

Target	Class		Examples	G +/-	Cidal / Static	Mechanism	Clinical Uses	Admin.	Adverse Effects	Resistance
Bacterial Wall (peptidoglycan) synthesis)	B lactam antibiotics	Penicillin	Ticarcillin Amoxicillin Methycillin	+, many -	cidal	-inhibit transpeptidases that cross-link peptidoglycan -stimulate autolysins that break down PG -cell wall loses rigidity -bacterial lysis	-B lactams can't be used against chlamydia/mycoplasma -ticarcillin can be used against pseudomonas -methycillin for anti-staph	Pencillin G by injection, penicillin V orally	-hypersensitivity (also type II, III, IV) -anaphylactic shock -GI upset (ampicillin)	1. inactivation by B lactamase (staph, pseudomonas, influenzae) 2. reduced permeability via porin proteins in G- outer membrane 3. altered penicillin binding proteins (MRSA, VRE, G+/-)
		Cephalosporin	Cephalexin Cefazolin Cefaclor Cefamandole Cefotaxime ceftriaxone	+,-	cidal	-inhibit transpeptidases that cross-link peptidoglycan -stimulate autolysins that break down PG -cell wall loses rigidity -bacterial lysis -can cross blood-brain barrier	1. UTI, surgical prophylaxis 2. sinusitis, otitis media, H. influenzae 3. meningitis streptococci, Neisseria, H. influenzae, G-sepsis → serous infections	IV or IM	-hypersensitivity -GI upset -cross sensitivity to penicillins	-more resistant to B lactamases than penicillin (cephalexin/cefazolin)
		B-lactamase resistant drugs	Inhibitors: Clavulanate Sulbactam Tazobactam Resistant B lactams: Methicillin Aztreonam Imipenem			-Blocks B lactamase activity		In combo with B lactam		
	Bacitracin			+ only		-inhibits bacterial cell wall formation by interfering with transfer of peptidoglycan polymer units to growing cell wall	-staphylococcus spp., streptococci	Topical only	-nephrotoxicity	
	Vancomycin			+	cidal	-stop formation of peptidoglycan chains that form cell wall -damages cell membrane function	-for really resistant bacteria (MRSA, enterococcus), life/sight threatening situations -staphylococcus spp., B lactamase strains	IV, topically	-fever, chills, rash, neurotoxicity, ototoxicity, nephrotoxicity	

Inhibit Bacterial Protein Synthesis	Aminoglycosides	Tobramycin Gentamycin Neomycin, streptomycin Kanamycin amikacin	-m some e +	cidal	-uptake via outer membrane/porins, active transport, passive diffusion... -binds to 30S ribosomal subunit to inhibit protein synthesis via misreading mRNA, blocking initiation of peptide formation and breaking up polysomes to monosomes -damages cell membrane	-pseudomonas aeruginosa -staph aureus -NOT ANAEROBIC BACTERIAL INFECTIONS	IV, IM for systemic, topical ocular	-nephrotoxicity ototoxicity	1. inactivation by bacterial enzymes 2. alter target 30S ribosome 3. reduced permeability
	Macrolides (& Lincosamides)	Erythromycin Azithromycin clarithromycin	+, newer r -	Static, cidal for azithromycin + clarithromycin	-binds reversibly to 50S ribosomal subunit to prevent peptide chain elongation	-safe for children		-GI upset	1. alteration of 50S target 2. inactivation enzymatic hydrolysis 3. decreased permeability
	Tetracyclines	Tetracycline (short acting) Doxycycline (long acting)	+, -	static	-bind to 30S subunit to block attachment of aminoacyl tRNA and prevent new AAs from entering peptide	-not for children under 8 -E. coli, N. gonorrhoeae, Chlamydia trachomatis, mycoplasma	oral	-children <8: teeth discoloration, hypoplasia of enamel -GI upset -photosensitivity -mycoplasma pneumonia -chlamydial urogenital infections -UTI -URT infections -Lyme disease -acne rosacea	1. protein pump removed drug from bacteria and reduced permeability 2. absorption inhibited by food
	Chloramphenicol		+, -	static	-reversibly binds to 50S to inhibit enzyme peptidyl transferase and prevent peptide bond formation between AAs	-Salmonella typhi, Bacteriodes fragilis -used for severe systemic or ocular infections		-hematological: reversible bone marrow depression, aplastic anemia -optic neuritis	1. inactivation by chloramphenicol acetyl transferase (CAT)
	Oxazolidinones	linezolid	+		-inhibits protein synthesis initiation	-staphylococcus, streptococcus, enterococcus (VRE/MRSA)	Oral, IV	-nausea, vomiting, diarrhea	
Interference with nucleic acid synthesis and function	Fluoroquinolones	Ciprofloxacin Norfloxacin ofloxacin	+, -	cidal	-inhibits DNA gyrase to prevent uncoiling/supercoiling		Oral?	-GI upset -ciprofloxacin not safe <18 years -norfloxacin /ofloxacin not for infants <1 year -drug interactions with theophylline, arfarin	1. alteration of target DNA gyrase 2. reduced permeability (G-porins)
	Trimethoprim		+, - except p augs inosa , b. fragilis	static	-inhibits dihydrofolate reductase (DHFR) to prevent dihydrofolic to tetrahydrofolic acid step of folic acid biosynthetic pathway	-urinary tract infections	oral	-hypersensitivity -anemia -GI upset -nephrotoxicity	1. alteration/absence of SHFR

	Sulfonamides	Sulfamethoxazole + sulfacetamide sodium	+, - not p aer.	static	-compete with PABA for active site of dihydropteroate synthetase to inhibit folic acid synthesis → purine/nucleic acid synthesis			-fever, headache -GI upset, nausea -rash, photosensitivity -liver damage -bone marrow suppression -type III hypersens.	1. alteration of dihydropteroate synthetase with increased affinity for PABA 2. increase production of competing PABA 3. reduced permeability
Cell membrane drugs		Polymyxin B	-		-interferes with cell membrane function		Topical only		1. activity inhibited by cations 2. decrease permeability through G- outer membrane