

**CHAPTER - 5**

**THE FUNDAMENTAL UNIT OF LIFE**

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**Q.1 We can try preparing temporary mounts of leaf peels, tip of roots of onion or even peels of onions of different sizes.**

**(a) Do all cells look alike in terms of shape and size?**

**Answer:** All cells of our body look different in shape and size performing different functions at various parts of the body.

**(b) Do all cells look alike in structure?**

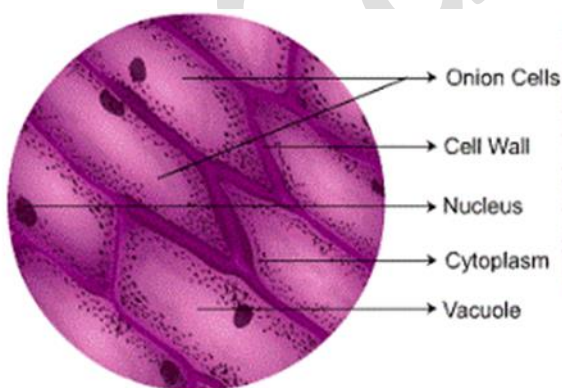
**Answer:** All cells of our body look different its structure too.

**(c) Could we find differences among cells from different parts of a plant body?**

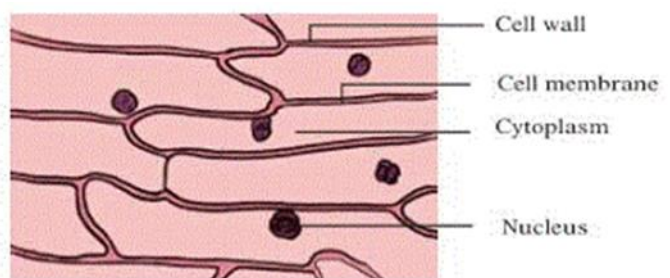
**Answer:** Yes, we can find differences in cells from various parts of the plant body. They have different structures to perform various functions. For example, root cells differ from the types of cells present in leaves or stem of a plant.

**(d) What similarities could we find?**

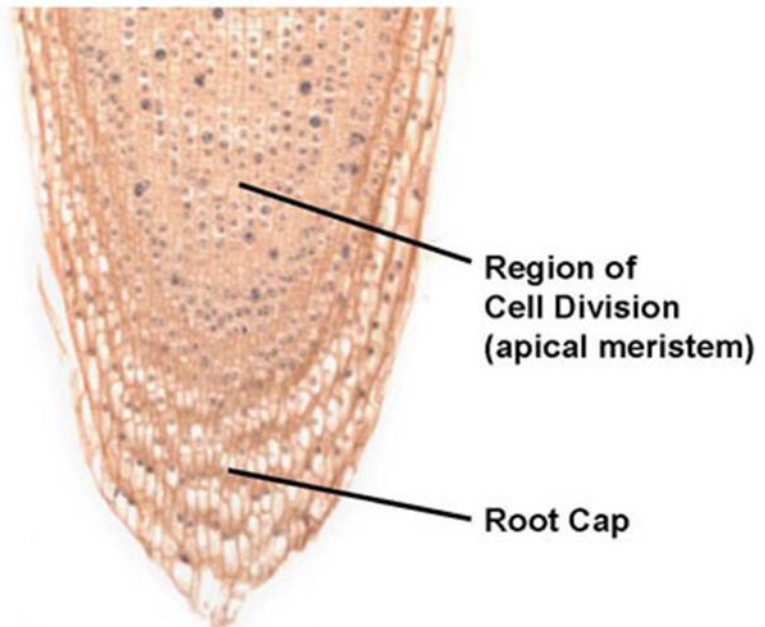
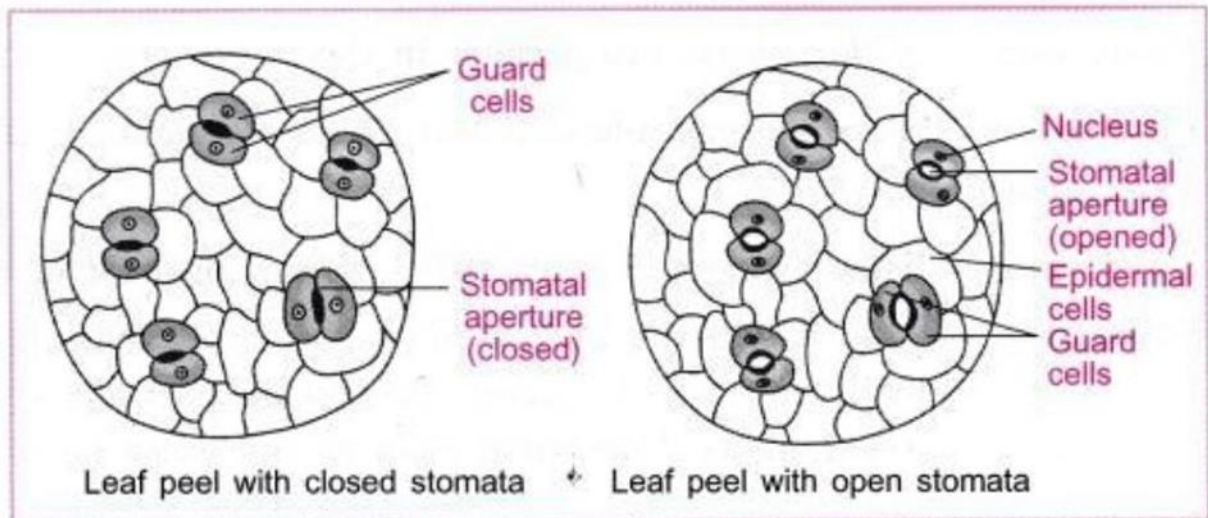
**Answer:** Cells have structural and functional similarities, which includes a cell membrane, a cytosol, ribosomes, and genetic material. All cells are consisting of carbohydrates, lipids, nucleic acids, and proteins.



