treatment of hyperlipidaemias (p.1169). The usual oral dose is 600 to 1200 mg daily in divided doses.

Pantethine is also used as a nutritional supplement.

Preparations

Proprietary Preparations (details are given in Part 3)
Hong Kong: Pantomin†; ***Ital.:*** Pantetina; ***Jpn:*** Pantosin; ***Spain:*** Liponet†; Obliterol†.

Multi-ingredient: ***Ital.:*** Carpantin†.

Pargyline Hydrochloride *(BANM, USAN, rINNM)*

A-19120; Hidrocloruro de pargilina; MO-911; NSC-43798; Pargyline, Chlorhydrate de; Pargylini Hydrochloridum. *N*-Methyl-*N*-2-propynylbenzylamine hydrochloride; Benzylmethylprop-2-ynylamine hydrochloride.

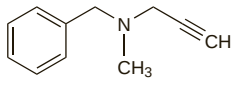
Паргилина Гидрохлорид

$C_{11}H_{13}N,HCl$ = 195.7.

CAS — 555-57-7 (pargyline); 306-07-0 (pargyline hydrochloride).

ATC — C02KC01.

ATC Vet — QC02KC01.



(pargyline)

Profile

Pargyline hydrochloride is an MAOI (see Phenelzine Sulfate, p.415) that was formerly used in the treatment of moderate to severe hypertension.

Parnaparin Sodium *(BAN, rINN)*

OP-21-23; Parnapariininatrium; Parnaparin sodná sůl; Parnaparin Sodyum; Parnaparina sódica; Parnaparine sodique; Parnaparinnatrium; Parnaparin-nátrium; Parnaparino natrio druska; Parnaparinum natricum.

Парнапарин Натрий

CAS — 9041-08-1.

ATC — B01AB07.

ATC Vet — QB01AB07.

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

Ph. Eur. 6.2 (Parnaparin Sodium). It is prepared by hydrogen peroxide and cupric salt depolymerisation of heparin obtained from the intestinal mucosa of pigs and cattle. The majority of the components have a 2-*O*-sulfo-α-L-idopyranosuronic acid structure at the non-reducing end and a 2-*N*,6-*O*-disulfo-D-glucosamine structure at the reducing end of their chain. The mass-average molecular mass ranges between 4000 and 6000, with a characteristic value of about 5000. The mass percentage of chains lower than 3000 is not more than 30%. The degree of sulfation is 2.0 to 2.6 per disaccharide unit. Potency is not less than 75 units and not more than 110 units of anti-factor Xa activity per mg with reference to the dried substance, and the ratio of anti-factor Xa activity to anti-factor IIa (antithrombin) activity is between 1.5 and 3.0.

Profile

Parnaparin sodium is a low-molecular-weight heparin (p.1329) with anticoagulant activity used in the prevention of postoperative venous thromboembolism (p.1189); it has also been used in other thromboembolic disorders. For general surgical procedures it is given by subcutaneous injection in a dose of 3200 units 2 hours before the procedure, followed by 3200 units once daily for 7 days or until the patient is fully ambulant. For higher risk or orthopaedic patients a dose of 4250 units is given 12 hours before the procedure, followed by 4250 units 12 hours postoperatively and then once daily for 10 days.

For treatment of thromboembolism a dose of 6400 units may be given by subcutaneous injection for 7 to 10 days.

◊ References.

1. Frampton JE, Faulds D. Parnaparin: a review of its pharmacology, and clinical application in the prevention and treatment of thromboembolic and other vascular disorders. *Drugs* 1994; **47:** 652–76.
2. McKeage K, Keating GM. Parnaparin: a review of its use in the management of venous thromboembolism, chronic venous disease and other vascular disorders. *Drugs* 2008; **68:** 105–22.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Tromboparin†; ***Cz.:*** Fluxum; ***Gr.:*** Thromboparin; Tromboparin†; ***Hung.:*** Fluxum; ***Ital.:*** Fluxum; ***Mex.:*** Fluxum; ***Pol.:*** Fluxum; ***Port.:*** Fluxum; Tromboparin; ***Turk.:*** Fluxum; ***Venez.:*** Tromboparin.

Penbutolol Sulfate *(USAN, rINNM)* ⊗

Hoe-39-893d; Hoe-893d; Levopenbutolol Sulfate; Penbutolol Hemisulfate; Penbutolol sulfát; Penbutolol, sulfate de; Penbutolol Sulphate *(BANM)*; Penbutololi sulfas; Penbutololio sulfatas; Penbutololisulfaatti; Penbutololsulfat; Penbutolol-szulfát; Sulfato de penbutolol. (*S*)-1-*tert*-Butylamino-3-(2-cyclopentylphenoxy)propan-2-ol hemisulfate.

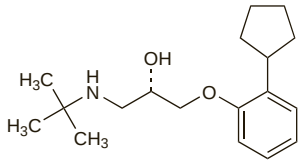
Пенбутолола Сульфат

$(C_{18}H_{29}NO_2)_2,H_2SO_4$ = 680.9.

CAS — 38363-40-5 (penbutolol); 38363-32-5 (penbutolol sulfate).

ATC — C07AA23.

ATC Vet — QC07AA23.



(penbutolol)

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

Ph. Eur. 6.2 (Penbutolol Sulphate). A white or almost white, crystalline powder. Slightly soluble in water; practically insoluble in cyclohexane; soluble in methyl alcohol. Protect from light.

USP 31 (Penbutolol Sulfate). A white to off-white, crystalline powder. Soluble in water and in methyl alcohol. Store in airtight containers. Protect from light.

Adverse Effects, Treatment, and Precautions

As for Beta Blockers, p.1226.

