QUIZ TIME

Microbiology

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Lec: 16

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1. Regarding cell wall synthesis inhibitors, which specific agent acts by blocking the dephosphorylation of the lipid carrier bactoprenol, thereby preventing it from transporting NAM-NAG units across the membrane?

A. Vancomycin

B. Bacitracin

C. Cycloserine

D. Cephalothin

2. Which of the following best describes the mechanism of action of Tetracyclines on the bacterial ribosome?

A. They bind to the 50S subunit and inhibit the formation of peptide bonds.

B. They bind to the 30S subunit and cause the mRNA code to be read incorrectly.

C. They interfere with the attachment of tRNA to the mRNA-ribosome complex.

D. They inhibit the translocation of the ribosome along the mRNA.

3. Sulfamethoxazole acts as a competitive inhibitor in the folic acid synthesis pathway. Which specific enzyme does it inhibit, and which substrate does it compete with?

A. Inhibits Dihydrofolate reductase; competes with Pteridine.

B. Inhibits Dihydropteroate synthetase; competes with Para-aminobenzoic acid (PABA).

C. Inhibits Dihydropteroate synthetase; competes with Dihydrofolic acid.

D. Inhibits Dihydrofolate reductase; competes with Trimethoprim.

4. Why is the clinical use of Polymyxin B generally limited to topical applications or severe resistant infections?

A. It targets mitochondrial ribosomes in host cells.

B. It injures the plasma membrane, which can lead to nephrotoxicity due to similarities with host cell membranes.

C. It is rapidly inactivated by gastric acids and cannot be absorbed.

D. It only works on Gram-positive bacteria, which are rare on skin surfaces.

5. Which of the following antimicrobial targets offers the highest degree of "Selective Toxicity" for the host (human)?

A. Plasma membrane integrity.

B. DNA replication (Gyrase).

C. Protein synthesis (70S Ribosomes).

D. Cell wall synthesis (Peptidoglycan).

6. Chloramphenicol is a broad-spectrum antibiotic that inhibits protein synthesis. What is its precise mode of action?

A. It inhibits the enzyme peptidyl transferase at the 50S ribosomal subunit.

B. It changes the shape of the 30S subunit, causing mistranslation.

C. It prevents the movement (translocation) of the ribosome.

D. It binds irreversibly to the 30S subunit preventing initiation.

7. Which statement accurately distinguishes between the Minimum Inhibitory Concentration (MIC) and the Minimal Lethal Concentration (MLC)?

A. MIC is the concentration required to kill 99.9% of microorganisms, while MLC only inhibits growth.

B. MIC is the lowest concentration that inhibits visible growth after overnight incubation, while MLC is the lowest concentration required to kill 99.9% of the microbes.

C. A higher MIC indicates a more potent antimicrobial agent.

D. MLC is used to determine the dosage for static drugs, while MIC is for cidal drugs.

8. The combination of Sulfamethoxazole and Trimethoprim is a classic example of antibiotic synergism. What is the molecular basis for this effect?

A. One drug increases the cell membrane permeability, allowing the other to enter.

B. They block two sequential steps in the synthesis of tetrahydrofolic acid.

C. One drug inhibits the efflux pump that ejects the other drug.

D. They bind to different subunits of the ribosome (30S and 50S) simultaneously.

9. "L-form" bacteria and Mycoplasma are naturally resistant to Penicillins and Cephalosporins. What is the primary reason for this intrinsic resistance?

A. They produce high levels of Beta-lactamase enzymes.

B. They possess an outer membrane that is impermeable to these drugs.

C. They lack the target structure (cell wall/peptidoglycan) that these drugs attack.

D. They have mutated transpeptidase enzymes.

10. Quinolones, such as Ciprofloxacin and Norfloxacin, exert their bactericidal effect by inhibiting:

A. DNA-dependent RNA polymerase.

B. DNA Gyrase (responsible for supercoiling).

C. Dihydrofolate reductase.

D. The 50S ribosomal subunit.

11. Resistance to Streptomycin is most likely acquired through which specific mechanism?

A. Alteration or mutation of the ribosome subunits (changing the drug's target site).

B. Synthesis of an enzyme that cleaves the beta-lactam ring.

C. Alteration of the metabolic pathway for folic acid.

D. Rapid efflux of the drug from the periplasmic space.

12. Which antibiotic is a glycopeptide that serves as the "last line" of defense against antibiotic-resistant MRSA (Methicillin-resistant Staphylococcus aureus)?

A. Methicillin.

B. Vancomycin.

C. Erythromycin.

D. Bacitracin.

Answer Key

1. B (Bacitracin blocks Bactoprenol phosphate recycling).

2. C (Tetracyclines interfere with tRNA attachment).

3. B (Competes with PABA for Dihydropteroate synthetase).

4. B (Injures plasma membrane; low selective toxicity).

5. D (Humans lack peptidoglycan cell walls, making it the most selective target).

6. A (Inhibits peptidyl transferase/peptide bond formation).

7. B (MIC inhibits visible growth; MLC kills).

8. B (Sequential blocking of the folic acid pathway).

9. C (L-forms and Mycoplasma lack cell walls).

10. B (Inhibit DNA Gyrase).

11. A (Mutation in Ribosome subunits).

12. B (Vancomycin is the glycopeptide for MRSA).

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