Preparations

Proprietary Preparations (details are given in Part 3)
Braz.: Eradacil; ***Mex.:*** Eradacil; ***Port.:*** Eradacil†.

Roxithromycin *(USAN, rINN)*

Roksitromicinas; Roksitromisin; Roksitromysiini; Roxithromycine; Roxithromycinum; Roxitromicin; Roxitromicina; Roxitromycin; RU-965; RU-28965. Erythromycin 9-{*O*-[(2-methoxyethoxy)-methyl]oxime}.

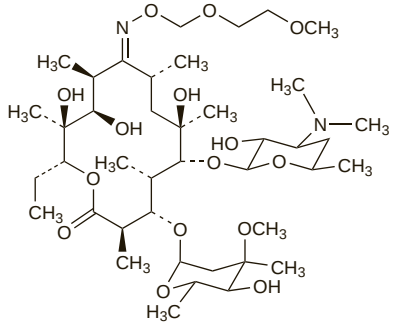
Рокситромицин

$C_{41}H_{76}N_2O_{15}$ = 837.0.

CAS — 80214-83-1.

ATC — J01FA06.

ATC Vet — QJ01FA06.



Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), and *Jpn*.
Ph. Eur. 6.2 (Roxithromycin). A white or almost white, crystalline powder. It exhibits polymorphism. Very slightly soluble in water; freely soluble in alcohol, in acetone, and in dichloromethane; slightly soluble in dilute hydrochloric acid. Store in airtight containers.

Adverse Effects and Precautions

As for Erythromycin, p.270.

Gastrointestinal disturbances are the most frequent adverse effect, but are less frequent than with erythromycin.

The dose of roxithromycin may need to be reduced in patients with hepatic or renal impairment.

Effects on the kidneys. Acute interstitial nephritis has been reported[1] in a patient given roxithromycin; renal function improved over several days after the drug was stopped.

1. Akcay A, *et al.* Acute renal failure and hepatotoxicity associated with roxithromycin. *Ann Pharmacother* 2004; **38:** 721–2.

Effects on the lungs. Acute eosinophilic pneumonia was attributed in a patient to the use of roxithromycin.[1] The condition resolved after treatment with methylprednisolone.

1. Pérez-Castrillón JL, *et al.* Roxithromycin-induced eosinophilic pneumonia. *Ann Pharmacother* 2002; **36:** 1808–9.

Effects on the pancreas. Acute pancreatitis, with duodenal inflammation, pain, pancreatic enlargement, and raised serum-amylase developed in a patient within 24 hours of substituting roxithromycin for erythromycin ethyl succinate.[1] Symptoms resolved rapidly once roxithromycin was stopped.

1. Souweine B, *et al.* Acute pancreatitis associated with roxithromycin therapy. *DICP Ann Pharmacother* 1991; **25:** 1137.

Eosinophilia. For a report of an eosinophilic syndrome in a patient after treatment with azithromycin or roxithromycin, see Azithromycin, p.207. See also under Effects on the Lungs, above.

Interactions

For a discussion of drug interactions of macrolide antibacterials, see Erythromycin, p.271.

Roxithromycin has a much lower affinity for cytochrome P450 isoenzymes than erythromycin and therefore has fewer interactions. It does not appear to interact with antacids, carbamazepine, oral contraceptives, prednisolone, or ranitidine.

Antimicrobial Action

As for Erythromycin, p.271. It is reported to be as active or slightly less active than erythromycin.

Pharmacokinetics

Roxithromycin is absorbed after oral doses with a bioavailability of about 50%. Peak plasma concentrations of about 6 to 8 micrograms/mL occur around 2 hours after a single dose of 150 mg. The mean peak plasma concentration at steady state after a dose of 150 mg twice daily is 9.3 micrograms/mL. Absorption is reduced when taken after a meal. It is widely distributed into tissues and body fluids; high concentrations are taken up into white blood cells. Small amounts of roxithromycin are distributed into breast milk. It is about 96% bound to plasma proteins (mainly α_1-acid glycoprotein) at trough concentrations, but binding is saturable, and only about 87% is bound at usual peak concentrations. Small amounts of roxithromycin are metabolised in the liver, and the majority of a dose is excreted in the faeces as unchanged drug and metabolites; about 7 to 10% is excreted in urine, and up to 15% via the lungs. The elimination half-life is reported to range from about 8 to 13 hours, but may be more prolonged in patients with hepatic or renal impairment and in children. It has been reported that roxithromycin is not substantially removed by peritoneal dialysis.

