

The Fundamental Unit of life

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

Solution:

Plant cells	Animal cells
<ol style="list-style-type: none">1. They are slightly larger than animal cells.2. They have a cell wall made of cellulose.3. They have chloroplast.4. They contain a large vacuole.5. They do not have a centrosome.	<ol style="list-style-type: none">1. They are smaller in size.2. They do not have cell wall.3. They do not have chloroplast.4. They contain a small vacuole.5. They have a centrosome.

How is a prokaryotic cell different from a eukaryotic cell?

Solution:

Prokaryotic cell	Eukaryotic cell
<ol style="list-style-type: none">1. Generally small in size (1 - 10 μm).2. The nuclear region (nucleoid) is not surrounded by a nuclear membrane.3. A single chromosome is present.4. Membrane-bound cell organelles are absent.	<ol style="list-style-type: none">1. Generally large in size (5 - 100 μm).2. Nuclear material is surrounded by a nuclear membrane.3. More than one chromosome is present.4. Membrane-bound cell organelles are present.



5. cell division takes place by fission or budding (no mitosis).	5. cell division is by mitosis or meiosis.
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What would happen if the plasma membrane ruptures or breaks down?

Solution:

If the plasma membrane ruptures or breaks down, the cytoplasm will come in direct contact with the surrounding medium and the act of selection will stop. It will lead to a leakage of the cellular components and ultimately to the death of the cell.

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

Solution:

Various substances are being continuously synthesised in the cell for various metabolic activities. Material that is synthesised in the endoplasmic reticulum are stored, modified and packed into vesicles by the Golgi apparatus. If Golgi apparatus were absent, several products (enzymes and hormones) would not be formed. This would result in reduction in or cessation of the cellular metabolic activity and ultimately would cause a reduction in cell life.

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

Solution:

Mitochondrion is called the powerhouse of the cell. They produce energy, which is stored in the form of ATP (Adenosine triphosphate) molecules. The energy stored in ATP is used by the body for making new chemical compounds and for mechanical work. Hence, mitochondrion is called the powerhouse of the cell.

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.

How does an Amoeba obtain its food?**Solution:**

Amoeba is a unicellular organism. It captures a food particle with the help of pseudopodia and forms a food vacuole. The food vacuole contains the food that is later consumed by the amoeba.

What is osmosis?**Solution:**

The movement of water molecules through a selectively permeable membrane from an area of higher concentration to an area of lower concentration is called osmosis. The movement of water depends on the substances dissolved in it.

Carry out the following osmosis experiment:

Take four peeled potato halves and scoops 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:

(a) A potato is made up of several cells. The cell membrane of the cells is selectively permeable. Cups B and C are filled with sugar and salt respectively, while their outer part is in contact with water. Therefore, the concentration of water is higher outside the potato as compared to the inside it. Thus, due to osmosis, water moved towards the inside of the potato from its outside. As a result, water collects inside cups B and C.

(b) Cup A is important in this experiment to compare the results with the other three potatoes, B, C and D. It shows that if two solutions with the same concentration are taken, then there is no movement in the water molecules.

(c) Water does not gather inside cup A because there is no concentration gradient and neither in cup D because cup D is made of boiled potato. Its cells are dead and their cell membranes are no more selectively permeable. Therefore, no osmosis takes place and water does not enter. Therefore, the concentration on both sides of the cell membrane is equal. Hence, water does not collect inside cups A and D.

