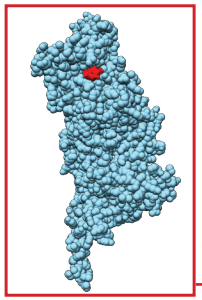
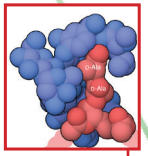
ANTIBIOTICS THAT INHIBIT THE SYNTHESIS OF PETIDOGLYCAN SHEETS IN THE CELL WALL

Beta-Lactam Antibiotics irreversibly bind to *Penicillin Binding Proteins (blue), a group of* enzymes essential in forming of the peptidoglycan sheath encasing the cell membrane



Example: *Ampicillin* (red)
PDB ID 5hl9

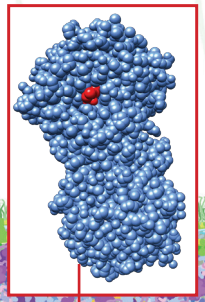
Peptide Antibiotics such as *Vancomycin* (blue) bind to the *backbones of individual peptidoglycans* preventing the formation of the peptidoglycan sheath



PDB ID 1FVM

ANTIBIOTICS THAT INHIBIT BACTERIAL METABOLISM

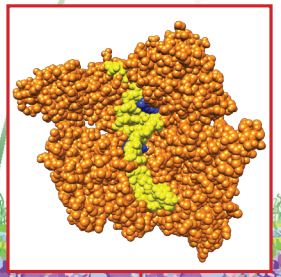
Sulfonamides inhibit the *dihydropteroate synthase enzyme* (blue) which is essential for synthesis of vitamin B9. This causes the bacteria to stop growing.



Example: *Sulfamethoxazole* (red)
PDB ID 3TZF

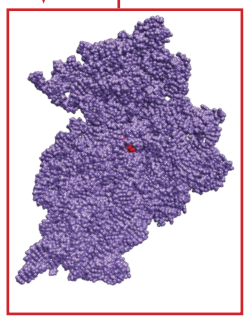
ANTIBIOTICS THAT INHIBIT DNA SYNTHESIS

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



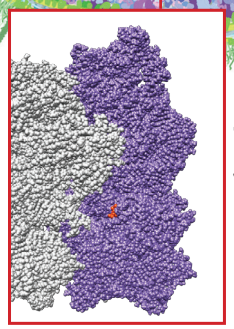
Example: *Ciprofloxacin* (blue)
DB ID 2XCT

The action of and resistance to these antibiotics is the scope of the 2019 video challenge.



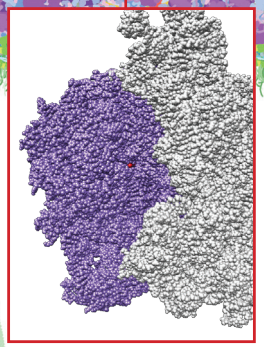
Aminoglycosides bind to the *small subunit of ribosomes* (purple) causing the enzyme to build erroneous protein chains that ultimately kill the cell.

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