CBSE NCERT Solutions for Class 9 Science Chapter 5

Back of Chapter Questions

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

Solution:

<table>
<thead>
<tr>
<th>Plant Cells</th>
<th>Animal Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Plant cells are bigger in size as compared to animal cells.</td>
<td>1. Animal cells are comparatively smaller in size.</td>
</tr>
<tr>
<td>2. The cell wall is present.</td>
<td>2. The cell wall is absent.</td>
</tr>
<tr>
<td>3. Plastid is an indispensable component of a plant cell which is further composed of Chloroplast, chromoplast, and leucoplast</td>
<td>3. Plastid is not present. Therefore, plastic components are missing.</td>
</tr>
<tr>
<td>4. The centrioles is absent.</td>
<td>4. Centrioles with centrosome is present.</td>
</tr>
<tr>
<td>5. Bigger vacuoles are present.</td>
<td>5. Vacuoles are mostly absent or if present they are very small in size.</td>
</tr>
<tr>
<td>6. Food is stored in the form of starch.</td>
<td>6. Food is stored in the form of glycogen.</td>
</tr>
<tr>
<td>7. Lysosomes are mostly absent or even if present they are very few in number.</td>
<td>7. Lysosomes are present and are more in number.</td>
</tr>
<tr>
<td>8. Golgi apparatus exists as a small subunit called dictyosomes.</td>
<td>8. Highly complex Golgi apparatus is present.</td>
</tr>
</tbody>
</table>

2. How is a prokaryotic cell different from a eukaryotic cell?

Solution:

<table>
<thead>
<tr>
<th>Prokaryotic cell</th>
<th>Eukaryotic Cell</th>
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<tbody>
<tr>
<td>1. Prokaryotic cells are generally small in size (1-10 µm) 1µm = 10^-6m.</td>
<td>1. eukaryotic cells are generally large in size (5-100 µm).</td>
</tr>
<tr>
<td>2. A poorly defined nuclear region is present containing only nucleic acids</td>
<td>2. A well-defined nucleus is present, surrounded by a nuclear membrane.</td>
</tr>
</tbody>
</table>
as a nucleoid. A well-defined nucleus is absent.

| 3. Membrane-bound cell organelles are absent. | 3. Membrane-bound cell organelles are present. |
| 4. Most of the functions of organelles are performed by unorganized parts of the cytoplasm. | 4. Different organelles perform specific functions. |
| 5. Cell division usually takes place by simple fission method. | 5. Cell division takes place by mitosis and meiosis. |

**Examples:** Bacteria, Cyanobacteria | **Examples:** Plant cells and Animal cells

3. What would happen if the plasma membrane ruptures or breaks down?

**Solution:**

The selectively permeable membrane that surrounds the cell and allows the entry and exit of selected materials into and out of the cell is called as Plasma membrane.

If it ruptures, then following changes might take place:

(i) The contents of the cell will come in direct contact with the outside medium and unwanted materials can enter the cell.

(ii) The cell will lose its shape and cell organelles will be ruptured as plasma membrane protects the cell organelles and provides shape to the cell.

4. What would happen to the life of a cell if there was no Golgi apparatus?

**Solution:**

The function of the Golgi apparatus in cells helps in packaging, storage and transport of different substances in the cell. If there were no Golgi apparatus, then the following things will happen:

(i) As Endoplasmic reticulum is attached to the Golgi apparatus, therefore if Golgi apparatus will not be there then Endoplasmic reticulum would not be able to perform its functions.

(ii) As the Golgi apparatus performs the function of storage and modification, synthesised materials would not be stored and modified further.

(iii) Lysosome production would not be there which leads to the accumulation of waste material, worn out and dead cell organelles within the cell which will ultimately lead to cell death.

5. Which organelle is known as the powerhouse of the cell? Why?

**Solution:**
Mitochondria is called the powerhouse of the cell as it produces energy by oxidizing the food and storing it in the form of ATP (Adenosine Triphosphate), which is called the energy currency of the cell. The energy produced by mitochondria is later used by the cell for various activities.

6. Where do the lipids and proteins constituting the cell membrane get synthesised?

Solution:

The lipids and proteins constituting the cell membrane are synthesised in the endoplasmic reticulum. Lipids are synthesised in the Smooth Endoplasmic Reticulum (SER) and the proteins are synthesised in the ribosomes attached to the Rough Endoplasmic Reticulum (RER).

7. How does an Amoeba obtain its food?

Solution:

Amoeba is a unicellular organism. It acquires its food through the false feet called "pseudopodia". Whenever it locates a food particle it engulfs the food by its flexible protruding membrane. This food is broken down into simpler form by the food vacuole which contains digestive enzymes. This process is known as endocytosis.

8. What is osmosis?

Solution:

Osmosis is the displacement of water molecules from a region where they are in higher concentration to a region where they are in lower concentration, through a partially permeable membrane.

