

Week 4 assignment

1. **Define the terms bactericidal and bacteriostatic. Apply this knowledge to a situation where you transfer a sample from the zone of inhibition surrounding an antibiotic disc on a Kirby- Bauer plate to a nutrient agar plate. After allowing for incubation, you observe bacterial growth on the new plate. Explain in 2 to 3 sentences how this growth is possible.**
 - a. Bactericidal refers to agents that kill bacteria, while bacteriostatic refers to agents that inhibit the growth and reproduction of bacteria without necessarily killing them. In the context of transferring a sample from the zone of inhibition surrounding an antibiotic disc on a Kirby-Bauer plate to a nutrient agar plate, the observed bacterial growth after incubation indicates that the antibiotic was bacteriostatic.
2. **Categorize the list of drugs below based on their antimicrobial mechanisms of action (Cell wall, protein synthesis, folic acid synthesis, DNA/RNA, or cell membrane).**
 - a. Fluoroquinolones
 - i. DNA/RNA Synthesis inhibitors
 - b. Polymyxin
 - i. Cell membrane disruptors
 - c. Isoniazid
 - i. Cell wall synthesis inhibitors
 - d. Penicillin
 - i. Cell wall synthesis inhibitors
 - e. Tetracycline
 - i. Protein synthesis inhibitors
 - f. Trimethoprim
 - i. Folic acid synthesis inhibitors
3. **Use your knowledge of the mechanism of action of penicillin to explain why it is ineffective at treating viral infections.**
 - a. Penicillin targets bacterial cell wall synthesis by inhibiting the enzymes responsible for cross-linking peptidoglycan layers, a structure absent in viruses. Since viruses lack a cell wall and rely on host cells for replication, penicillin is ineffective against viral infections.
4. **The relationship between our resident microbiota and our bodies is classified as mutualistic. Describe two benefits provided by our resident microbiota.**
 - a. Our resident microbiota help protect against pathogenic infections by outcompeting harmful microbes for resources and space, thus maintaining a balanced microbial environment. Additionally, they aid in digestion and the synthesis of essential vitamins like vitamin K and B vitamins, contributing to overall health.
5. **Define and provide example infections of each of the following patterns of infection: localized, focal, and secondary.**
 - a. Localized infection
 - i. an infection confined to a specific area of the body, such as a skin abscess caused by *Staphylococcus aureus*.