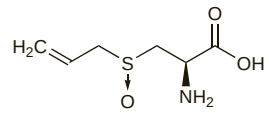
Aglio; Ail; Ail, poudre d' (garlic powder); Ajo; Allii sativi bulbi pulvis (garlic powder); Allium; Allium Sativum; Česnakų milteliai (garlic powder); Cibule česneku setého práškovaná (garlic powder); Fokhagymapor (garlic powder); Knoblauch; Valkosipuli; Vitlök.

Чеснок

CAS — 8008-99-9 (garlic extract).



allicin



alliin

Pharmacopoeias. In *US*, which also includes Garlic Fluidextract, Powdered Garlic, and Powdered Garlic Extract. *Eur.* (see p.vii) includes Garlic Powder.

Eur. also includes Garlic for Homoeopathic Preparations.

Ph. Eur. 6.2 (Garlic Powder). It is produced from garlic that has been cut, freeze-dried or dried at a temperature not exceeding 65°, and powdered. It contains not less than 0.45% of allicin, calculated with reference to the dried drug. It is a light yellowish powder. Protect from light.

Ph. Eur. 6.2 (Garlic for Homoeopathic Preparations). The fresh bulb of *Allium sativum*. Store in airtight containers. Protect from light.

USP 31 (Garlic). The fresh or dried compound bulbs of *Allium sativum* (Liliaceae). It contains not less than 0.5% of alliin and not less than 0.2% of γ-glutamyl-(*S*)-allyl-L-cysteine, calculated on the dried basis. Store in a dry place at a temperature of 8° to 15°. Protect from light.

USP 31 (Powdered Garlic). It is produced from garlic that has been cut, freeze-dried or dried at a temperature not exceeding 65°, and powdered. It contains not less than 0.3% of alliin and not less than 0.1% of γ-glutamyl-(*S*)-allyl-L-cysteine, calculated on the dried basis. Store in a dry place at a temperature of 8° to 15°. Protect from light.

Adverse Effects

◊ Reports of burns or skin lesions after topical application of garlic to children,[1,2] and to adults,[3,4] including self-inflicted injury.[5]

1. Garty B-Z. Garlic burns. *Pediatrics* 1993; **91:** 658–9.
2. Canduela V, *et al.* Garlic: always good for the health? *Br J Dermatol* 1995; **132:** 161–2.
3. Farrell AM, Staughton RCD. Garlic burns mimicking herpes zoster. *Lancet* 1996; **347:** 1195.
4. Eming SA, *et al.* Severe toxic contact dermatitis caused by garlic. *Br J Dermatol* 1999; **141:** 391–2.
5. Lachter J, *et al.* Garlic: a way out of work. *Mil Med* 2003; **168:** 499–500.

Uses and Administration

The constituents of garlic include alliin, allicin, diallyl disulfide, and ajoene. It has traditionally been reported to have expectorant, diaphoretic, disinfectant, and diuretic properties. More recently, it has been investigated for antimicrobial, antihypertensive, lipid-lowering, fibrinolytic, antiplatelet, and cancer protective effects. Garlic oil has also been used.

Homoeopathy. Garlic has been used in homoeopathic medicines under the following names: Allium sativum; All. sat.

◊ References.

1. Kleijnen J, *et al.* Garlic, onions and cardiovascular risk factors: a review of the evidence from human experiments with emphasis on commercially available preparations. *Br J Clin Pharmacol* 1989; **28:** 535–44.
2. Mansell P, Reckless JPD. Garlic. *BMJ* 1991; **303:** 379–80.
3. McElnay JC, Po ALW. Garlic. *Pharm J* 1991; **246:** 324–6.
4. Kiesewetter H, *et al.* Effect of garlic on platelet aggregation in patients with increased risk of juvenile ischaemic attack. *Eur J Clin Pharmacol* 1993; **45:** 333–6.
5. Deshpande RG, *et al.* Inhibition of Mycobacterium avium complex isolates from AIDS patients by garlic (Allium sativum). *J Antimicrob Chemother* 1993; **32:** 623–6.
6. Dorant E, *et al.* Garlic and its significance for the prevention of cancer in humans: a critical review. *Br J Cancer* 1993; **67:** 424–9.
7. Ackermann RT, *et al.* Garlic shows promise for improving some cardiovascular risk factors. *Arch Intern Med* 2001; **161:** 813–24.
8. Tattelman E. Health effects of garlic. *Am Fam Physician* 2005; **72:** 103–6.
9. Rahman K, Lowe GM. Garlic and cardiovascular disease: a critical review. *J Nutr* 2006; **136** (suppl): 736S–740S.

Hyperlipidaemia. Garlic has been widely promoted for use in the treatment of hyperlipidaemia (p.1169). Several early placebo-controlled trials[1,2] and meta-analyses[3,4] showed that garlic significantly decreased total serum-cholesterol concentrations. However, more recent data suggest that the effect is at best modest[5] or that there is no significant difference[6-9] when compared with placebo.