A dilute solution contains a high concentration of water molecules, while a concentrated solution contains a low concentration of water molecules.

9. Carry out the following osmosis experiment:

Take four peeled potato halves and scoos each one out to make potato cups. One of these potato cups should be made from a boiled potato. Put each potato cup in a trough containing water. Now,

(a) Keep cup A empty
(b) Put one teaspoon sugar in cup B
(c) Put one teaspoon salt in cup C
(d) Put one teaspoon sugar in the boiled potato cup D.

Keep these for two hours. Then observe the four potato cups and answer the following:

(i) Explain why water gathers in the hollowed portion of B and C.
(ii) Why is potato A necessary for this experiment?

(iii) Explain why water does not gather in the hollowed-out portions of A and D.

**Solution:**

(i) Water assembles in the hollowed portion of B and C because of the action of osmosis. The cell membrane of the potato is selectively permeable. As the cups B and C are filled with sugar and salt respectively and their outer portion is in contact with the water, the concentration of water outside the cups is higher than the concentration inside the cups, so water moves from the higher concentration to the lower concentration, inside the cup.

(ii) The potato A acts as a control for the experiment. It helps in comparing the result of the experiment.

(iii) Water does not gather in the hollowed-out portion of A because there is no difference in the concentration and hence no osmosis takes place. Water also does not gather in the cup D as the cells of boiled potato are dead cells and hence no osmosis takes place.

**10.** Which type of cell division is required for growth and repair of body and which type is involved in formation of gametes?

**Solution:**

Cell division required for growth and repair of the body is Mitosis. In this process mother cell divides to form two daughter cells which carries the same number of chromosomes as that of mother cell.

Meiosis is the type of cell division required for the formation of gametes. In this process mother cell divides to form four daughter cells which carries half of the number of chromosomes as that of mother cell. This happens through two consecutive division of cell.

**In chapter questions:**

1. **Who discovered cells, and how?**

   **Solution:**

   Robert Hooke is the scientist who discovered cells while observing a thin slice of cork under a self-made microscope. He noticed that the cork resembled the structure of a honeycomb consisting of many small compartments, which he named as cells. In Latin cell means "a little room".

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

   **Solution:**
Cells are the indispensable component for all living beings. The number of cells in an organism varies greatly depending on the size. A group of cells join to form tissues, tissues together form organ and many organs, in turn, forms an organ system. All organ system together forms an organism, that’s the reason the cells are called as a structural unit of life.

A cell can sustain and perform several functions of life. Each component of the cell carries out a specific function. In other words, it is a self-sufficient living entity. All the metabolic activities of life such as respiration, digestion, excretion, etc. occur at the cellular level. So, a cell is called as the functional unit of life.

3. How do substances like CO₂ and water move in and out of the cell? Discuss.

Solution:

In the process of diffusion, substances like CO₂ move in and out of the cell. When the CO₂ accumulation takes place inside the cell and the concentration is higher than the cell's external environment, it moves out and is thus expelled. Similarly, when its concentration is lower inside the cell as compared to outside the cell, it moves into the cell. Movement of water in and out of the cell takes place by the same principle of a difference of concentration, but the process through which water moves across a selectively permeable membrane is called osmosis.

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

Solution:

Only a few selected substances are allowed to move in and out of the cell by the plasma membrane and it also prevents the entry and exit of the other substances, therefore, it is known as a selectively permeable membrane.

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

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<td>and known as</td>
<td></td>
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Class- IX-CBSE-Science
The Fundamental Unit of Life

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<td>1µm=10⁻⁶ m.</td>
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<td>2. Nuclear region: Undefined nuclear region containing only nucleic acids is called a nucleoid.</td>
<td>2. Nuclear region: Well defined and surrounded by a nuclear membrane.</td>
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<td>4. Membrane-bound cell organelles are absent.</td>
<td>4. Membrane bound cell organelles (e.g., chloroplasts, Golgi bodies, mitochondria etc.) are present.</td>
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</tbody>
</table>

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

Solution:

The two organelles that contain their own genetic material are Plastids and Mitochondria.

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

Solution:

Cell organelles together are responsible for the organisation of a cell. Specific function is performed by each cell organelle. If any of these cell organelles get destroyed due to some physical or chemical influence, then the functions associated with it will no longer be performed and it will eventually result in the death of the cell. For example, energy currency is generated by mitochondria and if mitochondria will be destroyed then cell will die as it will not get any energy to sustain.

8. Why are lysosomes known as suicide bags?

Solution:

Lysosomes are known as suicide bags because if there is an interference in the cellular metabolism or any cell damage, the lysosomes starts its action there by bursting out the powerful hydrolytic enzyme which digest or breakdown their own cell. That is why they are called suicide bags.

9. Where are proteins synthesised inside the cell?
Solution:

Synthesis of proteins takes place in the ribosomes which are either attached to the surface of the rough endoplasmic reticulum or suspended freely in the cytoplasm.