Table 15.1-abbrev: Antimicrobial targets

Antibiotic	Resistance (mm)	Mode of Action	Target	Common Use
Ampicillin (AM-10)	<21	Binds to penicillin-binding proteins (PBPs), inhibiting the final transpeptidation state of peptidoglycan formation	Cell Wall	Broad-spectrum (*E. coli, P. mirabilis, Salmonella, S. pneumoniae, S. aureus*)
Bacitracin (Taxo A / B-10)	B-10 <9	Binds the lipid carrier molecule of peptidoglycan building blocks, inhibiting transport across the cell membrane	Cell Wall	Narrow-spectrum (Gram + organisms: *Clostridium, Staphylococcus, a*nd *Streptococcus*)
Chloramphenicol (C-30)	<13	Binds to the 50S ribosomal subunit and prevents the transfer of amino acids to a growing polypeptide chain	Protein Synthesis	Broad-spectrum (Enteric bacteria, *S. pneumonia, N. meningitidis, H. influenzae)*
Novobiocin (NB)	<17	Binds to the enzyme DNA gyrase, preventing the untangling of DNA during replication	DNA replication	Narrow-spectrum (mostly used against Gram + organisms, *S. aureus*)
See full Table 15.1 at end of Unit 5 for list of antibiotics				

Table 15.1 Full Antibiotic Targets

Antibiotic	Resistance (mm)	Mode of Action	Target	Common Use
Ampicillin (AM-10)	<21	Binds to penicillin-binding proteins (PBPs), inhibiting the final transpeptidation state of peptidoglycan formation	Cell Wall	Broad-spectrum (*E. coli, P. mirabilis, Salmonella, S. pneumoniae, S. aureus*)
Bacitracin (Taxo A / B-10)	B-10 <9	Binds the lipid carrier molecule of peptidoglycan building blocks, inhibiting transport across the cell membrane	Cell Wall	Narrow-spectrum (Gram + organisms: *Clostridium, Staphylococcus, a*nd *Streptococcus*)
Chloramphenicol (C-30)	<13	Binds to the 50S ribosomal subunit and prevents the transfer of amino acids to a growing polypeptide chain	Protein Synthesis	Broad-spectrum (Enteric bacteria, *S. pneumonia, N. meningitidis, H. influenzae)*
Erythromycin (E-15)	<14	Binds to the 50S ribosomal subunit, inhibiting transpeptidation and translocation	Protein Synthesis	Broad-spectrum (*Listeria, S. aureus, S. pyogenes, B. pertussis, N. gonorrhoeae*)
Gentamycin (GM-10)	<12	Binds to the 30 S ribosomal subunit leading acceptance of incorrect tRNAs resulting in formation of nonfunctional polypeptides	Protein Synthesis	Broad-spectrum (Enteric bacteria, *P. aeruginosa, S. marcescens, P. vulgaris*)
Kanamycin (K-30)	<12	Binds to the 30 S ribosomal subunit leading acceptance of incorrect tRNAs resulting in formation of nonfunctional polypeptides	Protein Synthesis	Broad-spectrum (Enteric bacteria)

Neomycin (N-30)	<13	Binds to the 30 S ribosomal subunit leading acceptance of incorrect tRNAs resulting in formation of nonfunctional polypeptides	Protein Synthesis	Broad-spectrum (Enteric bacteria, *E. coli, Klebsiella,* and *Enterobacter*)
Novobiocin (NB)	<17	Binds to the enzyme DNA gyrase, preventing the untangling of DNA during replication	DNA replication	Narrow-spectrum (mostly used against Gram + organisms, *S. aureus*)
Optochin (P)	<6	Interferes with ATP synthase and decreases ATP production	Metabolism	Narrow-spectrum (*S. pneumoniae*) *Used mostly for identification not treatment*
Penicillin (P-10)	<21	Binds to penicillin-binding proteins (PBPs), inhibiting the final transpeptidation state of peptidoglycan formation	Cell Wall	Broad-spectrum (Enteric bacteria, *S. pyogenes, S. aureus, S. epidermidis*)
Polymyxin B (PB-300)	<8	Binds to phospholipids in the cell membrane and disrupts membrane integrity leading to leakage of intracellular components	Cell Membrane	Narrow-spectrum (most Gram – organisms except *N. gonorrhoeae, N. meningitidis,* and Gram – cocci)
Streptomycin (S-10)	<12	Binds to the 30 S ribosomal subunit leading acceptance of incorrect tRNAs resulting in formation of nonfunctional polypeptides	Protein Synthesis	Broad-spectrum (Enteric bacteria, *Mycobacteria, S. aureus, E. faecalis*)
Trimethoprim/ Sulfamethoxazole (SXT)	<10	These two drugs work together to prevent folic acid synthesis which is required for the formation of nucleic acids	Metabolism	Broad-spectrum (*S. agalactiae, S. pyogenes S. aureus, P. mirabilis, E. coli*)

Tetracycline (Te-30)	<15	Inhibits protein synthesis by binding to the 30S ribosomal subunit of bacteria and preventing attachment of aminoacyl-tRNA	Protein Synthesis	Broad-spectrum (Enteric bacteria, *C. trachomatis, M. pneumoniae, Shigella, E. coli,* and *V. cholerae)*
Triple Sulfa (SSS-25)	<13	Binds to the enzyme dihydropteroate synthetase, preventing folic acid synthesis which is required for formation of nucleic acids	Metabolism	Broad-spectrum (*Staphylococcus, Streptococcus, N. meningitidis, N. gonorrhoeae, Enterobacter, E. coli*)