Preparations

Proprietary Preparations (details are given in Part 3)
Jpn: Finibax; ***USA:*** Doribax.

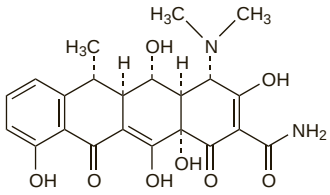
Doxycycline *(BAN, USAN, rINN)*

Doksiciklinas monohidratas; Doksisiklin; Doksisykliini; Doksisykliinimonohydraatti; Doksycyklina; Doxiciclina; Doxiciklin; Doxycyclin; Doxycycline Monohydrate; Doxycycline monohydratée; Doxycyclinum; Doxycyclinum monohydricum; Doxycyklin monohydrát; Doxycyklinmonohydrat; GS-3065. (4*S*,4a*R*,5*S*,5a*R*,6*S*,12a*S*)-4-Dimethylamino-1,4,4a,5,5a,6,11,12a-octahydro-3,5,10,12,12a-pentahydroxy-6-methyl-1,11-dioxonaphthacene-2-carboxamide monohydrate; 6-Deoxy-5β-hydroxytetracycline monohydrate.

Доксициклин

$C_{22}H_{24}N_2O_8,H_2O$ = 462.4.

CAS — 564-25-0 (anhydrous doxycycline); 17086-28-1 (doxycycline monohydrate).
ATC — A01AB22; J01AA02.
ATC Vet — QA01AB22; QJ01AA02.



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

Ph. Eur. 6.2 (Doxycycline Monohydrate). A yellow crystalline powder. Very slightly soluble in water and in alcohol. It dissolves in dilute solutions of mineral acids and in solutions of alkali hydroxides and carbonates. A 1% suspension in water has a pH of 5.0 to 6.5. Store in airtight containers. Protect from light.

USP 31 (Doxycycline). A yellow crystalline powder. Very slightly soluble in water; sparingly soluble in alcohol; practically insoluble in chloroform and in ether; freely soluble in dilute acid and in alkali hydroxide solutions. pH of a 1% suspension in water is between 5.0 and 6.5. Store in airtight containers. Protect from light.

Doxycycline Calcium *(BANM, rINNM)*

Calcii Doxycyclinum; Doxiciclina cálcica; Doxycycline Calcique.

Кальций Доксициклин

ATC — A01AB22; J01AA02.
ATC Vet — QA01AB22; QJ01AA02.

Doxycycline Fosfatex *(BAN, USAN)*

AB-08; DMSC; Doxiciclina fosfatex. 6-Deoxy-5β-hydroxytetracycline—metaphosphoric acid—sodium metaphosphate in the ratio 3:3:1.

$(C_{22}H_{24}N_2O_8)_3(HPO_3)_3NaPO_3$ = 1675.2.

CAS — 83038-87-3.
ATC — A01AB22; J01AA02.
ATC Vet — QA01AB22; QJ01AA02.

Doxycycline Hyclate *(BANM, rINNM)*

Doksiciklino hiklatas; Doksisykliinihyklaatti; Doksycykliny hyklan; Dossiciclina Iclato; Doxiciklin-hiklát; Doxycycline, hyclate de; Doxycycline Hydrochloride; Doxycyclini hyclas; Doxycyklinhyklat; Doxycyklin-hyklát; Hiclato de doxiciclina. Doxycycline hydrochloride hemiethanolate hemihydrate.

Доксициклина Гиклат

$C_{22}H_{24}N_2O_8,HCl,½C_2H_5OH,½H_2O$ = 512.9.

CAS — 10592-13-9 (doxycycline hydrochloride); 24390-14-5 (doxycycline hyclate).
ATC — A01AB22; J01AA02.
ATC Vet — QA01AB22; QJ01AA02.

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

Ph. Eur. 6.2 (Doxycycline Hyclate). A yellow hygroscopic crystalline powder. Freely soluble in water and in methyl alcohol; sparingly soluble in alcohol. It dissolves in solutions of alkali hydroxides and of carbonates. A 1% solution in water has a pH of 2.0 to 3.0. Store in airtight containers. Protect from light.

