Cell Structure and Function Class 8

What is a Cell?

All recognised species have a cell as their essential structural, functional, and biological unit. The human body contains trillions of cells. They are life's tiniest common denominator. Such cells are self-contained organisms, and others are components of multicellular organisms. They support the body's structure, absorb nutrients from food, turn certain nutrients to energy, and perform specialised functions. Cells also hold the body's genetic material and have the potential to reproduce themselves.

Discovery of Cell

The discovery of cells is one of science's most notable accomplishments. It teaches us that all species are made up of cells, which aid in the execution of different life processes. The arrangement and roles of cells assisted us in getting a greater understanding of life.

In 1665, Robert Hooke found the cell. Under a compound microscope, Robert Hooke studied a piece of bottle cork and found minuscule structures that reminded him of small spaces. As a result, he called these "rooms" cells. His compound microscope, though, had a low magnification, so he couldn't see any features in the structure. Hooke argued that they were non-living beings as a result of this restriction.

Later, Anton Van Leeuwenhoek studied cells under a higher magnification compound microscope. This time, he found that the cells were going in some direction. Leeuwenhoek came to the conclusion that these microscopic organisms were "alive." Animalcules was finally given a name following a slew of other discoveries.

Robert Brown, a Scottish botanist, was the first to discover the form of a cell in 1883. He was able to identify the nucleus found in orchid cells.

Types of Cells – Cell Structure and Function Class 8

Prokaryotes and eukaryotes are the two types of cells. Single-celled prokaryotic cells are usually smaller than eukaryotic cells. While most eukaryotic cells are present in multicellular organisms, certain single-celled eukaryotes exist. Let's have a look at their definitions as per Cell Structure and Function class 8 textbook:

Prokaryotic Cells	There is no nucleus of prokaryotic cells. Rather, certain prokaryotes, such as bacteria, have an area inside the cell where the genetic material is free to move about. "The nucleoid" is the term for this region. They're all microorganisms with just one cell. Archaea, bacteria, and cyanobacteria are examples. The diameter of the cells varies between 0.1 and 0.5 m. DNA or RNA may be used as genetic stuff. Binary fission, an asexual reproduction method, is used by most prokaryotes. They are also known to use conjugation, which is frequently mistaken for sexual reproduction in prokaryotes. However, conjugation is not sexual reproduction.
Eukaryotes	A true nucleus distinguishes eukaryotic cells. The diameter of the cells varies between 10 and 100 m. Plants, algae, protozoans, and animals all fall under this diverse group. The plasma membrane is in charge of controlling nutrient and electrolyte flow in and out of the cells. Cell-to-cell connectivity is also handled by it. They reproduce both sexually and asexually. Plant and animal cells have several distinct characteristics. Plant cells, for example, have chloroplasts, core vacuoles, and other plastids, while animal cells do not.

Structure of a Cell

Organelles are small structures that make up various parts of a cell. This components and their roles aid in the development and survival of every living being. We'll go into the layout of a cell in detail in this section:

Cell Membrane	Cell membrane refers to a cell's outermost coating. The cell membrane functions as a traffic cop, regulating the entrance and departure of contaminants such as ions and solutes. This aids in the maintenance of internal cell balance.
Cell Wall	The cell wall is the outermost lining of a plant cell. It is made up of cellulose and aids in the cell's mechanical support. It circles the cell membrane and aids in maintaining cell pressure.
Centrosome	The centrosome is an organelle present in animal cells. One or two centrosomes are found in animal cells which aid mitosis.
Chloroplast	Chloroplasts are plant cell components that are green in colour. Photosynthesis aids in the processing of food in the presence of sunlight.
Chromoplast	There are plant cell organelles that come in a number of colours and are present in various cells. They include xanthophyll and carotene, which contribute to the colour of the flowers and fruits.

