

Plant Cells - Definition, Diagram, Structure & Function

The cell is the basic unit of life in all organisms. Like humans and animals, plants are also composed of several cells. The plant cell is surrounded by a cell wall which is involved in providing shape to the plant cell. Apart from the cell wall, there are other organelles that are associated with different cellular activities.

Let us have a detailed look at the plant cell, its structure, and functions of different plant cell organelles.

Plant Cell Definition

“Plant cells are eukaryotic cells with a true nucleus along with specialized structures called organelles that carry out certain specific functions.”

What is a Plant Cell?

Plant cells are eukaryotic cells that vary in several fundamental factors from other eukaryotic organisms. Both plant and animal cells contain nucleus along with similar organelles. One of the distinctive aspects of a plant cell is the presence of a cell wall outside the cell membrane.

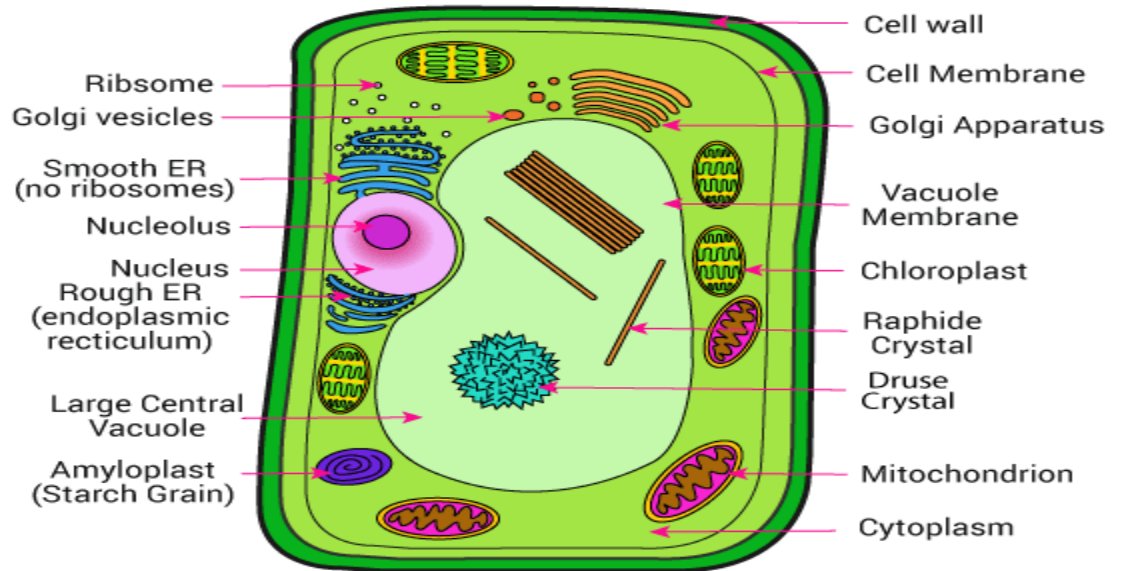
Read more: [Cells](#)

Plant Cell Diagram

The plant cell is rectangular and comparatively larger than the animal cell. Even though plant and animal cells are eukaryotic and share a few **cell organelles**, plant cells are quite distinct when compared to animal cell as they perform different functions. Some of these differences can be clearly understood when the cells are examined under an electron microscope.

Also Read: [Cellulose in Digestion](#)

Plant Cell



Plant Cell Diagram showing different cell organelles

Plant Cell Structure

Just like different organs within the body, plant cell structure includes various components known as cell organelles that perform different functions to sustain itself. These organelles include:

Cell Wall

It is a rigid layer which is composed of cellulose, glycoproteins, lignin, pectin, and hemicellulose. It is located outside the cell membrane. It comprises proteins, polysaccharides, and cellulose.

The primary function of the cell wall is to protect and provide structural support to the cell. The plant cell wall is also involved in protecting the cell against mechanical stress and to provide form and structure to the cell. It also filters the molecules passing in and out of the cell.