USP 31 (Doxycycline Hyclate). A yellow crystalline powder. Soluble in water; slightly soluble in alcohol; practically insoluble in chloroform and in ether; soluble in solutions of alkali hydroxides and carbonates. pH of a solution in water containing the equivalent of doxycycline 1% is between 2.0 and 3.0. Store in airtight containers. Protect from light.

Incompatibility. Preparations of doxycycline hyclate have an acid pH and incompatibility may reasonably be expected with alkaline preparations or with drugs unstable at low pH.

Adverse Effects and Precautions

As for Tetracycline, p.347.

Gastrointestinal disturbances with doxycycline are reported to be less frequent than with tetracycline and doxycycline may also cause less tooth discoloration.

Oesophageal ulceration may be a particular problem if capsules or tablets are taken with insufficient fluid or in a recumbent posture: doxycycline should be taken with at least half a glass of water, in an upright position, and well before going to bed. Dispersible tablets or liquid formulations should be used in elderly patients, who may be at greater risk of oesophageal injury.

Unlike many tetracyclines, doxycycline does not appear to accumulate in patients with impaired renal function, and aggravation of impairment may be less likely.

Incidence of adverse effects. For the suggestion that doxycycline may cause fewer adverse effects than minocycline, see p.301.

Anosmia. Anosmia or dysosmia (absent or impaired sense of smell) have occasionally been reported in patients receiving doxycycline, although the association has not been definitely established.[1]

1. Bleasel AF, *et al.* Anosmia after doxycycline use. *Med J Aust* 1990; **152:** 440.

Effects on intracranial pressure. Doxycycline has been associated with benign intracranial hypertension; for further details, see under Tetracycline, p.348.

Porphyria. Doxycycline has been associated with acute attacks of porphyria and is considered unsafe in porphyric patients.

Interactions

As for Tetracycline, p.348.

Doxycycline has a lower affinity for binding with calcium than many tetracyclines. Consequently its absorption is less likely to be affected by milk or food, although it is still affected by calcium-containing antacids and other divalent and trivalent cations such as aluminium, bismuth, iron, magnesium, and zinc; even intravenous doxycycline may be affected, although less so than when given orally.

The metabolism of doxycycline may be accelerated by drugs that induce hepatic enzymes such as alcohol (chronic use), rifampicin, and antiepileptics including carbamazepine, phenobarbital, phenytoin, and primidone.

It has been suggested that doxycycline could increase ciclosporin concentrations, but evidence for this seems to be scant.

Antimicrobial Action

As for Tetracycline, p.348.

Doxycycline is more active than tetracycline against many bacterial species including *Streptococcus pyogenes*, enterococci, *Nocardia* spp., and various anaerobes. Cross-resistance is common although some tetracycline-resistant *Staphylococcus aureus* respond to doxycycline. Doxycycline is also more active against protozoa, particularly *Plasmodium* spp.

Pharmacokinetics

For the general pharmacokinetics of the tetracyclines, see Tetracycline, p.349.

Doxycycline is readily and almost completely absorbed from the gastrointestinal tract and absorption is not significantly affected by the presence of milk or food in the stomach or duodenum. Mean peak plasma concentrations of 2.6 micrograms/mL have been reported 2 hours after a 200-mg oral dose, falling to 1.45 micrograms/mL at 24 hours. After intravenous infusion of the same dose peak plasma concentrations are briefly somewhat higher, but become very similar to those after oral dosage on equilibration into the tissues.

About 80 to 95% of doxycycline in the circulation is reported to be bound to plasma proteins. Its biological half-life varies from about 12 to 24 hours. Doxycycline is more lipid-soluble than tetracycline. It is widely distributed in body tissues and fluids.

In patients with normal renal function about 40% of a dose is slowly excreted in the urine, although more is excreted by this route if the urine is made alkaline. However, the majority of a dose of doxycycline is excreted in the faeces after chelation in the intestines. Although doxycycline has been reported to undergo partial inactivation in the liver, some sources consider this doubtful; however, the kinetics of doxycycline have been reportedly altered in patients receiving drugs that induce hepatic metabolism.

