

Penethamate Hydriodide (BAN)

Diethylaminoethyl Penicillin G Hydroiodide; Penetamato, hid-rioduro de; Pénéthamate, iodhydrate de; Penethamati hydroiodidum. 2-Diethylaminoethyl (6R)-6-(2-phenylacetamido)penicillanate hydriodide.

$C_{22}H_{31}N_3O_4S \cdot HI = 561.5$.

CAS — 3689-73-4 (penethamate); 808-71-9 (penethamate hydriodide).

ATC Vet — QJ01CE90; QJ51CE90.

Profile

Penethamate is a penicillin antibacterial used as the hydriodide in veterinary medicine.

Pheneticillin Potassium (BANM, rINNM)

Feneticilina potásica; Kalii Pheneticillinum; Penicillin B; Pheneticillin Potassium; Phénéticilline Potassique; Pheneticillinum Kalicum; Potassium α -Phenoxyethylpenicillin. A mixture of the D(+) and L(−) isomers of potassium (6R)-6-(2-phenoxypropionamido)penicillanate.

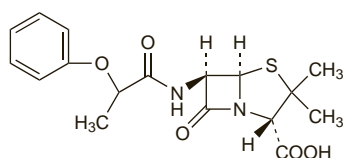
Калия Фенетициллин

$C_{17}H_{19}KN_2O_5S = 402.5$.

CAS — 147-55-7 (pheneticillin); 132-93-4 (pheneticillin potassium).

ATC — J01CE05.

ATC Vet — QJ01CE05.



(pheneticillin)

Pharmacopoeias. In *Jpn*.**Profile**

Pheneticillin is a phenoxyphenicillin with actions and uses similar to those of phenoxymethylpenicillin (below). It has been given orally, as the potassium salt, for the treatment of susceptible mild to moderate infections. Pheneticillin sodium has also been used.

Preparations

Proprietary Preparations (details are given in Part 3)

Neth.: Broxil.

Phenoxymethylpenicillin (BAN, rINN)

Fenoksimetilpenicilinas; Fenoksimetylpenicillini; Fenoksimetylo-penicilina; Fenoximetilpenicilina; Fenoximetilpenicillin; Fenoximetylpencillin; Fenoxymethylpenicillin; Penicillin, Phenoxymethyl; Penicillin V (USAN); Penicillin V; Phénomycline; Phenoxymethyl Penicillin; Phénoxyméthylpénicilline; Phenoxymethylpenicillinum. (6R)-6-(2-Phenoxyacetamido)penicillanic acid.

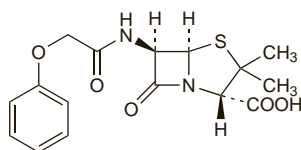
Феноксиметилпенициллин

$C_{16}H_{18}N_2O_5S = 350.4$.

CAS — 87-08-1.

ATC — J01CE02.

ATC Vet — QJ01CE02.

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

Ph. Eur. 6.2 (Phenoxymethylpenicillin). A substance produced by the growth of certain strains of *Penicillium notatum* or related organisms on a culture medium containing an appropriate precursor, or obtained by any other means. A white or almost white, slightly hygroscopic, crystalline powder. Very slightly soluble in water; soluble in alcohol. A 0.5% suspension in water has a pH of 2.4 to 4.0. Store in airtight containers.

USP 31 (Penicillin V). A white, odourless crystalline powder. Very slightly soluble in water; freely soluble in alcohol and in acetone; insoluble in fixed oils. pH of a 3% suspension in water is between 2.5 and 4.0. Store in airtight containers.

Phenoxymethylpenicillin Calcium (BANM, rINNM)

Calcii Phenoxymethylpenicillinum; Fenoximetilpenicilina cálcica; Penicillin V Calcium; Phénoxyméthylpénicilline Calcique; Phenoxymethylpenicillinum Calcium.

Кальций Феноксиметилпенициллин

$(C_{16}H_{17}N_2O_5S)_2 \cdot Ca \cdot 2H_2O = 774.9$.

CAS — 147-48-8 (anhydrous phenoxymethylpenicillin calcium); 73368-74-8 (phenoxymethylpenicillin calcium dihydrate).

ATC — J01CE02.

ATC Vet — QJ01CE02.

