

Examples: streptomycin, gentamicin, tobramycin

Mechanism of action

A bactericidal group of drugs which inhibit bacterial protein synthesis by irreversibly binding bacterial ribosomes. They require entry to Gram negative bacterial cells through outer cell membrane (via porins) and inner cytoplasmic membrane (an oxygen-dependent system) in order to exert their effect. They have difficulty penetrating Gram positive cell walls.

They are therefore effective against Gram negative aerobic bacteria but not against anaerobic gram negative bacteria whose cell wall/membranes the antibiotic cannot penetrate. They have limited application against Gram positive bacteria.

Synergistic with penicillins - cell wall synthesis inhibitors increase the permeability of the cell wall to aminoglycosides.

They do not cross the blood brain barrier and have low concentrations in many tissues. They reach high concentrations in the inner ears and kidneys.

Adverse Effects

Ototoxicity - accumulates in the endolymph and perilymph of the inner ear causing deafness, tinnitus and vertigo. Increased risk with co-use of loop diuretics and cisplatin.

Nephrotoxicity - retention of aminoglycosides by proximal tubular cells disrupts calcium-mediated transport processes resulting in nephrotoxicity. This ranges from mild, reversible renal impairment to severe, irreversible acute tubular necrosis. Dose, frequency and duration of therapy determine the extent of nephrotoxicity.

Other adverse effects - allergy, neuromuscular blockade. They cross the placenta and may cause congenital deafness.

Gentamicin Prescribing

Where possible prescribe gentamicin using the Gentamicin calculator.

If critically ill and gentamicin is needed prescribe 5mg/kg actual body weight (max 400mg).

If critically ill and known CKD stage V give 2.5mg/kg (max 180mg).

Always prescribe gentamicin on the Gentamicin prescription chart.

Gram Positive Cocci			Gram Negative Bacilli			Anaerobes
MRSA	MSSA	Streptococci	E.coli, Klebsiella	Proteus	Pseudomonas	
		Penicillin				
		Amoxycillin				
		Flucloxacillin				
		Cephazolin				
	Clindamycin					Clindamycin
Rifampicin/Fusidic Acid						
Vancomycin/Teicoplanin, Linezolid, Daptomycin						Metronidazole
		Trimethoprim				
		Ciprofloxacin				
		Gentamicin/Tobramycin, Aztreonam				Moxifloxacin
		Moxifloxacin				
		Cefuroxime				
		Ceftiaxone				
		Ceftazidime				
		Cefepime				
		Amoxycillin-clavulanate				Amoxycillin-clavulanate
		Ticarcillin-clavulanate, Piperacillin-tazobactam				Ticarcillin-clavulanate, Piperacillin-tazobactam
		Meropenem [†] , Imipenem [†]				
		Ertapenem [†]				Ertapenem [†]

Antibiotics in **bold** also cover Enterococcus Faecalis. For simplicity, atypical organisms are not shown.

ESBL-producing organisms are **not** susceptible to most antibiotics containing a beta-lactam ring; carbapenems[†] are the usual agent of choice.

*ESCAPPM organisms are Enterobacter spp., Serratia spp., Citrobacter freundii, Aeromonas spp., Proteus spp., Providencia spp. & Morganella morganii.