Doxycycline is stated not to accumulate significantly in patients with renal impairment, although excretion in the urine is reduced; increased amounts of doxycycline are excreted in the faeces in these patients. Nevertheless, there have been reports of some accumulation in renal failure. Removal of doxycycline by haemodialysis is insignificant.

◊ Reviews.

1. Saivin S, Houin G. Clinical pharmacokinetics of doxycycline and minocycline. *Clin Pharmacokinet* 1988; **15:** 355–66.

Uses and Administration

Doxycycline is a tetracycline derivative with uses similar to those of tetracycline (p.349). It may sometimes be preferred to other tetracyclines in the treatment of susceptible infections because of its fairly reliable absorption and its long half-life that permits less frequent (often once daily) dosing. It also has the advantage that it can be given (with care) to patients with renal impairment. However, relatively high doses may need to be given for urinary-tract infections because of its low renal excretion.

Doxycycline has antiprotozoal actions and may be given in conjunction with quinine in the management of falciparum malaria resistant to chloroquine (p.594).

Solutions of doxycycline are also used for malignant effusions (p.659).

Doxycycline is usually given orally as the base or its various salts, usually the hyclate. Doses are expressed in terms of doxycycline; doxycycline hyclate 115 mg is equivalent to about 100 mg of anhydrous doxycycline. Doxycycline capsules and tablets should be given with plenty of fluid, with the patient in an upright position, and well before going to bed. Doxycycline may be given with food or milk if gastric irritation occurs. Dispersible tablets or liquid formulations are advisable in elderly patients.

In patients in whom oral therapy is not feasible, doxycycline hyclate may be given by slow intravenous infusion of a solution containing 0.1 to 1 mg/mL, in equivalent doses. Infusions should be given over 1 to 4 hours.

The usual adult dose, either orally or intravenously, is 200 mg of doxycycline on the first day (as a single dose or in divided doses), followed by 100 mg daily. In severe infections the initial dosage is maintained throughout the course of treatment.

In patients with uncomplicated gonococcal infections, doxycycline 100 mg twice daily for 7 days is given orally, although it has occasionally been given in a single dose of 300 mg followed by a second similar dose 1 hour later. For syphilis in penicillin-allergic patients, doxycycline 100 to 200 mg twice daily is given orally for at least 14 days; some authorities suggest giving the same dose for 28 to 30 days to patients with late latent disease and those with syphilis for more than a year should be given 100 mg twice daily for 28 days.

For relapsing fever and louse-borne typhus, doxycycline 100 or 200 mg may be given as a single oral dose. For prophylaxis of scrub typhus, 200 mg may be taken as a single oral dose. For the prophylaxis of leptospirosis, 200 mg may be given orally once a week throughout exposure for up to 21 days and 200 mg is also given when leaving the area of infection risk.

Doxycycline is used in non-endemic areas for the treatment of chloroquine-resistant falciparum malaria in an oral dose of 200 mg daily for at least 7 days after treatment with quinine. Doxycycline 100 mg daily may be

used for prophylaxis in areas of high risk or where multidrug resistance exists, and can be used prophylactically for up to 2 years.

For treatment and postexposure prophylaxis of inhalation anthrax, a 60-day course of treatment with oral doses of 100 mg twice daily may be used; one or two other antibacterials should also be given. Although unlicensed, the same regimen is recommended by UK and US public health authorities for the treatment of gastrointestinal anthrax. In the treatment of cutaneous anthrax (also unlicensed), a 7- to 10-day course of treatment with an oral dose of doxycycline 100 mg twice daily is recommended; treatment may need to be extended to 60 days if infection is due to aerosol exposure. If there are signs of systemic involvement, extensive oedema, or lesions on the head and neck, intravenous therapy and a multidrug approach is recommended.

In the treatment of acne, an oral dose of 50 mg daily for 6 to 12 weeks may be adequate, although the *BNF* advocates a dose of 100 mg daily. It is also given in low doses of 40 mg once daily as a modified-release preparation for the treatment of inflammatory lesions associated with rosacea in adults.

