## Chapter 10 – Controlling Microbial Growth in the Body: Antimicrobial Drugs

- 1. Explain the principle of selective toxicity.
  - Applying an antimicrobial agent that is more toxic to a pathogen than to the pathogen's host.
- 2. List six mechanisms by which antimicrobial drugs affect pathogens.
  - Drugs that inhibit **cell wall** synthesis, **protein** synthesis, cytoplasmic **membrane**, **metabolic** pathways, **nucleic acid** synthesis, and a **pathogen's attachment** to its host.
- 3. Explain how cell wall synthesis is inhibited by following compounds: penicillin, cephalosporin, vancomycin, bacitracin.
  - **Penicillin** and **cephalosporin**, irreversibly bind to enzymes responsible for the NAM peptide bonding.
  - Vancomycin disrupt cell walls by interfering with alanine-alanine bridges that link NAM sugars.
  - **Bacitracin** blocks the transport of NAG and NAM from cytoplasm to the cell wall.

## 4. Describe the six different mechanisms by which protein synthesis is inhibited by antimicrobial drugs. Altering smaller ribosomal subunits:

- **Streptomycin** alters shape of the subunit, making it impossible for the subunit or besome to correctly read mRNA.
- **Tetracycline** blocks the tRNA docking site (A ster warch prevents the addition of amino acids.

Altering larger ribosomal subunite -

- Chloramphenical plock the enzymatic site of the subunit, preventing peptide bond form to be
- Lisosamides bind to a unferent place, preventing the ribosome to move the string of mRNA codons along.
- Antisense nucleic acid is either RNA or ssDNA that bind to complementary mRNA molecules of pathogens.
- **Oxazolidinone** block the start of translation by preventing the large subunit to form the initiation complex.

## Amphotericin B

- 5. Describe how nystatin and amphotericin B interfere with cytoplasmic membranes.
  - The two drugs above attach to **ergosterol**, a lipid in fungi membrane, causing an open channel.
- 6. Explain how sulfonamides disrupt synthesis of folic acid.

eventual cell death.



7. Describe the term analog as it relates to antimicrobial drugs.