Pharmacopoeias. In *Int*.**Phenoxymethylpenicillin Potassium** (BANM, rINNM)

Fenoksimetil Penicilin Potasyum; Fenoksimetilpenicilino kalio druska; Fenoksimetylpenicilliniakaliu; Fenoksimetylo-penicilina potasowa; Fenoximetilpenicilina potásica; Fenoximetilpenicilina Potásica; Fenoximetilpenicillin-kálium; Fenoximetylpencillin kalium; Fenoxymethylpenicillin draselná súť; Kalii Phenoxymethylpenicillinum; Penicillin V Potassium (USAN); Phénoxyméthylpénicilline potassique; Phenoxymethylpenicillinum kalicum.

Калия Феноксиметилпенициллин

$C_{16}H_{17}KN_2O_5S = 388.5$.

CAS — 132-98-9.

ATC — J01CE02.

ATC Vet — QJ01CE02.

Pharmacopoeias. In *Chin.*, *Eur*. (see p.vii), *Int.*, *US*, and *Viet*.

Ph. Eur. 6.2 (Phenoxymethylpenicillin Potassium). A white or almost white, crystalline powder. Freely soluble in water; practically insoluble in alcohol. A 0.5% solution in water has a pH of 5.5 to 7.5.

USP 31 (Penicillin V Potassium). A white, odourless crystalline powder. Very soluble in water; soluble 1 in 150 of alcohol; insoluble in acetone. pH of a 3% solution in water is between 4.0 and 7.5. Store in airtight containers.

Units

The first International Standard Preparation (1957) of phenoxymethylpenicillin contained 1695 units/mg but was withdrawn in 1968. Despite this, doses of phenoxymethylpenicillin are still expressed in units in some countries.

Phenoxymethylpenicillin 250 mg is equivalent to about 400 000 units.

Adverse Effects and Precautions

As for Benzylpenicillin, p.213.

Phenoxymethylpenicillin is usually well tolerated but may occasionally cause transient nausea and diarrhoea.

Potassium content. Each g of phenoxymethylpenicillin potassium contains about 2.6 mmol of potassium.

Interactions

As for Benzylpenicillin, p.214.

Antibacterials. Reduced absorption was reported when phenoxymethylpenicillin was given after an oral course of *neomycin*.¹

1. Cheng SH, White A. Effect of orally administered neomycin on the absorption of penicillin V. *N Engl J Med* 1962; **267**: 1296-7.

Beta blockers. Fatal anaphylactic reactions to phenoxymethylpenicillin in 2 patients on *nadolol* and *propranolol* respectively, might have been potentiated by the beta blocker.¹

1. Berkelman RL, et al. Beta-adrenergic antagonists and fatal anaphylactic reactions to oral penicillin. *Ann Intern Med* 1986; **104**: 134.

Antimicrobial Action

Phenoxymethylpenicillin has a range of antimicrobial activity similar to that of benzylpenicillin (p.214) and a similar mode of action. It may be less active against some susceptible organisms, particularly Gram-negative bacteria.

The mechanisms and patterns of resistance to phenoxymethylpenicillin are similar to those of benzylpenicillin.

Pharmacokinetics

Phenoxymethylpenicillin is more resistant to inactivation by gastric acid and is more completely absorbed than benzylpenicillin from the gastrointestinal tract. Absorption is usually rapid, although variable, with about 60% of an oral dose being absorbed. The calcium and potassium salts are better absorbed than the

free acid. Peak plasma concentrations of 3 to 5 micrograms/mL have been observed 30 to 60 minutes after a dose of 500 mg. The effect of food on absorption appears to be slight. The plasma half-life of phenoxymethylpenicillin is about 30 to 60 minutes and may be increased to about 4 hours in severe renal impairment. About 80% is reported to be protein bound. The distribution and elimination of phenoxymethylpenicillin is similar to that of benzylpenicillin (p.214). It is metabolised in the liver to a greater extent than benzylpenicillin; several metabolites have been identified including penicilloic acid. The unchanged drug and metabolites are excreted rapidly in the urine. Only small amounts are excreted in the bile.

Uses and Administration

Phenoxymethylpenicillin is used similarly to benzylpenicillin (p.215) in the treatment or prophylaxis of infections caused by susceptible organisms, especially streptococci. It is used only for the treatment of mild to moderate infections, and not for chronic, severe, or deep-seated infections since absorption can be unpredictable. Patients treated initially with parenteral benzylpenicillin may continue treatment with oral phenoxymethylpenicillin once a satisfactory clinical response has been obtained. Specific indications for phenoxymethylpenicillin include anthrax (mild uncomplicated infections), Lyme disease (early stage in pregnant women or young children), pharyngitis or tonsillitis, rheumatic fever (primary and secondary prophylaxis), streptococcal skin infections, and spleen disorders (pneumococcal infection prophylaxis). For details of these infections and their treatment, see under Choice of Antibacterial, p.162.