◊ References.

1. Puri SK, Lassman HB. Roxithromycin: a pharmacokinetic review of a macrolide. *J Antimicrob Chemother* 1987; **20** (suppl B): 89–100.

Uses and Administration

Roxithromycin is a macrolide antibacterial with actions and uses similar to those of erythromycin (p.272). It is given orally to adults in a usual dose of 150 mg twice daily or sometimes 300 mg once daily, at least 15 minutes before meals, for 5 to 10 days in the treatment of susceptible infections.

Dosage may need to be modified in patients with hepatic or renal impairment (see below).

For doses in infants and children, see below.

◊ References.

1. Williams JD, Sefton AM. Comparison of macrolide antibiotics. *J Antimicrob Chemother* 1993; **31** (suppl C): 11–26.
2. Markham A, Faulds D. Roxithromycin: an update of its antimicrobial activity, pharmacokinetic properties and therapeutic use. *Drugs* 1994; **48:** 297–326.
3. Young LS, Lode H, eds. Roxithromycin: first of a new generation of macrolides: update and perspectives. *Infection* 1995; **23** (suppl 1): S1–S52.
4. Lovering AM, *et al.*, eds. Roxithromycin—additional therapeutic potential. *J Antimicrob Chemother* 1998; **41** (suppl B): 1–97.

Administration in children. In children weighing from 6 up to 40 kg a dose of 5 to 8 mg/kg daily of roxithromycin may be used.

Administration in hepatic impairment. The licensed product information for roxithromycin notes that safety in hepatic impairment has not been established and advises halving the usual daily dose (see above) if used.

Administration in renal impairment. The licensed product information for roxithromycin notes that safety in renal impairment has not been established and dosage adjustment details are not specified.

A pharmacokinetic study[1] in 20 subjects (10 with normal renal function and 10 with severely impaired function) suggested that doubling the dosage interval of roxithromycin would be suitable in those with a creatinine clearance of less than 15 mL/minute.

1. Halstenson CE, *et al.* Disposition of roxithromycin in patients with normal and severely impaired renal function. *Antimicrob Agents Chemother* 1990; **34:** 385–9.

Hyperplasia. Gingival hyperplasia is a well recognised adverse effect of ciclosporin treatment; a small study[1] indicated that roxithromycin could reduce overgrowth, possibly by an effect on transforming growth factor-β. For the use of another macrolide, azithromycin, for this indication see Hyperplasia, p.1824.

1. Condé SAP, *et al.* Roxithromycin reduces cyclosporine-induced gingival hyperplasia in renal transplant patients. *Transplant Proc* 2008; **40:** 1435–8.

Ischaemic heart disease. For mention of studies investigating roxithromycin in the prevention of ischaemic heart disease, see under Azithromycin, p.208.

