What are Lysosomes?

Worksheet

Lysosomes are acidic, enzyme-filled vesicles that digest macromolecules, damaged organelles (autophagy), and engulfed material (phagocytosis), recycling their building blocks for the cell to reuse.

Questions

1. What is the primary function of a lysosome?

A) Photosynthesis
B) Digesting macromolecules and waste
C) Producing ATP
D) Storing genetic information

2. What is autophagy?

A) Cell division
B) A lysosome digesting the cell's own damaged parts
C) DNA replication
D) Protein synthesis

3. Why are lysosomal enzymes most active in an acidic environment?

A) To match the pH of the nucleus
B) It's an evolutionary accident with no function
C) It protects the rest of the cytoplasm if enzymes leak, and matches enzyme optimum pH
D) Acid dissolves the enzymes

4. A cell engulfing a bacterium via phagocytosis relies on which organelle to destroy it?

A) Golgi apparatus
B) Lysosome
C) Ribosome
D) Nucleus

5. A white blood cell engulfs a bacterium. Explain how the lysosome destroys it.

6. A cell's mitochondrion becomes damaged. How does the cell recycle it?

7. During tadpole development, a tail must be broken down. What organelle drives this and how?

8. Define: What is a lysosome?

9. Define: What is autophagy?

10. Define: What is phagocytosis?

Answer Key

1. B) Digesting macromolecules and waste - Lysosomes contain enzymes that break down waste and worn-out organelles.

2. B) A lysosome digesting the cell's own damaged parts - Autophagy recycles the cell's own damaged organelles via lysosomes.

3. C) It protects the rest of the cytoplasm if enzymes leak, and matches enzyme optimum pH - Acidic pH activates the enzymes but limits damage if they escape the lysosome.

4. B) Lysosome - Lysosomes fuse with the phagosome and digest the bacterium.

5. The cell engulfs the bacterium in a vesicle called a phagosome. A lysosome fuses with the phagosome, releasing digestive enzymes into it. Acidic enzymes break down the bacterium's proteins and membranes, neutralizing the threat.

6. The damaged mitochondrion is surrounded by a double membrane, forming an autophagosome. A lysosome fuses with the autophagosome. Enzymes digest the mitochondrion, and its components (amino acids, lipids) are recycled by the cell.

7. Lysosomes release their digestive enzymes into the cell in a controlled way. This triggers autolysis, digesting the tail cells' own components. The breakdown products are absorbed and reused as the tail disappears.

8. A membrane-bound organelle filled with digestive enzymes that breaks down waste, damaged organelles, and engulfed particles.

9. The process by which a lysosome digests a cell's own damaged organelles for recycling.

10. The engulfing of large particles (like bacteria) by a cell, which are then digested by lysosomes.