PUBLIC SCHOOL DARBHANGA

SESSION (2020-21)

CLASS-IX

SCIENCE

THE FUNDAMENTAL UNIT OF LIFE

1. Who discovered cells, and how?

2. Why is the cell called the structural and functional unit of life?

3. How do substances like CO_2 and water move in and out of the cell? Discuss.

4. Why is the plasma membrane called a selectively permeable membrane?

5. Fill in the gaps in the following table illustrating differences between prokaryotic and eukaryotic cells.

Prokaryotic Cell	**Eukaryotic Cell**
1. Size: Generally small (1-10 μm) 1 μm = 10^{-6}m 2. Nuclear region: _____ _____ and known as _____ 3. Chromosome: single 4. Membrane-bound cell organelles absent.	1. Size: Generally large (5-100 μm) 2. Nuclear region: well defined and surrounded by a nuclear membrane. 3. More than one chromosome. 4. _____ _____ _____

6. Can you name the two organelles we have studied that contain their own genetic material?

7. If the organisation of a cell is destroyed due to some physical or chemical influence, what will happen?

8. Why are lysosomes known as suicide bags?

9. Where are proteins synthesised inside the cell?

10. Make a comparison and write down ways in which plant cells are different from animal cells.

ANSWERS:

1. Who discovered cells, and how?

Solution:

in 1665, Robert Hooke discovered cells while examining a thin slice of cork through a self-designed microscope. He observed that the cork resembled the structure of a honeycomb consisting of numerous tiny compartments. The minuscule boxes are referred to as cells.

2. Why is the cell called the structural and functional unit of life?

Solution:

Cells form the structure of an entity. A group of cells form a tissue, further an organ and ultimately an organ system. They perform fundamental functions and life processes such as respiration, digestion, excretion etc in both unicellular and multicellular entities. They perform all the activities independently. Hence, cells are referred to as structural and fundamental units of life.

3. How do substances like CO_2 and water move in and out of the cell? Discuss.

Solution:

CO_2 moves by diffusion – These cellular waste accumulates in high concentrations in the cell, whereas the concentration of CO_2 in the external surroundings is comparatively lower. This difference in the concentration level inside and out of the cell causes the CO_2 to diffuse from a region of higher(within the cell) to a lower concentration.

H_2O diffuses by osmosis through the cell membrane. It moves from a region of higher concentration to a lower concentrated region through a selectively permeable membrane until equilibrium is reached.

4. Why is the plasma membrane called a selectively permeable membrane?

Solution:

The plasma membrane is called as a selectively permeable membrane as it permits the movement of only a certain molecules in and out of the cells. Not all molecules are free to diffuse.

5. Fill in the gaps in the following table illustrating differences between prokaryotic and eukaryotic cells.

Prokaryotic Cell	**Eukaryotic Cell**
1. Size: Generally small (1-10 μm) $1\ \mu m = 10^{-6} m$ 2. Nuclear region: _____	1. Size: Generally large (5-100 μm) 2. Nuclear region: well defined and surrounded by a nuclear membrane. 3. More than one chromosome.

_____ and known as _____ 3. Chromosome: single 4. Membrane-bound cell organelles absent.	4. _____ _____ _____

Solution:

Prokaryotic Cell	**Eukaryotic Cell**
1. Size: Generally small (1-10 μm) $1\ \mu m = 10^{-6} m$ 2. The nuclear region is poorly defined due to the absence of a nuclear membrane and known as the nucleoid. 3. There is a single chromosome. 4. Membrane-bound cell organelles absent.	1. Size: Generally large (5-100 μm) 2. Nuclear region: well defined and surrounded by a nuclear membrane. 3. There are more than one chromosomes. 4. Membrane-bound cell organelles present.

6. Can you name the two organelles we have studied that contain their own genetic material?

Solution:

The two organelles which have their own genetic material are:

1. Mitochondria

2. Plastids

7. If the organisation of a cell is destroyed due to some physical or chemical influence, what will happen?

Solution:

In the event of any damage to cells and when revival of cells is not possible, Lysosomes burst and enzymes digest such cells. This is why lysosomes are often referred to as ‘suicide bags’.

8. Why are lysosomes known as suicide bags?

Solution:

When there is damage to the cell and when revival is not possible, lysosomes may burst, and the enzymes digest their own cell. Consequently, lysosomes are known as suicide bags.

9. Where are proteins synthesised inside the cell?

Solution:

Protein synthesis in cells takes place in ribosomes. Hence, ribosomes are also referred to as protein factories. Ribosomes are particles that are found attached to the rough endoplasmic reticulum.

10. Make a comparison and write down ways in which plant cells are different from animal cells.

Solution:

The following table depicts the differences between plant cells and animal cells.

Characteristic	**Plant Cell**	**Animal Cell**
Cell wall	Present	Absent
Shape of cell	Distinct edges, shape is either rectangular or square shaped.	Round and irregular shape
Nucleus	Present. Lies on one side of the cell	Present. Lies in the center of the cell
Lysosomes	Rarely present	Always present
Plastids	Present	Absent
Structure of Vacuoles	Single or a few large vacuole that is centrally located	Presence of numerous and small vacuoles