**Fig: Onion Peel Cell**



**Fig: Epidermal cells of onion peel**



Onion Root

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**Q.2 Who discovered cells, and how?**

**Answer:** In 1665, Robert Hooke discovered cells while observing a thin slice of cork through microscope. He observed that the cork looks like a honeycomb which is made up of many tiny compartments.

**Q.3 Why is the cell called the structural and functional unit of life?**

**Answer:** Cells are called the structural and functional unit of life because living organisms are made up of cells and all the functions in an organism are done by cells.

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**Q.4 How do substances like CO<sub>2</sub> and water move in and out of the cell. Discuss?**

**Answer:** The substances like CO<sub>2</sub> and water move in a cell by the process known as diffusion from high concentration to low. When the concentration of carbon dioxide and water is higher outside than that inside the cell, CO<sub>2</sub> and water enters the cell.

**Q.5 Why is the plasma membrane called a selectively permeable membrane?**

**Answer:** The plasma membrane is a selectively permeable membrane as it allows the movement of particular molecules in the cells. If plasma membrane breaks up then molecules will move in and out of the cells.

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

**Answer:** The two organelles inclosing genetic material are mitochondria and plastids. Mitochondria is power house in the cell.



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

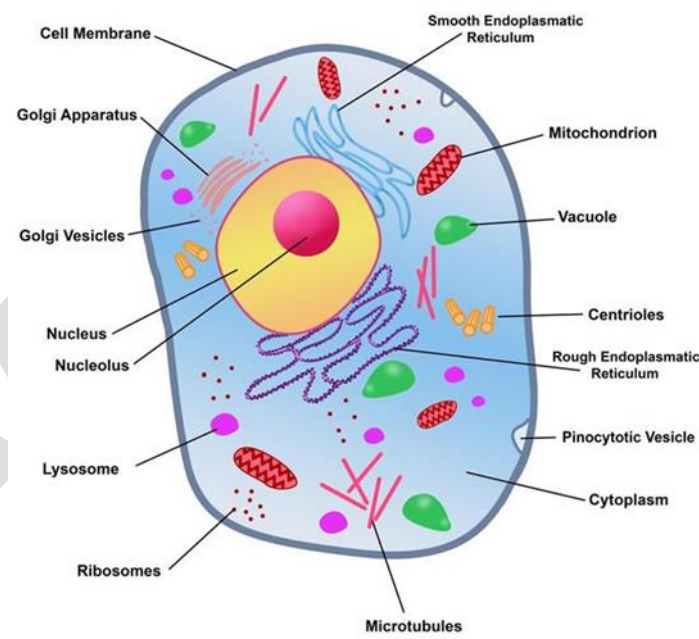
**Answer:** If the organisation of a cell is destroyed due to some physical or chemical influence then cell will not perform the functions like respiration, nutrition, excretion etc. which will end all the life activities and will be fatal too

**Q.8. Why are lysosomes known as suicide bags?**

**Answer:** Lysosomes are known as suicide bags of the cell because they have lytic enzymes which digest cells and surplus materials.

**Q.9 Where are proteins synthesized inside the cell?**

**Answer:** Proteins are made in RER (Rough Endoplasmic Reticulum) by the ribosomes present in it. Ribosomes are formed in cytoplasm and mitochondria's chloroplast.