Interactions

The interactions associated with beta blockers are discussed on p.1228.

Pharmacokinetics

Penbutolol is readily absorbed from the gastrointestinal tract and peak plasma concentrations occur about 1 to 3 hours after a dose. Penbutolol is 80 to 98% bound to plasma proteins. It has a high lipid solubility. It is extensively metabolised in the liver by hydroxylation and glucuronidation, the metabolites being excreted in the urine with only small amounts of unchanged penbutolol. A plasma elimination half-life of about 20 hours has been reported.

Renal impairment. Glucuronidation was considered more prominent than hydroxylation in the metabolism of penbutolol and its activity was not altered in patients with renal impairment.[1]

1. Bernard N, *et al.* Pharmacokinetics of penbutolol and its metabolites in renal insufficiency. *Eur J Clin Pharmacol* 1985; **29:** 215–19.

Uses and Administration

Penbutolol is a non-cardioselective beta blocker (p.1225). It is reported to possess some intrinsic sympathomimetic activity but lacks membrane-stabilising properties.

Penbutolol is used as the sulfate in the management of hypertension (p.1171). It may also be used in cardiac disorders such as angina pectoris (p.1157).

In **hypertension** penbutolol sulfate is given in an initial oral dose of 20 mg daily; the dose may be increased if necessary to 40 to 80 mg daily. Maximum antihypertensive efficacy is reported to occur within 2 weeks in patients given a dose of 20 mg daily but about 4 weeks may be required for maximum effect in patients given 10 mg daily.

Penbutolol sulfate has also been used in similar doses in cardiac disorders such as **angina**.

Preparations

USP 31: Penbutolol Sulfate Tablets.

Proprietary Preparations (details are given in Part 3)
Ger.: Betapressin; ***USA:*** Levatol.

Multi-ingredient: ***Ger.:*** Betarelix; Betasemid.

Pentaerithrityl Tetranitrate *(BAN, rINN)*

Erynite; Nitropentaerythrol; Nitropenthrite; Pentaérithrityle, Tétranitrate de; Pentaerithrityli Tetranitras; Pentaeritritilio tetranitratas; Pentaeritritol Tetranitrat; Pentaeritrit-tetranitrát; Pentaerithrityltetranitrat; Pentaerithrityylitetranitraatti; Pentaerythritol Tetranitrate; Pentaerythritolum Tetranitricum; Pentaerythrityl Tetranitrate; Pentaérythrityle, tétranitrate de; Pentaerythrityli tetranitras; Pentaerythrityl-tetranitrát; Pentaerytrityltetranitrat; Pentaerytrityylitetranitraatti; Pentaerytrytylu tetraazotan; Pentanitrol; PETN; Tetranitrato de pentaeritritilo. 2,2-Bis(hydroxymethyl)propane-1,3-diol tetranitrate.

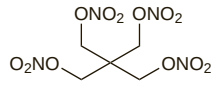
Пентаэритритила Тетранитрат

$C_5H_8N_4O_{12}$ = 316.1.

CAS — 78-11-5.

ATC — C01DA05.

ATC Vet — QC01DA05.



NOTE. The synonym PETN has been applied to both niceritrol and pentaerithrityl tetranitrate.

Pharmacopoeias. *Chin.* and *Eur.* (see p.vii) include as diluted pentaerithrityl tetranitrate.

Ph. Eur. 6.2 (Pentaerithrityl Tetranitrate, Diluted). A mixture of pentaerithrityl tetranitrate with lactose monohydrate or mannitol. Its solubility depends on the diluent and its concentration. Protect from light and heat.

Undiluted pentaerithrityl tetranitrate is a white or slightly yellowish powder. Practically insoluble in water; slightly soluble in alcohol; soluble in acetone.

Handling. Undiluted pentaerithrityl tetranitrate can be exploded by percussion or excessive heat.

Profile

Pentaerithrityl tetranitrate is a vasodilator with general properties similar to those of glyceryl trinitrate (p.1296) but its duration of action is more prolonged.

It is used in angina pectoris (p.1157) in usual oral doses of up to 240 mg daily, in divided doses, before a meal. It is also given as modified-release preparations.

Pentaerithrityl trinitrate, an active metabolite of pentaerithrityl tetranitrate, has also been used clinically under the name pentrinitrol.

Preparations

Proprietary Preparations (details are given in Part 3)
Chile: Cardiosedantol; ***Cz.:*** Pentalong; ***Fr.:*** Nitrodex†; ***Ger.:*** Dilcoran; Nirason N; Pentalong; ***Hung.:*** Nitropenton; ***India:*** Peritrate; ***Ital.:*** Peritrate; ***Switz.:*** Nitrodex†; ***Thai.:*** Peritrate; ***Turk.:*** Danitrin.

Multi-ingredient: ***Austria:*** Spasmocor; ***Ger.:*** Nitro-Crataegutt†; Nitro-Obsidan†; VisanoCor N†; ***Pol.:*** Pentaerythritol Compositum.

Pentifylline *(BAN, rINN)*

1-Hexyltheobromine; Pentifilina; Pentifylliini; Pentifyllin; Pentifyllinum; SK-7. 1-Hexyl-3,7-dimethylxanthine.

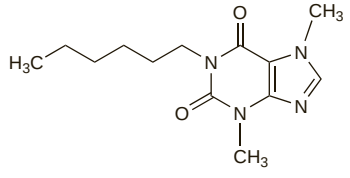
Пентифиллин

$C_{13}H_{20}N_4O_2$ = 264.3.

CAS — 1028-33-7.

ATC — C04AD01.

ATC Vet — QC04AD01.



Profile

Pentifylline is a xanthine derivative that has been used as a vasodilator in the management of peripheral or cerebral vascular disorders.