

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Invisible Empires, Global Impacts: College Microbiology Quiz

Analyze metabolic diversity and pathogenic mechanisms through 10 rigorous questions focusing on horizontal gene transfer and microbial ecology.

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**1. Which of the following describes a chemolithoautotroph's primary method of energy acquisition and carbon fixation?**

- A. Oxidizing organic compounds for energy and using CO<sub>2</sub> as a carbon source.
- B. Utilizing light for energy and organic molecules for carbon.
- C. Oxidizing inorganic molecules like H<sub>2</sub>S for energy and fixing CO<sub>2</sub>.
- D. Breaking down host proteins for both energy and carbon requirements.

**2. The process by which a bacteriophage transfers DNA from one host cell to another is known as \_\_\_\_\_.**

- A. Transformation
- B. Transduction
- C. Conjugation
- D. Transposition

**3. Gram-negative bacteria possess a thick peptidoglycan layer that retains crystal violet stain during the decolorization step.**

- A. True
- B. False

**4. In the context of the nitrogen cycle, which genus is primarily responsible for symbiotic nitrogen fixation in legume root nodules?**

- A. Nitrobacter
- B. Clostridium
- C. Rhizobium
- D. Pseudomonas

**5. The metabolic pathway used by many microbes to oxidize glucose to pyruvate, specifically yielding 2 ATP and 2 NADH per mole of glucose, is the \_\_\_\_\_ pathway.**

- A. Entner-Doudoroff
- B. Pentose Phosphate
- C. Embden-Meyerhof-Parnas
- D. Glyoxylate

**6. Archaeal plasma membranes can contain ether-linked lipids with branched isoprenoid chains, distinguishing them from Bacterial ester-linked lipids.**

- A. True
- B. False

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**7. Which component of the lipopolysaccharide (LPS) layer in Gram-negative bacteria is responsible for its endotoxin activity?**

- A. O-antigen
- B. Core polysaccharide
- C. Lipid A
- D. Teichoic acid

**8. In microbial genetics, a set of structural genes regulated by a single promoter and operator is termed a(n) \_\_\_\_\_.**

- A. Regulon
- B. Operon
- C. Intron
- D. Plasmid

**9. Prions are infectious agents composed entirely of misfolded DNA molecules that cause neurodegenerative diseases.**

- A. True
- B. False

**10. During the stationary phase of a bacterial growth curve, which of the following is occurring?**

- A. The rate of cell division is exponentially higher than the death rate.
- B. Metabolic activity stops completely as cells enter dormancy.
- C. The reproductive rate is roughly equal to the death rate due to nutrient depletion.
- D. Cells are primarily synthesizing enzymes for a new medium.