Name: _____ **Date:** _____

Horizontal Gene Transfer and Microbial Pathogenesis Quiz for Grade 11

Analyze how conjugation, transformation, and transduction drive rapid evolution in bacterial populations facing selective pressures like antibiotic resistance.

---

1. An environmental microbiologist discovers a strain of 'Deinococcus radiodurans' that has incorporated DNA from a lysed neighboring cell in its soil habitat. Which mechanism of horizontal gene transfer occurred?

A. Viral Transduction
B. Bacterial Transformation
C. Conjugative Pilus Transfer
D. Binary Fission

2. In the process of _____, a bacteriophage acts as a vector to transport genetic material from a donor bacterium to a recipient bacterium.

A. Specialized Transduction
B. Active Transport
C. Reciprocal Recombination
D. Endocytosis

3. Prions are considered microorganisms because they possess a simplified genomic structure consisting of single-stranded RNA.

A. True
B. False

4. Why is 'Agrobacterium tumefaciens' a critical tool in agricultural biotechnology for creating transgenic crops?

A. It fixes atmospheric nitrogen for the plant.
B. It uses a T-DNA plasmid to insert genes into the host genome.
C. It acts as a probiotic for root-dwelling fungi.
D. It speeds up the process of photosynthesis.

5. During bacterial conjugation, a donor cell (F+) uses a _____ to establish a physical connection with a recipient cell (F-) for plasmid transfer.

A. Flagellum
B. Cytoplasmic bridge
C. Sex pilus
D. Capsule layer

6. Gram-positive bacteria possess an outer lipopolysaccharide (LPS) membrane that prevents the crystal violet stain from reaching the peptidoglycan layer.

Name: _____ **Date:** _____

A. True
B. False

7. In a clinical setting, a patient is infected with a bacterium that produces beta-lactamase. How does this enzyme contribute to the microorganism's survival?

A. It increases the rate of cellular respiration.
B. It pumps toxic metals out of the cytoplasm.
C. It chemically degrades penicillin-class antibiotics.
D. It reinforces the cell wall against osmotic pressure.

8. The use of 'Magnetospirillum' species in bioremediation is unique because they contain _____, which are organelles that sense magnetic fields.

A. Magnetosomes
B. Chloroplasts
C. Mitochondria
D. Nucleosomes

9. Which of the following best describes the metabolic strategy of a chemoautotroph found in deep-sea hydrothermal vents?

A. Deriving energy from sunlight and carbon from organic waste.
B. Deriving energy from inorganic chemicals and carbon from CO2.
C. Consuming other microorganisms for both energy and carbon.
D. Using fermentation to produce ATP in the presence of oxygen.

10. Reverse transcriptase is an enzyme used by retroviruses to synthesize DNA from an RNA template, a process that violates the traditional 'Central Dogma' of biology.

A. True
B. False