Doxycycline may be given orally in low doses of 20 mg twice daily for 3 months as an adjunct to supragingival and subgingival scaling and root planing to adults with periodontitis. For chronic periodontitis, a modified-release subgingival gel containing doxycycline hyclate 10% (released over 7 days) has been inserted into the periodontal pocket.

For details of doses in children and adolescents, see below.

Administration. ***SUBANTIMICROBIAL DOSES.*** Doxycycline is given in doses of 20 mg orally twice daily, which are not sufficient to achieve antimicrobial concentrations in the body, as an adjunct in the treatment of periodontal disease. The benefits of treatment are believed to be due to its ability to downregulate the actions of matrix metalloproteinases, enzymes involved in the breakdown of collagen and which play a key role in the inflammatory and destructive processes of periodontitis.[1] Similar subantimicrobial doses have been investigated, and produced apparent benefit, in patients with acne or rosacea;[2] there was no evidence that even quite prolonged therapy at these doses influenced the development of antibiotic resistance in bacterial flora. A low-dose modified-release preparation containing doxycycline 40 mg is available in some countries for the treatment of inflammatory lesions associated with rosacea.

1. Preshaw PM, *et al.* Subantimicrobial dose doxycycline as adjunctive treatment for periodontitis: a review. *J Clin Periodontol* 2004; **31:** 697–707.
2. Del Rosso JQ. A status report on the use of subantimicrobial-dose doxycycline: a review of the biologic and antimicrobial effects of the tetracyclines. *Cutis* 2004; **74:** 118–122.

Administration in children. In children, the effects on teeth should be considered and tetracyclines only used when absolutely essential. In the UK, doxycycline is licensed for use in children aged 12 years and over; the usual adult dose (see above) may be given orally. However, in the USA, it may be given to children over 8 years old; those weighing 45 kg or less may be given usual oral or intravenous doses of 4.4 mg/kg on the first day (as a single dose or in divided doses), followed by 2.2 mg/kg daily and those weighing over 45 kg may be given the usual adult dose (see above).

In the USA, doxycycline is licensed in children over 8 years old for prophylaxis of chloroquine-resistant falciparum malaria in areas of high risk or where multidrug resistance exists. The recommended oral dose is 2 mg/kg (to a maximum of 100 mg) once daily.

US[1] public health authorities suggest that doxycycline may be given to children under 8 years old for the treatment of inhalation, gastrointestinal, or cutaneous anthrax, and for postexposure prophylaxis of inhalation anthrax. For the treatment and postexposure prophylaxis of inhalation anthrax, a 60-day course of treatment with initial intravenous doses of 2.2 mg/kg (to a maximum of 100 mg) twice daily followed by the same dose given orally is recommended; the same regimen is also recommended for the treatment of gastrointestinal anthrax. As with the adult regimens, one or two other antibacterials should also be given. In the treatment of cutaneous anthrax, a 7- to 10-day course of treatment with an oral dose of 2.2 mg/kg twice daily is recommended; treatment may need to be extended to 60 days if infection is due to aerosol exposure. In the UK[2] public health authorities only recommend doxycycline for those older than 8 years old and weighing over 45 kg who may be given the usual adult dose (see above).

1. CDC. Notice to readers: update: interim recommendations for antimicrobial prophylaxis for children and breastfeeding mothers and treatment of children with anthrax. *MMWR* 2001; **50:** 1014–16. Also available at: http://www.cdc.gov/mmwr/PDF/wk/mm5045.pdf (accessed 25/04/07)
2. Health Protection Agency. Guidelines for action in the event of a deliberate release: anthrax. Version 5.9, 16 April 2007. Available at: http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1194947401128 (accessed 11/08/08)

Lymphatic filariasis. Filaria have been shown to contain *Wolbachia* endobacteria which are essential for larval development and adult worm fertility and viability. This symbiotic dependency has provided a new approach in the treatment of individuals with lymphatic filariasis (p.137). A double-blind, randomised, placebo-controlled study[1] of 72 patients infected with *Wuchereria bancrofti* found that those given oral doxycycline 200 mg daily for 8 weeks had a significant reduction in the number of adult worms at 14 months; ultrasonography detected adult worms in 22% of those given doxycycline and in 88% of those given placebo. Microfilaraemia was almost completely eliminated at 8 to 14 months follow-up.