The formation of the cell wall is guided by microtubules. It consists of three layers, namely, primary, secondary and the middle lamella. The primary cell wall is formed by cellulose laid down by enzymes.

Also Read: [Cell Wall](#)

Cell membrane

It is the semi-permeable membrane that is present within the cell wall. It is composed of a thin layer of protein and fat.

The cell membrane plays an important role in regulating the entry and exit of specific substances within the cell.

For instance, cell membrane keeps toxins from entering inside, while nutrients and essential minerals are transported across.

Also Read: [Cell Wall and Cell Membrane](#)

Nucleus

The nucleus is a membrane-bound structure that is present only in eukaryotic cells. The vital function of a nucleus is to store DNA or hereditary information required for cell division, metabolism, and growth.

1. **Nucleolus:** It manufactures cell's protein-producing structures and ribosomes.
2. **Nucleopore:** Nuclear membrane is perforated with holes called nucleopore that allows proteins and nucleic acids to pass through.

Explore more: [The Nucleus](#)

Plastids

They are membrane-bound organelles that have their own DNA. They are necessary to store starch, to carry out the process of photosynthesis. It is also used in the synthesis of many molecules which form the building blocks of the cell. Some of the vital types of **plastids** and their functions are stated below:

Leucoplasts

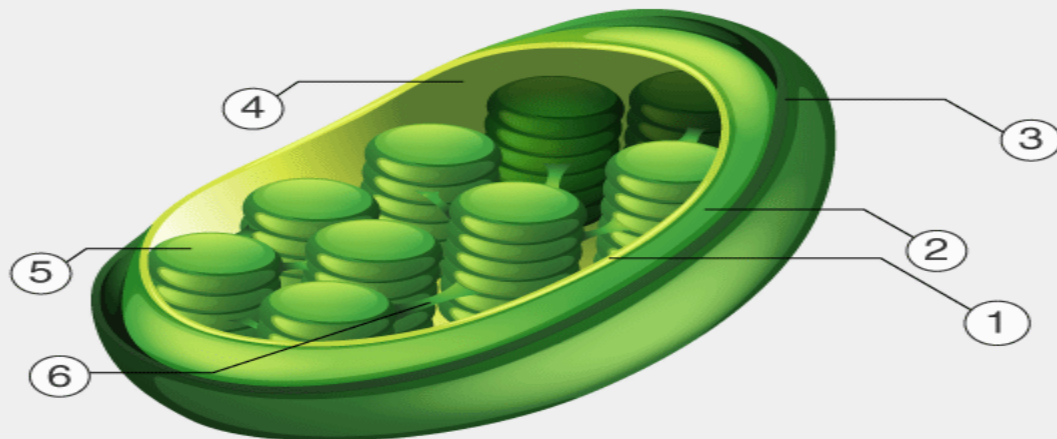
They are found in non-photosynthetic tissues of plants. They are used for the storage of protein, lipid, and starch.

Chloroplasts

It is an elongated organelle enclosed by phospholipid membrane. The chloroplast is shaped like a disc and the stroma is the fluid within the chloroplast that comprises a circular DNA. Each chloroplast contains a green coloured pigment called chlorophyll required for the process of photosynthesis. The chlorophyll absorbs light energy from the sun and uses it to transform carbon dioxide and water into glucose.

Also Read: [Chloroplasts](#)

CHLOROPLAST



- 1 Inner membrane | 2 Intermembrane space | 3 Outer membrane
4 Stroma | 5 Thylakoid | 6 Lamella

Chromoplasts

They are heterogeneous, coloured plastid which is responsible for pigment synthesis and for storage in photosynthetic eukaryotic organisms. Chromoplasts have red, orange and yellow coloured pigments which provide colour to all ripe fruits and flowers.

