What is Cell Structure?

Worksheet

Cell structure refers to the arrangement of organelles within a cell - such as the nucleus (stores DNA), mitochondria (produce ATP energy), ribosomes (build proteins), and the cell membrane (controls what enters and exits) - that together let the cell carry out life's functions.

Questions

1. Which organelle is known as the 'powerhouse of the cell'?

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

2. Which structure stores a cell's DNA?

A) Cell membrane
B) Nucleus
C) Vacuole
D) Cytoplasm

3. Which organelle is found in plant cells but NOT animal cells?

A) Mitochondria
B) Ribosome
C) Chloroplast
D) Cell membrane

4. What is the main function of ribosomes?

A) Store water
B) Produce ATP
C) Synthesize proteins
D) Control cell shape

5. A muscle cell needs a constant, large supply of ATP to contract repeatedly. Which organelle is most abundant, and why?

6. A pancreatic cell produces and secretes large amounts of digestive enzymes (proteins). Which organelles are essential, in order?

7. A plant cell placed in bright sunlight increases sugar production. Which organelle drives this, and what does it need?

8. Define: What is the function of the nucleus?

9. Define: What do mitochondria do?

10. Define: What is the role of ribosomes?

Answer Key

1. C) Mitochondria - Mitochondria generate ATP through cellular respiration, powering cell activities.

2. B) Nucleus - The nucleus houses the cell's chromosomes and genetic instructions.

3. C) Chloroplast - Chloroplasts perform photosynthesis and are unique to plant (and some protist) cells.

4. C) Synthesize proteins - Ribosomes translate mRNA into proteins, whether free-floating or on the rough ER.

5. Muscle contraction requires continuous energy in the form of ATP Mitochondria are the organelles that produce ATP through cellular respiration Muscle cells therefore contain far more mitochondria than, say, skin cells This matches structure to function: high energy demand high mitochondria count

6. Ribosomes on the rough endoplasmic reticulum synthesize the enzyme proteins The rough ER folds and packages these proteins into vesicles The Golgi apparatus modifies and sorts the proteins, packaging them for secretion Secretory vesicles fuse with the cell membrane to release enzymes outside the cell

7. Chloroplasts contain chlorophyll, which absorbs light energy During photosynthesis, chloroplasts convert light energy + CO2 + water into glucose + oxygen More light generally increases the rate of photosynthesis (up to a saturation point) The glucose produced can be used for energy or stored, showing structure (chloroplast) enabling function (sugar production)

8. Stores the cell's genetic material (DNA) and controls gene expression and cell activities.

9. Produce ATP (cellular energy) through cellular respiration - often called the 'powerhouse of the cell.'

10. Synthesize proteins by translating mRNA; found free in the cytoplasm or attached to the rough ER.