See also Onchocerciasis, below.

1. Taylor MJ, *et al.* Macrofilaricidal activity after doxycycline treatment of Wuchereria bancrofti: a double-blind, randomised placebo-controlled trial. *Lancet* 2005; **365:** 2116–21.

Musculoskeletal and joint disorders. For reference to the use of doxycycline in the management of various musculoskeletal and joint disorders, see under Tetracycline, p.350.

Onchocerciasis. As in lymphatic filariasis (above), *Onchocerca volvulus* worms rely on a symbiotic relationship with *Wolbachia* endobacteria, and this has provided a new approach in the treatment of individuals with onchocerciasis (p.137). A 4-month controlled clinical study[1] of 35 patients with onchocerciasis found that those given oral doxycycline 100 mg daily for 6 weeks showed a trend toward more frequent degeneration or death of adult worms and suppressed embryonic development at early stages for the duration of the study period. A subsequent study[2] of 88 patients found that embryogenesis was interrupted for at least 18 months in those given a single standard dose of ivermectin (150 micrograms/kg) plus oral doxycycline 100 mg daily for 6 weeks compared to those given only the standard dose of ivermectin.

1. Hoerauf A, *et al.* Endosymbiotic bacteria in worms as targets for a novel chemotherapy in filariasis. *Lancet* 2000; **355:** 1242–3.
2. Hoerauf A, *et al.* Depletion of wolbachia endobacteria in Onchocerca volvulus by doxycycline and microfilaridermia after ivermectin treatment. *Lancet* 2001; **357:** 1415–16.

Preparations

BP 2008: Dispersible Doxycycline Tablets; Doxycycline Capsules;
USP 31: Doxycycline Calcium Oral Suspension; Doxycycline Capsules; Doxycycline for Injection; Doxycycline for Oral Suspension; Doxycycline Hyclate Capsules; Doxycycline Hyclate Delayed-release Capsules; Doxycycline Hyclate Tablets.

