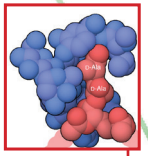
ANTIBIOTICS THAT INHIBIT THE SYNTHESIS OF PETIDOGLYCAN SHEETS IN THE CELL WALL

BETA-LACTAM ANTIBIOTICS such as **Penicillins**, **Cephalosporins,** and **Carbapenems** bind to *Penicillin Binding Proteins (PBPs)*, enzymes essential in forming the cross-linking between the individual peptidoglycans. See the mechanism of action in Figure 1 and drug examples in Table 1.

Peptide Antibiotics such as *Vancomycin* (blue) bind to the *backbones of individual peptidoglycans* preventing the formation of the peptidoglycan sheet



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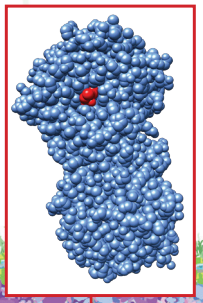
ANTIBIOTICS THAT INHIBIT BACTERIAL METABOLISM

Sulfonamides inhibit the *dihydropteroate synthase enzyme* (blue) which is essential for synthesis of vitamin B9. This causes the bacteria to stop growing.



Example: *Sulfamethoxazole* (red)

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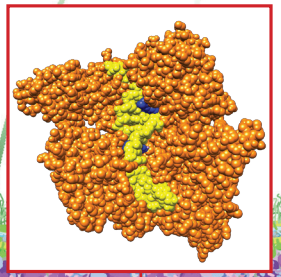
ANTIBIOTICS THAT INHIBIT DNA SYNTHESIS

Quinolones inhibit the *DNA gyrase* (orange), a bacterial enzyme essential in unwinding the double helix for DNA replication.



Example: *Ciprofloxacin* (blue)

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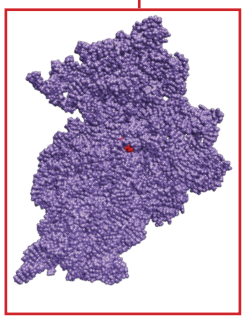
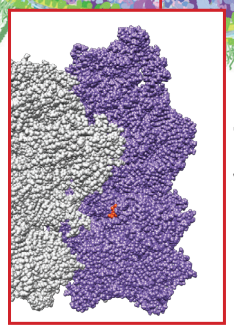
The action of and resistance to these antibiotics is the scope of the 2018 video challenge.



Aminoglycosides bind to the *small subunit of ribosomes* (purple) causing the enzyme to build erroneous protein chains that ultimately kill the cell.

Example: *Paromomycin* (red)

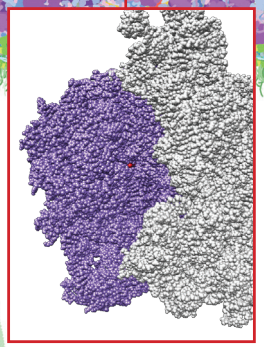
PDB ID 1IBK



Tetracyclines bind to the *small subunit of ribosomes* (purple) preventing the addition of new amino acids to the nascent peptide chain.

Example: *Tetracycline* (red)

PDB ID 5J5B



Lincosamides bind to the *large subunit of ribosomes* (purple) causing premature dissociation of the peptidyl-tRNA.

Example: *Clindamycin* (red)

PDB ID 4V7V

ANTIBIOTICS THAT INHIBIT PROTEIN SYNTHESIS