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**Q1. Make a comparison and write down ways to in which plant cells are different from animal cells.**

**Answer:**

The main difference between plant cells and animal cells are tabulated below:

S/No.	Plant cell	Animal cell
1.	Plant cell are larger in size than animal cell.	Animal cell are smaller in size than plant cell.
2.	The plasma membrane is surrounded by a rigid cell wall of cellulose.	Cell wall is absent in animal cell.
3.	Plastids are present in plant cell.	No animal cell has plastids except the protozoan Euglena.
4.	It has a permanent and large central sap vacuole.	It has small and temporary vacuoles .
5.	There are many simpler units of Golgi apparatus which is called as dictyosomes.	They have single highly complex Golgi apparatus.
6.	There is no centrosome and centrioles .	There are centrosome and centrioles .

**Q2. How is a prokaryotic cell different from a eukaryotic cell?**

**Answer:**

Differentiate between prokaryotic cell and eukaryotic cell are as follows:

S/No.	Prokaryotic cell	Eukaryotic cell
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1.	The size of a prokaryotic cell is smaller.(1 -10 mm).	The size of a eukaryotic cell is large. (5 – 100 mm).
2.	The Nucleus is absent.	The Nucleus is present.
3.	Only single chromosome is present .	More than one chromosome is present .
4.	The Nucleolus is absent.	The Nucleolus is present.
5.	The membrane bound cell organelles are absent.	The membrane bound cell organelles like mitochondria, plastids, endoplasmic reticulum, Golgi apparatus, etc. are present.
6.	The cell division occurs by the method of fusion and budding.	The cell division occurs by the process of mitotic or meiotic cell division.

**Q3. What would happen if the plasma membrane ruptures or break down?**

**Answer:**

- If a plasma membrane breaks down or ruptures, the internal chemical composition of the cell will be lost hence it will not be able to perform its basic function.
- Any cell with a ruptured plasma membrane would be killed.

**Q4. What would happen to the life of a cell if there was no Golgi apparatus?**

**Answer:**

If there is no Golgi apparatus in a cell then there is:

- No lysosome for intracellular digestion and cleansing.
- No complexing of molecules.
- No exocytosis and no formation of new plasma membrane.

**Q5. Which organelle is known as the powerhouse of the cell? Why?**

**Answer:**

The powerhouse of the cell is Mitochondrion as it contains enzymes which is required for the oxidation of food such as carbohydrates, fats or lipids and proteins present in the cell. The energy currency of the cell is the ATP (adenosine triphosphate) molecules which is used for cellular fuel. Oxidation of food releases energy to form high energy ATP. The energy stored in the ATP is used in photosynthesis, protein synthesis and muscle contraction.

**Q6. Where do the lipids and proteins constituting the cell membrane get synthesized?**

**Answer:**

Lipids are synthesized in smooth Endoplasmic Reticulum and the proteins are synthesized in the ribosomes.

**Q7. How does an Amoeba obtain its food?**

**Answer:**

Amoeba is a basically a unicellular animal, which acquires food by the process of endocytosis. Amoeba's plasma membrane is quite flexible with its help in Amoeba consumes food particles. The food particle passes into the body of organisms as a phagosome. Lysosome combines with phagosome to produce digestive or food vacuole. Digestion takes place in food vacuole. The digestive food passes into cytoplasm, and the undigested matter is thrown out of the cell.

**Q8. What is osmosis?**

**Answer:**

Osmosis is defined as "diffusion of water from the region of its higher concentration to the region of its lower concentration through a semipermeable membrane."

**Q9. Carry out the following osmosis experiment:**

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

**Now**

- a) Keep cup A empty;
- b) Put one teaspoon sugar in cup B;
- c) Put one teaspoon sugar in cup C;
- d) Put one teaspoon sugar in the boiled potato cup D; Keep these for 2 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 hollow out portion of A and D?

**Answer:**



- i) When a unboiled potato cups B and C are put into a trough containing water, the cells of potatoes takes water by the endosmosis. When we add a teaspoon of sugar and salt in the hollowed portion of cups B and C respectively, water moves through the plasma membranes of the cells of potato into the hollowed portion of both B and C cups by exosmosis.
- ii) Potato cup A is necessary in the experiment for providing comparison with situations of potato cups B, C and D which shows that the potato cavity alone does not include movement of water.
- iii) Water does not gather in hollowed portion of potato cup A because it does not possess higher osmotic concentration than the cells of potato. Potato cup D is boiled so, potato cells die and the membranes of the potato cell lose their permeability.

**Q10. Which type of cell division is required for growth and repair of body and which type is involved in formation of gametes?**

**Answer:**

There are basically two ways in which the cell division takes place:

1. Mitosis.
2. Meiosis.

1. Mitosis is a cell division which help in the formation of two daughter cells each with same number of chromosomes as the parent cell.
2. Meiosis is a cell division which help in the formation of four daughter cells with half number of chromosomes as the parent cell.

So, mitosis is the cell division that is involved in the growth and repair of body, and meiosis is a type of cell division which help in the formation of gametes.