

Class 9th

Chapter 5 (biology)

The fundamental unit of life

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Que no.1- Who discovered cell, and how?

Answer- Robert hooke(1665) discovered the cell. He examined a fine slice of a cork under a self manufactured primitive microscope and observed that the Slice of cork resembled the structure of a honeycomb. These were actually dead cell walls observed by Robert hooke. He named these tiny compartment Cellulae now termed cells. Cellula is a Latin word which means 'a little room'.

Que no.2- Why is the cell called the structural and functional unit of life.

Answer- cell is the structural unit of life because, all living organisms are made up of cells. Cells is the functional unit of life because functions of life like nutrition, respirstion, excretion and reproduction etc. are basically performed by cell only.

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Que no.3- How do substances like CO₂ and water moves in and out of the cell ? Discuss.

Answer- Carbon dioxide moves in and out of the cell by the process of diffusion. It is movement of particles of various substances from the region of the higher concentration to the region of the lower concentration.

Water moves in and out of the cell by osmosis. Osmosis is movement of water from the region of its higher concentration to the region of its lower concentration, when the both are separated by a semipermeable membrane.

Diffusion and Osmosis are physical or mechanical phenomenon and do not require energy for their performance by the cells.

Que no.4- why is plasma membrane called a selectively permeable membrane?

Answer- plasma membrane allows the movement of only selected molecules across it and not all of them, so it is called selectively permeable membrane. For instance, It permits the entry of gases through diffusion and water through osmosis. Larger molecules may pass through the plasma membrane by an active process. Plasma membrane is impermeable to certain other materials. Therefore, it is selectively permeable.

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Que no.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.Size: generally large
2.Nuclear region <u>poorly defined due to absence of nuclear envelop</u> and known as <u>nucleoid.</u>	2.Nuclear region: well defined and surrounded by a nuclear membrane
3.Chromosomes. single	3.Chromosomes. more than one chromosome.
4.Membrane bound cell organelles: Absent	4. <u>Membrane bound cell organelles are absent.</u>

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Que no.6- Can you name the two organelles, we have studied that contain their own genetic material?

Answer- Yes, mitochondria and chloroplast.

Que no.7- If the organisation of a cell is destroyed due to some physical or chemical influence what will happen?

Answer- If organisation is destroyed or plasma membrane is disrupted the cell would not be able to maintain the internal environment and chemical uniqueness. It will lead to death of the cell. Lysosomes would cause autolysis of the cell.

Que no.8- Why are lysosomes known as suicide bags?

Answer- Lysosomes are membrane bound sacs which contain hydrolytic enzymes. If lysosomes burst, enzymes are released and digest other organelles of the same cell. Therefore, they are known as 'suicide bags'.

Que no.9- Where are proteins synthesized inside the cell?

Answer- Proteins are synthesized over the ribosomes.

NCERT exercise

Que no.1- How is a prokaryotic cell different from a Eukaryotic cell?

Answer-

Prokaryotic cell	Eukaryotic cell
1. Generally these are smaller in size.	1. These are generally larger in size.
2. True nucleus absent (genetic materials or nucleoid is not bounded by a nuclear membrane).	2. True nucleus present (nuclear material is bounded by a nuclear membrane).
3. These cells contain single chromosome.	3. These cells contain more than one chromosome.
4. Chromosome lacks histones.	4. Chromosomes have histones.
5. Nucleolus is absent.	5. Nucleolus is present in nucleoplasm.
6. Membrane bounded cell organelles are absent.	6. Membrane bounded organelles are present.
7. Ribosomes are of 70s type.	7. Ribosomes are of 70s and 80s types.
8. Cell division takes place by fission or budding.	8. Cell division takes place by mitotic or meiotic cell division.

Que no.2- what would happen if the plasma membrane ruptures or breaks down?

Answer- If plasma membrane is disrupted the cell would not be able to maintain the internal environment and chemical uniqueness. It will lead to death of the cell. Lysosomes would cause autolysis of the cell.