Administration and dosage. Phenoxymethylpenicillin is given orally, usually as the potassium or calcium salt, preferably at least 30 minutes before, or 2 hours after, food. Benzathine phenoxymethylpenicillin (p.212) is also used.

Doses are expressed in terms of the equivalent amount of phenoxymethylpenicillin; 1.1 g of phenoxymethylpenicillin calcium and 1.1 g of phenoxymethylpenicillin potassium are each equivalent to about 1 g of phenoxymethylpenicillin.

Usual adult doses have been 250 to 500 mg every 6 hours, but the *BNF* recommends up to 1 g every 6 hours in severe infections. Children may be given the following doses every 6 hours: up to 1 year, 62.5 mg; 1 to 5 years, 125 mg; and 6 to 12 years, 250 mg. The *BNFC* recommends that doses be increased to ensure at least 12.5 mg/kg every 6 hours in severe infection. Dosage may need to be modified in severe renal impairment.

To prevent recurrences of rheumatic fever, WHO and the *BNF* recommend 250 mg twice daily.

Preparations

BP 2008: Phenoxymethylpenicillin Oral Solution; Phenoxymethylpenicillin Tablets;

USP 31: Penicillin V for Oral Suspension; Penicillin V Potassium for Oral Solution; Penicillin V Potassium Tablets; Penicillin V Tablets.

Proprietary Preparations (details are given in Part 3)

Arg.: Pen Oral; Penagrand; Penfantil; Penicina. **Austral.**: Abboicillin-VK; Cilicaine VK; Cilopen VK; LPV; Penhexal VK. **Austria:** Allicillin; Clacil; Megacillin; Oспен; Pen-V; Penbene; Penoral; Penstad; Star-Pen; **Belg.**: Peni-Oral; **Braz.**: Meracilina; Oracilin; Pen-V-Cil; Pen-Ve-Oral; Penicilin-V; Penicigran; **Canad.**: Apo-Pen-VK; Nadopen-Vt; Novo-Pen-VK; Nu-Pen-VK; Pen-Vee; PVFK†; **Cz.**: InfectoCillin†; Megacillin†; Oспен; Penbene; Penid; **Denm.**: Calcipen; Pandillin; Primicillin; Rocilin; Vepicombin; **Fin.**: Medicillin; Milcopen; V-Pen; **Fr.**: Oraciline; Oспен†; **Ger.**: Arcasin; durapencillin†; InfectoCillin; Isocillin; Ispenoral; Jenacillin V†; Megacillin oral; P-Mega-Tablinen; Pen Mega; Pen†; Penbeta; Penhexal; Penicillat†; V-Tablopen†; **Gr.**: Oспен; **Hong Kong:** Oспен†; **Hung.**: Oспен; Vegacillin†; **Indon.**: Fenocin; Oспен; **Irl.**: Calvepen; Koppen; **Israel:** Rafapen Mega; Rafapen V-K; **Malaysia:**: Beapen; Oспен; Penoxil V†; **Mex.**: Anapen†; Kavipen; Megapen†; Pen-Vi-K; Pota-Vi-Kin; **Neth.**: Acipen; Acipen-V; **Norw.**: Apocillin; Calcipen†; Kavepenin†; Rocilin†; Weifapen; **NZ:**: Cilicaine VK; **Philipp.**: Sumapen; **Pol.**: Oспен; **Rus.**: Oспен (Oсрeн); **S.Afr.**: Betapen; Deltacillin†; Incil; Len VK; Novo V-K†; Rolab-Pen-VK†; Spec-Pen-VK†; **Singapore:** Oспен; **Spain:** Penilevel; **Swed.**: Kavepenin; Peceve; Tikacilin; **Switz.**: Brunocillin†; Megacillin†; Oспен; pen-V-basq†; Penisol; Phenocillin; Stabilline; **Thal.**: Pen-V; Penser; Penveno; Servipen-V†; **Turk.**: Cilacil; **USA:** Pen-Vee K; Veeids; **Venez.**: Oспен.

Multi-ingredient: **Spain:** Penilevel Retard.