

The Fundamental Unit Of Life Revision Notes - Chapter 5 Class 9th Science

Life, as we know it, took billions of years to evolve. From the very first precursor of life to the multitude of multicellular organisms that we see around us today, the most basic unit of all these is the cell.

All about Cells

Cells are the basic structural and functional unit of life. Cell was discovered by Robert Hooke. A number of cells can work together to form tissues and organs.

Cellular respiration

Cellular respiration is the process by which the food releases energy in the mitochondria. Cells absorb glucose from the food and burn it to produce energy.

Prokaryotic & Eukaryotic cells

Two types of cell; Prokaryotic and Eukaryotic cells. Prokaryotic cells are primitive and lack well defined nucleus. Eukaryotic cells are more advanced and have well defined nucleus.

Cell structure in Eukaryotic cells

Eukaryotic cells have the most well defined structure. These cells have cell membrane, membrane bound cell organelles and a well defined nucleus. The nucleus has its own membrane called nuclear membrane.

Cell membrane

- Cell membrane is the outer covering of a cell.
- It is made up of phospho-lipid bilayer membrane.
- It is selectively permeable in nature.
- The structure of a cell membrane is best described by the fluid mosaic model.

Diffusion

The movement of molecules from a region of their high concentration to a region of their lower concentration is known as diffusion.

Osmosis in selectively permeable membrane

Osmosis is the movement of water across a semi-permeable membrane. Osmosis is a selective process since the membrane does not allow all molecules to pass through it. Water is usually the only free flowing molecule across this membrane.

Isotonic, hypotonic solutions, hypertonic solutions

- Isotonic solutions are those which have the same solute and pH concentration as the surrounding body fluid or the cytoplasm.
- Hypotonic solutions contain lesser amount of solute concentration compared to the surrounding fluid and can force the cell to rupture due to excess input of water into the cell.
- Hypertonic solutions contain higher concentration of solute compared to the surrounding fluid and thus push water out of cell, shrinking it.

Cell walls in plants

Plant cells are different from animals cells due to the presence of a cell wall. The cell wall is made of cellulose and gives a rigid structure to the plant cell.

Cell Organelles

Endocytosis

Endocytosis is the invagination of cell membrane, followed by pinching off forming a membrane bound vesicle. This is commonly seen in Amoeba.

Nucleus in cells

Nucleus is the processing unit of the cell. It is a double membrane bound organelle which contains the genetic material for inheritance.

Chromosomes

During the growth phase of the cell, the chromatin condenses into a much thicker structure called chromosome.

Chromatin

Chromatin is a thread like structure which serves as the genetic material present inside the nucleus of the cell. It is made up of DNA and protein molecules. The DNA contains the hereditary information needed for the structure and function of the organism.

Cytoplasm

Cytoplasm is the fluid found inside the cell. It gives the structure to the cell and houses different organelles of the cell.

Organelles

Organelles are structures present in the cytoplasm of the cell that help in several functions of the cell.

Endoplasmic Reticulum

Endoplasmic reticulum is a membrane like cell organelle that plays an integral role in the interpretation of the genetic information present in the nucleus.

Rough ER

Rough ER are the ones that have ribosomes on it. The ribosome is made up of nucleic acids and proteins. They are the site of protein synthesis. The Rough ER is also involved in the modification and folding of protein.

Smooth ER

Smooth ER do not have ribosomes and thus are not involved in protein synthesis. They are however, involved in the lipid metabolism and detoxifying poisonous molecules.

Golgi Apparatus

Golgi Apparatus is also called the post office of the cell. They package and transport the proteins across the cytoplasm.

Lysosomes

They are referred to as suicide bags of the cell as they contain potent enzymes that can digest a cell. Lysosome also help in defense by attacking a foreign object.

Mitochondria

Mitochondria are also called power plant of the cell. They generate ATP via the electron transport chain. They also have a DNA called mtDNA which makes them semi-autonomous organelle.

Plastids

There are various types of plastids in different cells based on the pigment they contain. The chloroplast is the plastid where the photosynthesis occurs. Some of the other plastids are leucoplast and chromoplast.

Vacuoles

Vacuoles are large vesicles that hold water or air in them and give structural rigidity to the cell. Vacuoles are common in plant cells. In animals the vacuoles are either very small or absent.

Comparison between plant & animal cells

Plants cells are different from animals cells structurally. Plant cells have cell wall and chloroplast which are missing in animals cells. Plants cells also have large vacuoles which are either very small or missing in animal cells. The nucleus is present at the center of the cell in animal cells and at the periphery in plant cells.

Question from The Fundamental Unit Of Life Class 9 Notes

1. How does a plant cell differ from an animal cell?
2. Differentiate between a eukaryotic cell and a prokaryotic cell.
3. What would be the outcome in a scenario where a rupture occurs in the plasma membrane?
4. Define osmosis.
5. How does an amoeba acquire food?
6. Growth and repair require which type of cell division?