Central Vacuole

It occupies around 30% of the cell's volume in a mature plant cell. Tonoplast is a membrane that surrounds central vacuole. The vital function of central vacuole apart from storage is to sustain turgid pressure against the cell wall. The central vacuole consists of cell sap. It is a mixture of salts, enzymes, and other substances.

Also read: [Vacuoles](#)

Golgi Apparatus

They are found in all eukaryotic cells which are involved in distributing synthesized macromolecules to various parts of the cell.

Explore more: [Golgi Apparatus](#)

Ribosomes

They are the smallest membrane-bound organelles which comprise RNA and protein. They are the sites for protein synthesis, hence, also referred to as the protein factories of the cell.

Explore more: [Ribosomes](#)

Mitochondria

They are the double-membraned organelles found in the cytoplasm of all eukaryotic cells. They provide energy by breaking down carbohydrate and sugar molecules, hence they are also referred to as the “Powerhouse of the cell.”

Explore more: [Mitochondria](#)

Lysosome

Lysosomes are called as suicidal bags as they hold digestive enzymes in an enclosed membrane. They perform the function of cellular waste disposal by digesting worn-out organelles, food particles and foreign bodies in the cell..

Also read: [Lysosomes](#)

Plant Cell Types

Cells of a matured and higher plant become specialized to perform certain vital functions that are essential for their survival. Few plant cells are involved in the transportation of nutrients and water, while others for storing food.

The specialized plant cells include parenchyma cells, sclerenchyma cells, collenchyma cells, xylem cells, and phloem cells.

Following are some of the different types of plant cells:

Collenchyma Cells

They are hard or rigid cells, which play a primary role in providing support to the plants when there is restraining growth in a plant due to lack of hardening agent in primary walls.

Sclerenchyma Cells

These cells are more rigid compared to collenchyma cells and this is because of the presence of a hardening agent. These cells are usually found in all plant roots and mainly involved in providing support to the plants.

Parenchyma Cells

Parenchyma cells play a significant role in all plants. They are the living cells of plants, which are involved in the production of leaves. They are also involved in the **exchange of gases**, production of food, storage of organic products and cell metabolism. These cells are typically more flexible than others because they are thinner.

Xylem Cells

Xylem cells are the transport cells in vascular plants. They help in the transport of water and minerals from the roots to the leaves and other parts of the plants.

Phloem Cells

Phloem cells are other transport cells in vascular plants. They transport food prepared by the leaves to different parts of the plants.

Refer more: [Plant Tissue System](#)

Plant Cell Functions

Plant cells are the building blocks of plants. Photosynthesis is the major function performed by plant cells.

Photosynthesis occurs in the chloroplasts of the plant cell. It is the process of preparing food by the plants, by utilizing sunlight, carbon dioxide and water. Energy is produced in the form of ATP in the process.

Few plant cells help in the transport of water and nutrients from the roots and leaves to different parts of the plants.

Also read: [Golgi Apparatus](#)

To more about what is a plant cell, its definition, structure, diagram, types and functions, keep visiting [BYJU'S Biology](#) website or download BYJU'S app for further reference.

Frequently Asked Questions

What is a plant cell?

A plant cell is a eukaryotic cell that contains a true nucleus and certain organelles to perform specific functions. However, some of the organelles present in plant cells are different from other eukaryotic cells.

What are the different types of plant cells?

The different types of plant cells include- collenchyma, sclerenchyma, parenchyma, xylem and phloem.

Which organelles are found only in plant cells?

The organelles found only in plant cells include- chloroplast, cell wall, plastids, and a large central vacuole. The chloroplasts contain a green pigment chlorophyll that is responsible for the process of photosynthesis.

What is the composition of a plant cell wall?

The cell wall of a plant is made up of cellulose. Cellulose is a long, linear polymer of several glucose molecules.

Where does photosynthesis occur in plant cells?

Photosynthesis occurs inside the chloroplast of the plant cells. Chloroplast consists of a green pigment called chlorophyll. The light reactions occur within the thylakoids of the chloroplast where the chlorophyll pigment is found.