

**CBSE class IX Science**  
**NCERT Solutions**  
**Chapter - 5**  
**The Fundamental Unit of Life**

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

**Ans.** In 1665, an English scientist named Robert Hooke discovered cells. He examined a thin slice of cork under a self-designed microscope and observed that the cork resembled the structure of a honey comb. Hooke named these tiny compartments as 'cells'.

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

**Ans.** All living organisms are made up of cells so cell is the basic building unit of a living organism and all the activities performed by a living organism are sum total of activities performed by its cells hence cell is called the structural and functional unit of life.

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

**Ans.** The exchange of gases (CO<sub>2</sub> and O<sub>2</sub>) between cells takes place by diffusion process.

Diffusion is defined as movement of a substance from a region of higher concentration to lower concentration. CO<sub>2</sub> is formed inside cell due to respiration and it accumulates in the cell so its concentration is high in the cell as compared to the surroundings. On the other hand O<sub>2</sub> is utilized inside cell during respiration and therefore its concentration decreases inside the cell while remains comparatively high in the surroundings. As a result CO<sub>2</sub> diffuses out and O<sub>2</sub> diffuses into the cell.

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

**Ans.** Plasma membrane is a highly specific structure. It is made up of lipids and proteins

which selectively allows the entry of substances into cell and exit of some other substances from the cell i.e. selectively permeable.

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

Prokaryotic Cell	Eukaryotic Cell
<b>1. Size: generally small ( 1-10 <math>\mu\text{m}</math>)</b> <b>1 <math>\mu\text{m}</math> = 10<sup>-6</sup> m</b> <b>2. Nuclear region: _____</b> <b>_____ and known as _____</b> <b>3. Chromosome: single</b> <b>4. Membrane-bound cell organelles</b> <b>Absent.</b>	<b>1. Size : generally large ( 5-100 <math>\mu\text{m}</math>)</b> <b>2. Nuclear region: well defined and</b> <b>surrounded by a nuclear membrane</b> <b>3. More than one chromosome</b> <b>4. _____, _____</b>

Ans.

Prokaryotic Cell	Eukaryotic Cell
<b>1. Size: generally small ( 1-10 <math>\mu\text{m}</math>)</b> <b>1 <math>\mu\text{m}</math> = 10<sup>-6</sup> m</b> <b>2. Nuclear region: not defined and</b> <b>known as nucleoid.</b> <b>3. Chromosome: single</b> <b>4. Membrane-bound cell organelles</b> <b>Absent.</b>	<b>1. Size : generally large ( 5-100 <math>\mu\text{m}</math>)</b> <b>2. Nuclear region: well defined and</b> <b>surrounded by a nuclear membrane</b> <b>3. More than one chromosome</b> <b>4. membrane bound cell organelles are</b> <b>Present</b>

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

Ans. Chloroplasts and Mitochondria.

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

**Ans.** If the organisation of a cell is destroyed due to some physical or chemical influence then such cell would not survive any more as all components of that cell are digested up by its lysosomes.

**3. Why are lysosomes known as suicide bags?**

**Ans.** Lysosomes are cell organelles filled with hydrolytic(digestive) enzymes. When a cell is damaged, its lysosomes may burst out and its enzymes digest up its own cell. Due to this, we can say that lysosomes are suicide bags.

**4. Where are proteins synthesised inside the cell?**

**Ans.** Ribosomes are the sites for protein synthesis inside the cell.

**(Chapter – end)**

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

**Ans.**

Plant cell	Animal cell
1. cell wall is present.	1. cell wall is absent.
2. Plastids are present.	2. Plastids are absent.
3. They have dictyosomes instead of golgi body.	3. They have golgi apparatus.
4. centrosomes and centrioles are absent.	4. centrosomes and centrioles are present.
5. Vacuoles are larger in size.	5. vacuoles are smaller in size.
6. Daughter cells separate from each other due to formation of cell plate.	6. Daughter cells separate from each other due to contrition or furrow formation.

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

**Ans.**

Prokaryotic cell	Eukaryotic cell
1. Nuclear region is not surrounded by a nuclear membrane.	1. A double layered nuclear envelope is present around the nuclear region.
2. Nucleolus is absent.	2. nucleolus is present.
3. Only one chromosome.	3. more than one chromosomes are present.
4. membrane bound cell organelles are absent.	4. membrane bound cell organelles are present.

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

**Ans.** The rupture or break down of cell's plasma membrane indicates that cell is damaged and in such condition the lysosomes of the damaged cells may burst and the digestive enzymes present inside those lysosomes would digest their own cell. This will result into death of the cell.

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

**Ans.** The functions of golgi apparatus includes storage, modification and packaging of products in the vesicles. If there was no golgi apparatus for a cell then all sort of storage, modification, packaging and dispatch of materials within and outside the cell would be impossible.

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

**Ans.** It is Mitochondria of the cell also known as the power house of the cell because it synthesizes energy in the form of ATP molecules during respiration which is vital for various life activities.

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

**Ans.** The endoplasmic reticulum is of two types:

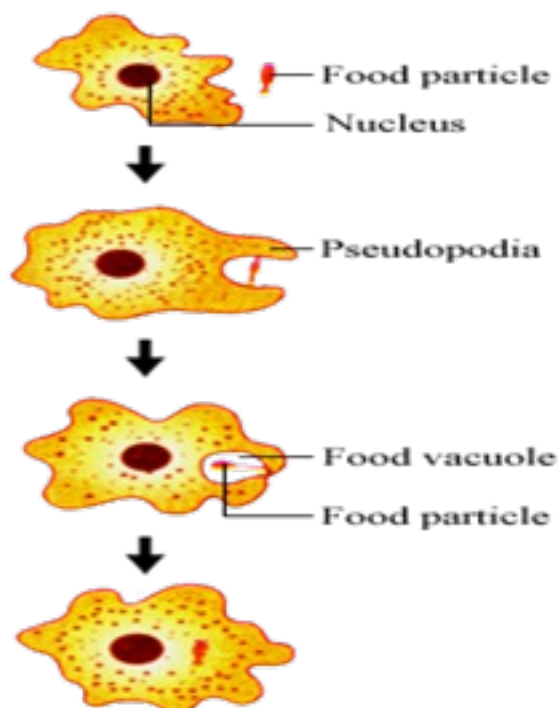
**i) Smooth endoplasmic reticulum (SER):** It is responsible for the synthesis of lipids constituting cell membrane.

**ii) Rough endoplasmic reticulum (RER) :** It bears the ribosomes and is therefore responsible for the synthesis of proteins constituting cell membrane.

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### 7. How does an *Amoeba* obtain its food?

**Ans.** Amoeba feeds on microorganisms (like planktons) which float on water. It develops false feet or pseudopodia to surround the food. It captures the food within a sac like structure called the food vacuole inside which digestion of food takes place.



### 8. What is osmosis?

**Ans.** Osmosis is the movement of water(solvent) from a region of high water concentration through a semipermeable membrane to a region of low concentration of water. It can take place only in liquid medium and not in solid or gases. Example is absorption of water from soil by plant roots.

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### 9. 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 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.

**Ans. i)** When we put one teaspoon sugar in cup B and one teaspoon salt in cup C, the hypertonic solution is formed inside so through osmosis, water from outside enters inside and collects in the hollowed portion of cups B & C.

**ii)** Potato A is necessary to observe osmosis.

**iii)** In hollowed out portion of A & D there is no solution (liquid medium) present therefore osmosis cannot take place and as a result water does not gather.