Respiratory disorders. For reference to the use of roxithromycin in the management of respiratory disorders, see under Erythromycin, p.273.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Anuar†; Delos; Klomicina; Rulid; Sinurit†; ***Austral.:*** Biaxsig; Roxar; Roximycin; Rulide; ***Austria:*** Roxithrostad; Rulide; ***Belg.:*** Claramid†; Docroxithro; Rulid; ***Braz.:*** Floxid; Rotram; Roxid†; Roxina; Roxitran; Roxitricina†; Roxitrom; Roxitromin†; Rulid; ***Chile:*** Ramivan; ***Cz.:*** Rovenal†; Rulid†; ***Denm.:*** Forilin†; Forimycin; Roximstad; Surlid; ***Fin.:*** Roxibion; Surlid; ***Fr.:*** Claramid; Rulid; Subroxine; ***Ger.:*** Infectoroxit; Romyk†; Roxi; Roxipaed†; Roxi-Puren; Roxi-Q; Roxi-saar; Roxibeta; Roxidura; Roxigamma; Roxigrun; RoxiHefa; RoxiHexal; Roxiklinge†; Roxithro-Lich; Rulid; ***Gr.:*** Acevor; Anti-Bio; Aristomycin; Asmetic; Azuril; Bazuctril; Bicofen; Delitroxin; Erybros; Macrolid-S; Neo-Suxigal; Nirox; Oxetine; Redotrin; Roxibron; Roxicillin; Roximin; Roxitazon; Roxivinol; Roxy-Due; Roxyspes; Rulid; Seide; Siguon; Thriostaxil; Tirabicin; Toscamycin-R; Uramilon; Vaselpin; Vomitoran; ***Hong Kong:*** Roxicin; Rudin; Rulid; Uonin; ***Hung.:*** Renicin; Rulid; ***India:*** Biorox; Roxee; Roxem; Roxeptin; Roxibid; Roxid; Roxivista; Roxyrol; Unorox†; ***Indon.:*** Anbiolid; Biostatik; Ixor; Rolexit; Rulid; Ruxcine; Simacron; Sitro; Uplores; Xorin; ***Israel:*** Roxo; Rulid; ***Ital.:*** Assoral; Overal; Rossitrol; Rulid; ***Malaysia:*** Roxcin; Roxinox; Rulid; Uonin; ***Mex.:*** Crolix; Kensodic; Rulid; Sertrom; ***Neth.:*** Rulide; ***NZ:*** Romicin; ***Philipp.:*** Macrol; Marulide; Rulid; Ruthison; Thromyn; ***Pol.:*** Renicin; Rolicyn; Roxiratio; Roxitron; Rulid; Xitrocin; ***Port.:*** Inferoxin; Odonticina; Roxitron; Rulide; ***Rus.:*** Elrox (Элрокс); Roxeptin (Роксептин); Roxihexal (Роксигексал); Roxylor (Роксилор); Rulid (Рулид); ***S.Afr.:*** Roxulide; Roxxibid; Rulide; Throsyn; ***Singapore:*** Roxid; Rulid†; ***Spain:*** Macrosil; Rotramin; Rulide; ***Swed.:*** Surlid; ***Switz.:*** Rulid; ***Thai.:*** Ammirox; Eroxade; Poliroxin; Rothricin; Roxcin; Roxicin; Roxilan; Roximin; Roxithro; Roxithroxyl; Roxitin; Roxitop; Roxlecon; Roxomycin; Roxthomed; Roxthrin; Roxto; Roxtrocin; Roxy; Roxydin; Rucin; Rulid; Uonin; Utolid; Vesthromycin; ***Turk.:*** Remora; Ritosin; Roksimin; Roksolit; Rulid; ***Venez.:*** Rancolid†; Roxicure; Roxitrol; Rulid.

Multi-ingredient: ***India:*** Roxeptin-ME.

Rufloxacin Hydrochloride *(BANM, rINNM)*

Hidrocloruro de rufloxacino; MF-934 (rufloxacin); Rufloxacine, Chlorhydrate de; Rufloxacini Hydrochloridum. 9-Fluoro-2,3-dihydro-10-[4-methylpiperazin-1-yl]-7-oxo-7*H*-pyrido[1,2,3-*de*]-1,4-benzothiazine-6-carboxylic acid hydrochloride.

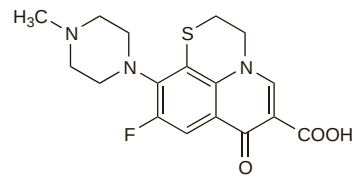
Руфлоксацина Гидрохлорид

$C_{17}H_{18}FN_3O_3S,HCl$ = 399.9.

CAS — 101363-10-4 (rufloxacin); 106017-08-7 (rufloxacin hydrochloride).

ATC — J01MA10.

ATC Vet — QJ01MA10.



(rufloxacin)

Profile

Rufloxacin is a fluoroquinolone antibacterial with properties similar to those of ciprofloxacin (p.243). It is given orally as the hydrochloride in the treatment of susceptible infections in a usual initial dose of 400 mg on the first day followed by 200 mg daily thereafter. A plasma half-life of 30 hours or more has been reported.

Preparations

Proprietary Preparations (details are given in Part 3)
Ital.: Monos; Qari; Tebraxin; ***Mex.:*** Uroflox; ***Philipp.:*** Uroclar; ***Thai.:*** Uroflox.