Proprietary Preparations (details are given in Part 3)
Arg.: Asolmicina.dox; Atridox; Ciclidoxan; Doxibiot; Granudoxy; Verboril; Vibramicina; ***Austral.:*** Doryx; Doxsig; Doxy; Doxyhexal; Doxylin; Frakas; Vibra-Tabs; Vibramycin; ***Austria:*** Aliudox; Dotur; Doxal; Doxybene; Doxyderm; Doxydyn; Doxyhexal; Doxylan; Doxystad; Supracyclin; Vibramycin; Vibravenos; ***Belg.:*** Docdoxycy; Doxylets; Doxytab; Vibramycine; Vibratab; ***Braz.:*** Ciclisan; Clordox; Doxilina†; Neo Doxicilin; Protectina; Uni Doxiciclin; Vibramicina; ***Canad.:*** Apo-Doxy; Doxycin; Doxytec†; Novo-Doxylin; Vibra-Tabs; ***Chile:*** Doryx; Doxithal; Sigadoxin; Vibramicina; ***Cz.:*** Apo-Doxy†; Deoxymykoin; Doxybene; Doxyhexal; Helvedoclyn†; Unidox†; ***Denm.:*** Atridox†; Vibradox; Vibramycin†; ***Fin.:*** Apodoxin; Atridox†; Doxyklin; Doximed; Doximycin; Doxitin; ***Fr.:*** Doxy; Doxygram; Doxylis; Doxypalu; Granudoxy; Spanor; Tolexine; Vibramycine N; ***Ger.:*** Aknefug Doxy; Antodox; Atridox; Azudoxat†; Clinofug D†; Doxakne; Doxy; Doxy Komb; Doxy M; Doxy-Diolan†; Doxy-HP; Doxy-N-Tablinen; Doxy-Puren†; Doxy-Wolff; Doxyderma; Doxydoc; Doxyhexal; Doxymerck; Doxymono; Jenacyclin†; Mespafin; Neodox†; Sigadoxin†; Supracyclin; Vibramycin†; Vibravenos†; ***Gr.:*** Atridox; Impalamycin; Microvibrate; Novimax; Otosal; Relyomycin; Smilitene; Vibramycin; Vibravenos†; Vibravenosa†; ***Hong Kong:*** Amermycin; Doxitab; Doxy†; Doxymycin; Medomycin; Remycin†; Vibramycin; Wanmycin; Zadorin†; ***Hung.:*** Doxypharm; Doxyprotect; Huma-Doxylin; Tenutan; Vibramycin†; ***India:*** Biodoxi; Doxicip; Doxy; Doxypal-DR; Geeox; Lenteclin; Solomycin; Vibazine†; ***Indon.:*** Dotur; Doxacin; Doxicor; Doxin; Dumoxin; Interdoxin; Siclidon; Viadoxin; Vibramycin; ***Irl.:*** By-Mycin; Periostat; Vibramycin; ***Israel:*** Doxibiotic; Doxy; Doxylin; Doxytrim; Periostat; Vibramycin; ***Ital.:*** Bassado; Miraclin; ***Malaysia:*** Bronmycin†; Doline; Doxacyne†; Doxy†; Doxycillin; Doxymycin; Medomycin; Vibramycin; Wanmycin†; Zadorin†; ***Mex.:*** Apociclina†; Bioximicina; Domiken; Kenciclen; Periosan; Vibramicina; Vivradoxil; ***Neth.:*** Atridox; Doxy; Doxy-Dagra†; Doxymycin†; Periostat; Unidox; Vibra-S†; Vibramycin; ***Norw.:*** Doryx†; Doxylin; Doxysol†; Dumoxin; Vibramycin; ***NZ:*** Atridox†; Doxine; Doxy; ***Philipp.:*** Cytragen; Doxicon; Doxin; Doxylyn; Harvellin; Vibramycin; ***Pol.:*** Dotur; Doxicin; Doxyratio M; Supracyclin; Unidox; ***Port.:*** Actidox; Atridox; Biocin†; Doxytrex; Periostat; Pluridoxina; Sigadoxin; Vibramicina; ***Rus.:*** Apo-Doxy (Апо-докси)†; Doxal (Доксал)†; Medomycin (Медомицин); Unidox (Юнидокс); Vibramycin (Вибрамицин); ***S.Afr.:*** Cyclidox; Doximal; Doxitab; Doxyclin; Doxycyl; Doxyhexal; Doxymycin; Dumoxin; Noritet; Randoclin†; Vibramycin; ***Singapore:*** Apo-Doxy; Bronmycin; Doryx†; Doxilin†; Doxine; Doxycap; Doxyline; Doxymycin; Medomycin; Remycin†; Tetradox; Vibramycin; Wanmycin; ***Spain:*** Docosyl†; Dosil; Doxiclat; Doxicrisol; Doxinate†; Doxiten Bio; Mededoxi; Peledox; Proderma; Retens; Rexilen; Vibracina; Vibravenosa; ***Swed.:*** Atridox; Doryx†; Doxyferm; Vibramycin; ***Switz.:*** Atridox; Diocimex; Doxy-basan†; Doxycline; Doxylag; Doxysol; Periostat; Rudocycline; Sigadoxin†; Supracycline; Tasmacyclin Akne; Vibramycine; Vibraveineuse; Zadorine; ***Thai.:*** Amermycin; Bronmycin; Docline; Docyl; Doxin; Doxy; Doxy-P†; Doxycline; Doxylcap; Doxylin; Dumoxin†; Madoxy; Medomycin; Medoxin; Poli-Cycline; Servidoxyne; Siadocin; Tetradox; Torymycin; Veemycin; Vibramycin; ***Turk.:*** Doksin; Monodoks; Tetradox; ***UAE:*** DuraDox; ***UK:*** Atridox; Demix†; Doxylar; Periostat; Vibramycin; ***USA:*** Adoxa; Alodox; Atridox; Doryx; Monodox; Oracea; Oraxyl; Periostat; Vibra-Tabs; Vibramycin; ***Venez.:*** Doxiclival; Tremesal; Vibrafesa†; Vibramicina C.

