

Class/Name	Mechanism	Clearance	Toxicity	Spectrum	Use
Penicillins	bind to penicillin-binding proteins and block cell wall synthesis, cidal	Renal, short half-life			
Penicillin G	"	"	hypersensitivity reactions and seizures (rare)	Narrow. Normal mouth flora including mouth anaerobes, Strep pneumoniae (many now resistant), Strep. pyogenes, spirochetes (Treponema pallidum, syphilis).	mouth infections, aspiration pneumonia, and pneumococcal pneumonia (use high dose because of intermediate resistance)
Ampicillin and Ampicillin clavulanate	"	"	"	Moderately broad; with clavulanate broad: same as penicillin G + Listeria monocytogenes, Enterococcus and H. influenzae. With clavulanate MSSA and Moraxella catarrhalis and beta-lactamase producing H. influenzae	Otitis media, Listeria meningitis, Bacterial sinusitis
Cephalosporins	bind to penicillin-binding proteins, cidal		Safest class of antibiotics		
First generation: Cefazolin	"	Renal, moderately short half-life	hypersensitivity reactions more common than other cephalosporins	Narrow. MSSA, Strep pyogenes, S. pneumoniae, E. coli (some), Klebsiella, Proteus	Soft tissue infections, surgical prophylaxis, does not cross blood-brain barrier
Third generation: Ceftriaxone	"	Hepatic, excreted in the bile	Biliary sludging and cholelithiasis	Broad - Improved Gram negative coverage including Neisseria species gonorrhoeae and meningitidis, H. influenzae, Moraxella, Salmonella, Citrobacter, Morganella	Community-acquired pneumonia and bacterial meningitis, treatment of gonorrhea
Carbapenems Imipenem	bind penicillin-binding proteins, highly resistant to beta-lactamases	renal, short half-life	allergic reactions, seizures	Very broad including most Gram-positive, Gram-negative and anaerobic bacteria	Intra-abdominal infections, empiric therapy, resistant hospital-acquired pathogens

Glycopeptide Vancomycin	binds to D-Ala-D-Ala interfering with cell wall synthesis, cidal	Renal, long half-life	nephrotoxicity, phlebitis at iv administration site, no cross-reactivity to Penicillin (use in PCN-allergic patient)	Narrow. Covers MRSA, MSSA, S. pyogenes, enterococcus (except VRE)	Widely used for suspected MRSA bacteremia, S. pyogenes, Enterococcus
Quinolones Ciprofloxacin	inhibit DNA gyrase, cidal	Renal, intermediate half-life. Well absorbed orally and levels same as IV	collagen and tendon breakdown, prolonged QT interval	Broad (Cipro) to very broad (levo and moxi). Ciprofloxacin most Gram-negatives including Pseudomonas. Levofloxacin and moxyfloxacin same Gram-negative activity plus Gram-positive coverage including S. pneumoniae and MSSA. Covers Chlamydia and mycoplasma	UTI, traveler's diarrhea, Salmonella typhi, Bartonella henselae
Macrolides Azythromycin	inhibit protein synthesis	Hepatic, long half-life	increase bowel motility, nausea and vomiting	Moderately broad. S. pneumoniae, S. pyogenes, Legionella pneumoniae, Mycoplasma pneumoniae, Chlamydia pneumoniae	Pneumonia
Metronidazole nitroimidazole	electron acceptor, free radical formation, DNA strand breaks, cidal	Hepatic, moderate half-life	Causes adverse reactions to alcohol, potential mutagenic potential not recommended for pregnant women	Strictly covers anaerobes, some protozoa (Trichomonas vaginales)	Intra-abdominal infections in conjunction with other antibiotics, aspiration pneumonia combined with a cephalosporin