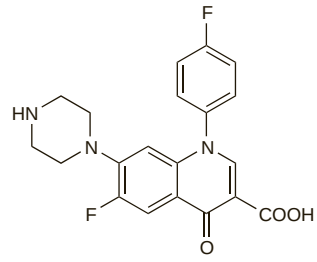
Sarafloxacin Hydrochloride *(BANM, USAN, rINNM)*

A-57135 (sarafloxacin); A-56620 (sarafloxacin or sarafloxacin hydrochloride); Abbott-56620 (sarafloxacin or sarafloxacin hydrochloride); Hidrocloruro de sarafloxacino; Sarafloxacine, Chlorhydrate de; Sarafloxacini Hydrochloridum.

Сарафлоксацина Гидрохлорид

$C_{20}H_{17}F_2N_3O_3,HCl$ = 421.8.

CAS — 98105-99-8 (sarafloxacin); 91296-87-6 (sarafloxacin hydrochloride).



(sarafloxacin)

Profile

Sarafloxacin is a fluoroquinolone antibacterial that has been used as the hydrochloride in veterinary medicine.

Sisomicin Sulfate *(USAN, rINNM)*

Antibiotic 6640 (sisomicin); Rickamicin Sulphate; Sch-13475 (sisomicin); Sisomicin Sulphate *(BANM)*; Sisomicine, Sulfate de; Sisomicini Sulfas; Sissomicin Sulphate; Sulfato de sisomicina. 4-*O*-[(2*R*,3*R*)-*cis*-3-Amino-6-aminomethyl-3,4-dihydro-2*H*-pyran-2-yl]-2-deoxy-6-*O*-(3-deoxy-4-*C*-methyl-3-methylamino-β-L-arabinopyranosyl)streptamine sulphate; 2-Deoxy-6-*O*-(3-deoxy-4-*C*-methyl-3-methylamino-β-L-arabinopyranosyl)-4-*O*-(2,6-diamino-2,3,4,6-tetradeoxy-D-*glycero*-hex-4-enopyranosyl)streptamine sulphate.

Сизомицина Сульфат

$(C_{19}H_{37}N_5O_7)_2,5H_2SO_4$ = 1385.4.

CAS — 32385-11-8 (sisomicin); 53179-09-2 (sisomicin sulfate).

ATC — J01GB08.

ATC Vet — QJ01GB08.

Pharmacopoeias. In *Chin.*, *Jpn*, and *US*.

USP 31 (Sisomicin Sulfate). It loses not more than 15% of its weight on drying. 1 mg of sisomicin sulfate has a potency equivalent to not less than 580 micrograms of sisomicin calculated on the dried basis. A 4% solution in water of sisomicin has a pH of 3.5 to 5.5. Store in airtight containers.

Profile

Sisomicin, an antibiotic produced by *Micromonospora inyoensis* and closely related to gentamicin C_{1A}, is an aminoglycoside with general properties similar to those of gentamicin (p.282). It is given as the sulfate but doses are expressed in terms of the base; 1.5 g of sisomicin sulfate is equivalent to about 1 g of sisomicin. The usual dose for adults is 3 mg/kg daily given intramuscularly in 2 or 3 divided doses. It may be given by intravenous infusion if necessary.

Preparations

USP 31: Sisomicin Sulfate Injection.

Proprietary Preparations (details are given in Part 3)
India: Sisoptin; ***Ital.:*** Mensiso†.

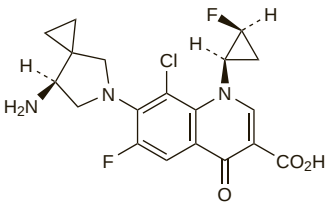
Sitafloxacin *(USAN, rINN)*

DU-6859 (anhydrous sitafloxacin); DU-6859a (sitafloxacin sesquihydrate); Sitafloxacine; Sitafloxacino; Sitafloxacinum. (–)-7-[(7*S*)-7-Amino-5-azaspiro[2.4]hept-5-yl]-8-chloro-6-fluoro-1-[(1*R*,2*S*)-2-fluorocyclopropyl]-1,4-dihydro-4-oxo-3-quinolinecarboxylic acid.

Ситафлоксацин

$C_{19}H_{18}ClF_2N_3O_3$ = 409.8.

CAS — 127254-12-0 (anhydrous sitafloxacin); 163253-37-0 (sitafloxacin monohydrate); 163253-35-8 (sitafloxacin sesquihydrate).



NOTE. Sitafloxacin exists in several hydration states; the name sitafloxacin has been used to refer to both the anhydrous substance and the sesquihydrate ($C_{19}H_{18}ClF_2N_3O_3,1/H_2O$ = 436.8); the latter is known in Japan as sitafloxacin hydrate.