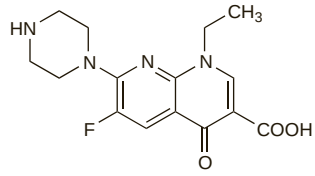
Multi-ingredient: ***Cz.:*** Doxycyclin Al Comp; ***Ger.:*** Ambrodoxy; Ambroxol AL comp; Ambroxol comp; Amdox-Puren†; Azudoxat comp†; Doxam; Doximucol; Doxy Comp; Doxy Lindoxyl; Doxy Plus; Doxy-Wolff Mucolyt†; Doxysolvat†; Jenabroxol comp†; Sigamuc†; Terelit†; ***Spain:*** Dosil Enzimatico; Doxiten Enzimatico; Pulmotropic.

Enoxacin *(BAN, USAN, rINN)*

AT-2266; CI-919; Enoksasiini; Enoksasin; Énoxacine; Enoxacino; Enoxacinum; PD-107779. 1-Ethyl-6-fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)-1,8-naphthyridine-3-carboxylic acid.

Эноксацин

$C_{15}H_{17}FN_4O_3$ = 320.3.
CAS — 74011-58-8.
ATC — J01MA04.
ATC Vet — QJ01MA04.



Pharmacopoeias. *Chin.* and *Jpn* include the sesquihydrate.

Adverse Effects and Precautions

As for Ciprofloxacin, p.244.

Reduced dosage may be needed in renal impairment—see Administration in Renal Impairment, under Uses and Administration, below.

Interactions

As for Ciprofloxacin, p.246.

Of the fluoroquinolones, enoxacin has been reported to cause the most marked interaction with theophylline (p.1143) and with caffeine (p.1117).

Antimicrobial Action

As for Ciprofloxacin, p.246, although enoxacin is generally less potent *in vitro*.

Pharmacokinetics

Peak plasma concentrations of 2 to 3 micrograms/mL occur 1 to 2 hours after a 400-mg oral dose of enoxacin. The plasma half-life is about 3 to 6 hours. Plasma protein binding ranges from 18 to 67%. Enoxacin appears to be widely distributed in the body and concentrations higher than those in plasma have been reported in tissues such as lung, kidney, and prostate. High concentrations are achieved in bile, but the extent of biliary excretion is not completely clear.

Enoxacin is eliminated from the body mainly by urinary excretion, but also by metabolism. The major metabolite, 3-oxo-enoxacin, has some antibacterial activity. Urinary excretion of enoxacin is by both tubular secretion and glomerular filtration and may be reduced by probenecid. High concentrations are achieved in the urine since about 60% of an oral dose of enoxacin appears unchanged in the urine within 24 hours; about 10% is recovered as 3-oxo-enoxacin. In renal impairment the half-life of enoxacin may be prolonged and the oxometabolite may accumulate.

Uses and Administration

Enoxacin is a fluoroquinolone antibacterial with actions and uses similar to those of ciprofloxacin (p.247). It is used mainly in the treatment of urinary-tract infections (p.199) and gonorrhoea (p.191).

For urinary-tract infections, enoxacin is given orally in doses of 200 to 400 mg twice daily.

For details of reduced doses in renal impairment, see below.

A single 400-mg dose is given for uncomplicated gonorrhoea.

◊ References.

1. Patel SS, Spencer CM. Enoxacin: a reappraisal of its clinical efficacy in the treatment of genitourinary tract infections. *Drugs* 1996; **51:** 137–60.

Administration in renal impairment. In renal impairment when the creatinine clearance is 30 mL/minute or less the urinary concentrations achieved may be too low to have a therapeutic effect in urinary-tract infections. In other infections, half the usual dose of enoxacin is recommended.

Preparations

Proprietary Preparations (details are given in Part 3)
Austria: Enoxor; ***Fr.:*** Enoxor; ***Ger.:*** Enoxor; ***Ital.:*** Bactidan; Enoxen; ***Jpn:*** Flumark; ***Port.:*** Vinone†; ***S.Afr.:*** Bactidron†; ***Turk.:*** Enoksetin; ***USA:*** Penetrex†.