Name: _____ **Date:** _____

Answer Key: Prokaryotic Morphology and Pathogenesis Quiz for 12th Grade

Examine microbial classifications and mechanisms beyond simple cell structures, focusing on extremophiles and viral replication cycles.

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1. Which of the following describes an organism that thrives in extremely high-temperature environments, such as hydrothermal vents?

Answer: B) Hyperthermophile

Hyperthermophiles are a subset of extremophiles, often within the domain Archaea, that have specialized proteins and membranes stable at temperatures above 80 degrees Celsius.

2. Prions are considered microorganisms because they contain a small amount of DNA surrounded by a protein coat.

Answer: B) False

Prions are misfolded proteins that lack any nucleic acids (DNA or RNA) and are classified as infectious agents rather than living microorganisms.

3. The _____ cycle is a viral replication pathway where the viral genome integrates into the host's chromosome as a prophage.

Answer: B) Lysogenic

In the lysogenic cycle, the virus remains latent within the host genome and does not immediately destroy the host cell, unlike the lytic cycle.

4. Which structure allows certain bacteria to survive harsh conditions like desiccation or radiation by entering a dormant state?

Answer: C) Endospore

Endospores are highly resistant, dormant structures formed by genera such as Bacillus and Clostridium to withstand environmental extremes.

5. Archaea are structurally similar to bacteria but are genetically more closely related to eukaryotes.

Answer: A) True

Name: _____ **Date:** _____

Archaea possess transcription and translation machinery that shares more similarities with Eukarya than with the domain Bacteria.

6. Organisms that obtain energy from inorganic chemical compounds rather than sunlight are known as _____.

Answer: B) Chemolithotrophs

Chemolithotrophs are unique to the microbial world and can fix carbon using energy derived from the oxidation of inorganic molecules like hydrogen sulfide.

7. What is the primary distinguishing feature of a retrovirus like HIV?

Answer: B) It uses reverse transcriptase to create DNA from RNA.

Retroviruses use the enzyme reverse transcriptase to convert their single-stranded RNA genome into DNA, which is then integrated into the host cell's DNA.

8. Gram-negative bacteria have a thick layer of peptidoglycan that retains the primary crystal violet stain.

Answer: B) False

Gram-negative bacteria have a thin peptidoglycan layer and an outer membrane; it is Gram-positive bacteria that have the thick peptidoglycan layer.

9. The process by which bacteria exchange genetic material through a bridge-like connection called a pilus is known as _____.

Answer: C) Conjugation

Conjugation is a form of horizontal gene transfer that requires direct cell-to-cell contact to move plasmids between bacteria.

10. Which organism is a eukaryotic microbe known for its complex life cycle involving an Anopheles mosquito vector?

Answer: B) Plasmodium falciparum

Plasmodium falciparum is the protozoan parasite responsible for malaria, demonstrating the complexity of eukaryotic microbial pathogens.