Cytoplasm	The cytoplasm is a combination of water and soluble organic and inorganic compounds. The cytoplasm comprises the bulk of a cell's components. This is where an animal cell's metabolic functions and activities take place.
Endoplasmic Reticulum	The endoplasmic reticulum is a series of tubular structures located near the nucleus that help support both plant and animal cells. Smooth reticulum without attached ribosomes and rough endoplasmic reticulum with attached ribosomes are the two forms of endoplasmic reticulum.
Golgi Bodies	The golgi apparatus, also known as the limbs, are flat vesicular structures placed one on top of the other. Hormones and enzymes that aid in cell transport are secreted and stored by them.
Leukoplasts	These are colourless plastid organelles found in plant cells that aid in the preservation of starch.
Lysosome	A membranous sac is a component of an animal cell. It is a component of the golgi apparatus, which houses a variety of enzymes. It aids in intracellular digestion and foreign material clearance. They're also known as 'suicide sacs,' and if one of them explodes, the whole cell will die.

Mitochondria	The inner membrane of the mitochondria is bent to form cristae, and the outer membrane is flat. It is the cell's powerhouse, where cellular respiration generates ATP.
Nuclear Membrane	The nuclear membrane is the nucleus's outermost layer. It has a lot of pores that help with material transport.
Nucleoulus	The nucleoulus stores the RNA and sends the RNS along with the blueprints for the protein to be synthesised to ribosomes.
Nucleoplasm	Nucleoplasm is the thick fluid that comprises DNA-based chromatin fibres. Chromosomes are chromatin fibres that undergo structural changes during cell division. This chromosome is where genes' genetic information is stored.
Nucleus	The cell nucleus, a cell's brain, is in charge of all of the cell's functions. It includes DNA, which is the blueprint for survival.
Ribosomes	The portion of a cell that contains RNA, which aids protein synthesis.

Vacuole	A vacuole is a huge and numerous vesicle found in plant cells. It holds liquids and aids in the handling of chemicals, construction materials, and water.

Functions of a Cell – Cell Structure and Function Class 8

A cell plays these critical roles for an organism's growth and development. The following are some of the most important functions of a cell:

Providing Structure as well as Support	An organism is made up of cells, much like a classroom is made up of bricks. Although certain cells, such as the collenchyma and sclerenchyma, are specifically designed to provide structural support, all cells serve as the foundation for all species. Skin, for example, is made up of a multitude of skin cells. Xylem, a special tissue made up of cells that provides structural protection to vascular plants, has grown.

Makes Growth Easier through Mitosis	Tissues in complex organisms expand through simple cell multiplication. This occurs during the course of mitosis, in which the parent cell divides into two daughter cells that are similar to it. Simpler species replicate and give birth to new organisms by the mechanism of mitosis.

Facilitates Transport of Substances	The cells import different nutrients in order to carry out various chemical processes within the cells. Active and passive transport removes the waste generated by chemical processes from the cells. In the concentration gradient, small molecules like oxygen, carbon dioxide, and ethanol diffuse through the cell membrane. This is referred to as passive transportation. The larger molecules are transported across the cell membrane through active transport, which requires a lot of energy from the cells.
Production of Energy	The thousands of chemical reactions that cells carry out on a regular basis are vital to an organism's survival. Cells require energy to carry out these reactions. Many plants produce this energy by photosynthesis, while animals obtain it by a mechanism known as respiration.
Helps in Reproduction	Mitosis and meiosis are two mechanisms that help in cell replication. Mitosis is the asexual replication process in which the parent cell splits into daughter cells. Meiosis results in genetic variations between the daughter cells and the parent cells. As a consequence, we can see that cells are referred to as the structural and functional unit of life. This is due to the fact that they give cohesion to organisms and perform a number of roles that are needed to carry out life's processes.
Creation of Metabolic Reactions	Metabolism refers to any of the chemical reactions that occur within an organism in order to keep it alive. Catabolic or anabolic reactions can occur. Catabolism is the mechanism of producing energy by breaking down molecules (glucose). Anabolic reactions, on the other

hand, use energy to turn simpler molecules into more complicated ones.