Profile

Sitafloxacin is a fluoroquinolone that is given orally in the treatment of susceptible infections.

Preparations

Proprietary Preparations (details are given in Part 3)
Jpn: Gracevit.

Sparfloxacin *(BAN, USAN, rINN)*

AT-4140; CI-978; Esparfloxacino; PD-131501; RP-64206; Sparfloksasiini; Sparfloxacine; Sparfloxacinum. 5-Amino-1-cyclopropyl-7-(*cis*-3,5-dimethylpiperazin-1-yl)-6,8-difluoro-1,4-dihydro-4-oxoquinoline-3-carboxylic acid.

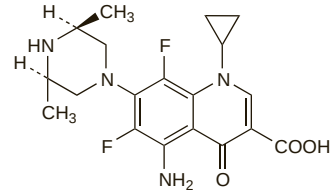
Спарфлоксацин

$C_{19}H_{22}F_2N_4O_3$ = 392.4.

CAS — 110871-86-8.

ATC — J01MA09.

ATC Vet — QJ01MA09.



Pharmacopoeias. In *Chin.*

Adverse Effects and Precautions

As for Ciprofloxacin, p.244.

Concern over phototoxicity associated with sparfloxacin has led to restriction of its use in some countries; patients should be advised to avoid exposure to sunlight during, and for a few days after, sparfloxacin therapy, and to stop the drug immediately if phototoxicity occurs.

Photosensitivity. In a survey[1] of the reporting rate for phototoxicity associated with sparfloxacin in France, the manufacturer or the French Pharmacovigilance System received 371 reports of severe phototoxic reactions during the first 9 months after marketing of the drug; this approximated to between 4 and 25 times the rate reported for other fluoroquinolones.

1. Pierfitte C, *et al.* The link between sunshine and phototoxicity of sparfloxacin. *Br J Clin Pharmacol* 2000; **49:** 609–12.

Interactions

As for Ciprofloxacin, p.246.

Sparfloxacin does not appear to interact with theophylline or caffeine, nor with warfarin or cimetidine. Probenecid does not alter the pharmacokinetics of sparfloxacin.

Antimicrobial Action

As for Ciprofloxacin, p.246.

Sparfloxacin is reported to be more active *in vitro* than ciprofloxacin against mycobacteria and against Gram-positive bacteria, including *Streptococcus pneumoniae* and other streptococci and staphylococci.

Pharmacokinetics

Sparfloxacin is well absorbed from the gastrointestinal tract with a bioavailability of about 90%. Peak plasma concentrations occur 3 to 6 hours after a dose. Sparfloxacin is widely distributed into body tissues and fluids, including respiratory tissues, but is only about 45% bound to plasma proteins. It is metabolised in the liver by glucuronidation and has an elimination half-life of about 20 hours. It is excreted in equal amounts in the faeces and urine as unchanged drug and as the glucuronide metabolite.

◊ References.

1. Shimada J, *et al.* Clinical pharmacokinetics of sparfloxacin. *Clin Pharmacokinet* 1993; **25:** 358–69.

Uses and Administration

Sparfloxacin is a fluoroquinolone antibacterial with actions and uses similar to those of ciprofloxacin (p.247). It is given orally for the treatment of susceptible infections in a usual dose of 100 to 300 mg in 1 or 2 divided doses daily. It has also been tried in tuberculosis (see under Uses and Administration of Ciprofloxacin, p.248).

◊ General references.

1. Finch RG, *et al.*, eds. Sparfloxacin: focus on clinical performance. *J Antimicrob Chemother* 1996; **37** (suppl A): 1–167.
2. Goa KL, *et al.* Sparfloxacin: a review of its antibacterial activity, pharmacokinetic properties, clinical efficacy and tolerability in lower respiratory tract infections. *Drugs* 1997; **53:** 700–25.
3. Martin SJ, *et al.* Levofloxacin and sparfloxacin: new quinolone antibiotics. *Ann Pharmacother* 1998; **32:** 320–36.
4. Schentag JJ. Sparfloxacin: a review. *Clin Ther* 2000; **22:** 372–87.

Preparations

Proprietary Preparations (details are given in Part 3)
Cz.: Zagam†; ***India:*** Scat; Sparbact; Sparcip; Spardac; Spardrops; Sparquin; Sparvista; Sparx; ***Indon.:*** Newspar; Resflok; Sparos; ***Jpn:*** Spara; ***Rus.:*** Sparflo (Спарфло); ***USA:*** Zagam†.