1. Jain AK, *et al.* Can garlic reduce levels of serum lipids? A controlled clinical study. *Am J Med* 1993; **94:** 632–5.
2. Kenzelmann R, Kade F. Limitation of the deterioration of lipid parameters by a standardized garlic-ginkgo combination product: a multicenter placebo-controlled double-blind study. *Arzneimittelforschung* 1993; **43:** 978–81.
3. Warshafsky S, *et al.* Effect of garlic on total serum cholesterol: a meta-analysis. *Ann Intern Med* 1993; **119:** 599–605.
4. Silagy C, Neil A. Garlic as a lipid lowering agent—a meta-analysis. *J R Coll Physicians Lond* 1994; **28:** 39–45.
5. Stevinson C, *et al.* Garlic for treating hypercholesterolemia: a meta-analysis of randomized clinical trials. *Ann Intern Med* 2000; **133:** 420–9.
6. Neil HAW, *et al.* Garlic powder in the treatment of moderate hyperlipidaemia: a controlled trial and a meta-analysis. *J R Coll Physicians Lond* 1996; **30:** 329–34.
7. Berthold HK, *et al.* Effect of a garlic oil preparation on serum lipoproteins and cholesterol metabolism: a randomized controlled trial. *JAMA* 1998; **279:** 1900–2.
8. Isaacsohn JL, *et al.* Garlic powder and plasma lipids and lipoproteins: a multicenter, randomized, placebo-controlled trial. *Arch Intern Med* 1998; **158:** 1189–94.
9. Gardner CD, *et al.* Effect of raw garlic vs commercial garlic supplements on plasma lipid concentrations in adults with moderate hypercholesterolemia: a randomized clinical trial. *Arch Intern Med* 2007; **167:** 346–53.

Preparations

USP 31: Garlic Delayed-Release Tablets.

Proprietary Preparations (details are given in Part 3)
Arg.: Ajomast; Alliocaps; Kyolic Super Formula†; ***Austral.:*** Garlix; Macro Garlic†; ***Austria:*** Kwai; ***Canad.:*** Kwai†; Kyolic†; ***Cz.:*** Kwai†; ***Ger.:*** Alliosan†; beni-cur†; Carisano†; Ilja Rogoff Forte†; Kwai; Ravalgen†; Sapec; Strongus†; Vitagutt Knoblauch†; ***Ital.:*** Kwai; ***Malaysia:*** Kyolic; ***Pol.:*** Aliovital; Alitol; Geriacaps; ***Port.:*** Alho Rogoff†; ***Switz.:*** A Vogel Capsules a l'ail†; Kwai†; ***UK:*** Garlimega; Kwai; Kyolic; ***Venez.:*** Kwai†.

Multi-ingredient: ***Arg.:*** Aglio; Ajo 1000 + C; Ajo Forte; Ajolip; Ajomast Circulatorio†; Exail; Varisedan; ***Austral.:*** Garlic Allium Complex; Garlic and Horseradish + C Complex; Garlic, Horseradish, A & C Capsules†; Gartech; Herbal Cold & Flu Relief†; Lifesystem Herbal Formula 7 Liver Tonic†; Liver Tonic Herbal Formula 6†; Odourless Garlic; Procold†; Proesten†; Protol†; Proyeast†; Silybum Complex†; ***Austria:*** Rutiviscal; ***Canad.:*** Kyolic 101; Kyolic 102; Kyolic 103†; Kyolic 104†; Kyolic 106†; ***Fr.:*** Arterase; ***Ger.:*** Asgoviscum N†; Ilja Rogoff; Lipidavit; Presselin Arterien K 5 P†; ***Hong Kong:*** Ginkgo Plus Vivo-Livo†; ***Indon.:*** Garlic-Plus; Resvica; Sotens; ***Ital.:*** Angiovein; ***Malaysia:*** Circarol; Echinacea Plus†; Horseradish Plus†; Total Man†; ***Mex.:*** Supravital; ***Philipp.:*** Circulan; Nutrotal; ***Pol.:*** Alliofil; Alliogal†; Alliorut; Cepasmel; Cepastil; Doppelherz Vital Kapseln; ***Switz.:*** Allium Plus; Arterosan Plus; Keli-med; Triallin; ***UK:*** Antifect; Clogar; Fishogar; Hay Fever & Sinus Relief; Hayfever & Sinus Relief; Liqufruta Garlic Cough Medicine.

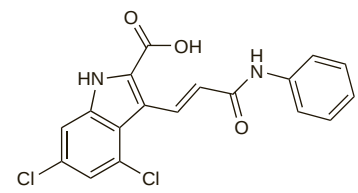
Gavestinel *(BAN, USAN, rINN)*

Gavestinelum; GV-150526X. 4,6-Dichloro-3-[(*E*)-2-(phenylcarbamoyl)vinyl]indole-2-carboxylic acid.

Гавестинел

$C_{18}H_{12}Cl_2N_2O_3$ = 375.2.

CAS — 153436-22-7.



Profile

Gavestinel is a glycine antagonist that has been investigated as a neuroprotectant in stroke.