

Gene	Antibiotic Class	Resistance Conferred	Mechanism	Common Organisms
bla_TEM	β -Lactams (Penicillins)	Penicillin, early cephalosporins	Class A β -lactamase (hydrolyzes β -lactam ring)	E. coli, K. pneumoniae, P. aeruginosa
bla_SHV	β -Lactams (Penicillins/ Cephalosporins)	Penicillins, some cephalosporins	Class A β -lactamase	K. pneumoniae, E. coli
bla_CTX-M	Extended-Spectrum β -Lactams	Cefotaxime, ceftriaxone, cefepime (3rd/4th-gen cephs)	Class A ESBL (extended-spectrum β -lactamase)	E. coli, K. pneumoniae, Salmonella
bla_KPC	Carbapenems / β -Lactams	Imipenem, meropenem, ertapenem	Class A carbapenemase (hydrolyzes carbapenem ring)	K. pneumoniae, Enterobacter spp.
bla_NDM	Carbapenems / β -Lactams	Imipenem, meropenem, doripenem	Metallo- β -lactamase (zinc-dependent hydrolysis)	E. coli, K. pneumoniae, Acinetobacter baumannii
mecA	β -Lactams (Penicillins)	Methicillin, oxacillin, most penicillins	Alters PBP (penicillin-binding protein PBP2a) binding	Staphylococcus aureus (MRSA)
vanA	Glycopeptides	Vancomycin, teicoplanin	Alters peptidoglycan precursor (D-Ala-D-Lac substitution)	Enterococcus faecalis, E. faecium
vanB	Glycopeptides	Vancomycin	Alters peptidoglycan precursor (D-Ala-D-Lac substitution)	Enterococcus faecalis, E. faecium
ermB	Macrolides / Lincosamides	Erythromycin, clindamycin	Methylation of 23S rRNA (prevents antibiotic binding)	Streptococcus pneumoniae, S. agalactiae, Enterococcus spp.
ermC	Macrolides / Lincosamides	Erythromycin, clindamycin	Methylation of 23S rRNA	Staphylococcus aureus
tetA	Tetracyclines	Tetracycline, doxycycline	Efflux pump	E. coli, Salmonella spp.
tetB	Tetracyclines	Tetracycline, minocycline	Efflux pump	E. coli, K. pneumoniae
tetM	Tetracyclines	Tetracycline, doxycycline, minocycline	Ribosomal protection protein	Campylobacter spp., Enterococcus spp., Streptococcus spp.
aac(6)-Ib	Aminoglycosides	Gentamicin, tobramycin, amikacin	Aminoglycoside acetyltransferase (inactivates drug)	E. coli, K. pneumoniae, P. aeruginosa
aph(3')-IIIa	Aminoglycosides	Kanamycin, amikacin	Aminoglycoside phosphotransferase (inactivates drug)	Enterococcus faecalis, E. faecium
ant(2'')-Ia	Aminoglycosides	Gentamicin, tobramycin	Aminoglycoside nucleotidyltransferase (inactivates)	Pseudomonas aeruginosa, Staphylococcus spp.
sul1	Sulfonamides	Sulfamethoxazole (often combined with trimethoprim)	Dihydropteroate synthase variant (low binding)	E. coli, K. pneumoniae, Salmonella spp.
sul2	Sulfonamides	Sulfamethoxazole	Dihydropteroate synthase variant (low binding)	E. coli, Salmonella spp., Shigella spp.
qnrA	Fluoroquinolones	Ciprofloxacin, levofloxacin	Protects DNA gyrase/topoisomerase from drug binding	K. pneumoniae, E. coli
qnrB	Fluoroquinolones	Ciprofloxacin, levofloxacin	Protects DNA gyrase/topoisomerase	Enterobacter cloacae, E. coli
qnrS	Fluoroquinolones	Ciprofloxacin, levofloxacin	Protects DNA gyrase/topoisomerase	Salmonella spp., E. coli
mcr-1	Polymyxins (Colistin)	Colistin	Phosphoethanolamine transferase (modifies lipid A)	E. coli, K. pneumoniae
fosA	Fosfomycin	Fosfomycin	Glutathione transferase (inactivates drug)	K. pneumoniae, P. aeruginosa, E. coli
ermA	Macrolides / Lincosamides	Erythromycin, clindamycin	Methylation of 23S rRNA	Staphylococcus aureus, Streptococcus pyogenes
bla_OXA-48	Carbapenems / β -Lactams	Imipenem, meropenem, ertapenem (low-level)	Class D carbapenem-hydrolyzing β -lactamase	K. pneumoniae, E. coli, Acinetobacter baumannii
bla_IMP	Carbapenems / β -Lactams	Imipenem, meropenem	Metallo- β -lactamase (zinc-dependent hydrolysis)	Pseudomonas aeruginosa, K. pneumoniae
bla_VIM	Carbapenems / β -Lactams	Imipenem, meropenem	Metallo- β -lactamase	Pseudomonas aeruginosa, Acinetobacter baumannii
nimA	Nitroimidazoles	Metronidazole	Nitroimidazole reductase (inactivates drug)	Bacteroides fragilis, Clostridioides difficile
catA1	Phenicol	Chloramphenicol	Chloramphenicol acetyltransferase	Salmonella spp., E. coli, Shigella spp.
floR	Phenicol	Chloramphenicol, florfenicol	Efflux pump/multidrug exporter	Salmonella spp., E. coli, Pasteurella multocida
ermF	Macrolides / Lincosamides	Erythromycin, clindamycin	Methylation of 23S rRNA	Bacteroides fragilis, Prevotella spp.
linA	Lincosamides	Clindamycin	Acetyltransferase (inactivates drug)	Staphylococcus aureus, Streptococcus spp.
aadA1	Aminoglycosides	Streptomycin, spectinomycin	Aminoglycoside nucleotidyltransferase	E. coli, Salmonella spp.