Spectinomycin *(BAN, rINN)*

Actinospectacin; Espectinomicina; Spectinomycine; Spectinomycinum; Spektinomycin; Spektinomysiini. Perhydro-4a,7,9-trihydroxy-2-methyl-6,8-bis(methylamino)pyrano[2,3-*b*][1,4]benzodioxin-4-one.

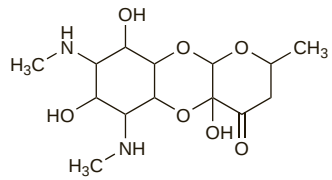
Спектиномицин

$C_{14}H_{24}N_2O_7$ = 332.3.

CAS — 1695-77-8.

ATC — J01XX04.

ATC Vet — QJ01XX04.



Description. Spectinomycin is an antimicrobial substance produced by the growth of *Streptomyces spectabilis* or by any other means.

Spectinomycin Hydrochloride *(BANM, USAN, rINNM)*

Hidrocloruro de espectinomicina; M-141; Spectinomycine, Chlorhydrate de; Spectinomycine (dichlorhydrate de) pentahydraté; Spectinomycini dihydrochloridum pentahydricum; Spectinomycini hydrochloridum; Spektinomicin-hidroklorid; Spektinomicino hidrochloridas; Spektinomycin hydrochlorid; Spektinomycindihydrokloridpentahydrat; Spektinomysiinidihydrokloridipentahydraatti; Spektynomycyny chlorowodorek; Spektynomycyny dichlorowodorek pięciowodny; U-18409AE. Spectinomycin dihydrochloride pentahydrate.

Спектиномицина Гидрохлорид

$C_{14}H_{24}N_2O_7,2HCl,5H_2O$ = 495.3.

CAS — 21736-83-4 (anhydrous spectinomycin hydrochloride); 22189-32-8 (spectinomycin hydrochloride pentahydrate).

ATC — J01XX04.

ATC Vet — QJ01XX04.

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

Ph. Eur. 6.2 (Spectinomycin Dihydrochloride Pentahydrate). A substance produced by *Streptomyces spectabilis* or by any other means. A white or almost white, slightly hygroscopic, powder. Freely soluble in water; very slightly soluble in alcohol. A 10% solution in water has a pH of 3.8 to 5.6. Store in airtight containers.

USP 31 (Spectinomycin Hydrochloride). A white to pale buff crystalline powder. 1 mg of monograph substance has a potency equivalent to not less than 603 micrograms of spectinomycin. Freely soluble in water; practically insoluble in alcohol, in chloroform, and in ether. A 1% solution in water has a pH of 3.8 to 5.6. Store in airtight containers.

Adverse Effects and Precautions

Nausea, dizziness, fever and chills, insomnia, and urticaria have occasionally occurred with single doses of spectinomycin. Anaphylaxis has occurred rarely. Mild to moderate pain has been reported after intramuscular injections. Alterations in kidney and liver function and a decrease in haemoglobin and haematocrit have occasionally been seen with repeated doses. Although a reduction in urine output has been seen after single and multiple doses, spectinomycin has not been noted to produce functional changes indicative of nephrotoxicity.

Spectinomycin is ineffective in the treatment of syphilis and patients being treated for gonorrhoea should be observed for evidence of syphilis.

Interactions

Lithium. For the effect of spectinomycin on lithium, see Antimicrobials, under Interactions of Lithium, p.404.

Antimicrobial Action

Spectinomycin is an aminocyclitol antibacterial that acts by binding to the 30S subunit of the bacterial ribosome and inhibiting protein synthesis. Its activity is generally modest, particularly against Gram-positive organisms. Anaerobic organisms are mostly resistant. Various Gram-negative organisms are sensitive, including many enterobacteria and also *Haemophilus ducreyi*, and it is particularly effective against *Neisseria gonorrhoeae*. Although generally bacteriostatic, spectinomycin is bactericidal against susceptible gonococci at concentrations not much above the MIC.

Resistance may develop by chromosomal mutation or may be plasmid-mediated in some organisms; resistant gonococci have been reported clinically, notably in the Far East, but in most parts of the world resistant neisserial strains have been uncommon to date.