Que no.3- Make a comparison and write down ways in which plant cells are different from animal cells.

Answer-

Plant cell	Animal cell
1. Plant cells are generally larger than animal cells.	1. Animal cells are smaller than plant cells.
2. A plant cell has a rigid cell wall on the outside.	2. Cell wall is absent.
3. Plastids are found in plant cell.	3. Plastids are absent.
4. A mature plant cell contains a large central vacuole.	4. In animal cell vacuoles are either absent or they may have few small vacuoles.
5. Centrioles are usually absent except in lower plants.	5. Centrioles are found in animal cell.
6. Golgi apparatus consists of a number of distinct or unconnected units called dictyosomes.	6. Golgi apparatus is either localised or consists of a wall connecting single complex.
7. Plant cells exposed to sunlight possess chlorophyll containing plastids called chloroplast.	7. Chlorophyll is absent.
8. Reserve food is generally starch and fat.	8. Reserve food is usually glycogen and fat.

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

Answer- Golgi apparatus packages and dispatch enzymes, hormones and other essential lipids and proteins secreted by ER to target inside and outside of the cell. Moreover, the digestive enzymes which remain concealed in lysosome will remain free in the cytoplasm killing the other cell content. Overall, in absence of Golgi apparatus cell would die.

Que no.5- Which organelle is known as the powerhouse of the cell? why.

Answer- Mitochondria are known as the powerhouse of the cell because the energy required for various life activities is released by mitochondria in the term of ATP molecule. Mitochondria contains enzymes that are needed for stepwise oxidation of food present in the cells to CO₂ and water. Oxidation of food releases energy which is used to to form high energy ATP molecules. ATP are known as energy currency of the cell and these are used as Cellular fuel.

Que no.6- Where do the lipids and proteins constituting the cell membrane get synthesised?

Answer- Proteins are synthesized over ribosomes which are attached to rough endoplasmic reticulum while lipids are synthesized over smooth endoplasmic reticulum.

Que no.7- How does an Amoeba obtain its food?

Answer- Amoeba is unicellular organism. It acquires its food by the process of endocytosis. Plasma membrane of amoeba is flexible which help it to engulf food particles. The engulfed

food particles pass into the body of amoeba as a phagosome. Phagosome combine with lysosome to produce digestive or food vacuole. Digestion occurs in food vacuole. The digested food passes into surrounding cytoplasm. The undigested residue is thrown out of the cell.

Que no.-8 What is osmosis?

Answer- Diffusion of water from the region of its higher concentration to the region of its lower concentration through a semipermeable membrane is called osmosis.

Que no.9- Carry out the following Osmosis experiment:

Take four peeled potato halves and hollow each one out to make potato cups. One of these potato cups should be made from boiled potato. Is potato cup in trough containing water. Now- (a) keep cup A empty. (b) put one teaspoon sugar in cup B © put one teaspoon salt in cup C (d) put one teaspoon sugar in boiled potato cup D. Keep this set up for 2 hours. Then observe the four potato cups and answer the following:

1. Explain why water gathers in the hollowed portion of B and C.
2. Why is potato A necessary for this experiment.
3. Explain why water does not gather in the hollowed out portions A and D.

Answer- 1. Water gathers in the hollow portion B and C because living plasma membrane of potato cup acts as semipermeable membrane. There is higher concentration of water in trough than the sugar solution of B and salt solution of C potato Cup respectively. So by process of osmosis water moves into potato cups B and C.

2. Potato A functions as control experiment which indicates that the cavity does not induce movement of water.

3. Water does not gather in the potato cup A because it does not possess higher osmotic concentration than the cell of potato.

Potato cup D is boiled cup. It does not have living cells and the membrane of the potato cells have lost their permeability. As a result, when teaspoon of sugar is added in to hollowed portion of boiled potato cup D, water does not come out from within the potato cells into the hollowed portion.