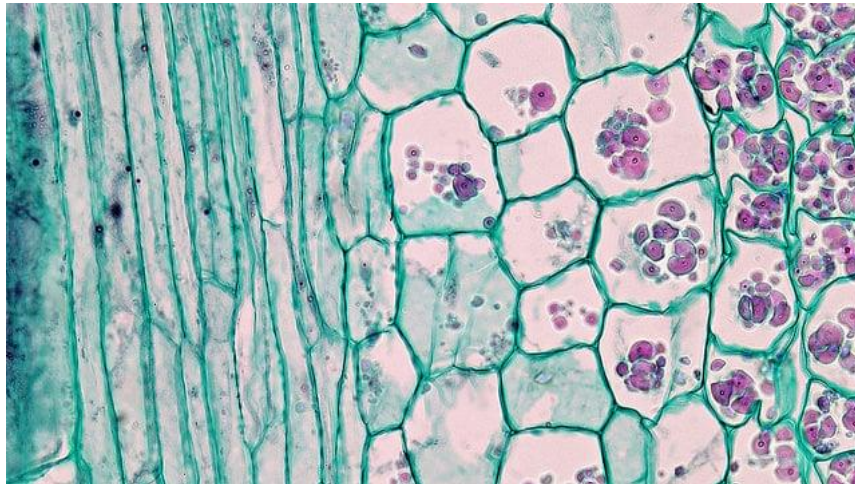


Types of plant cells:

Plants are comprised of several cells that may be organized to plant tissues and organs that perform a particular function. Thus, plant cells may be classified into types based on the tissues they are associated with. The common plant cell types are meristematic cells, parenchyma cells, collenchyma cells, sclerenchyma cells, and reproductive cells.

A. Meristematic cells: Meristematic cells are the cells of the meristem. These cells are not yet differentiated and divide actively by mitosis. They are the stem cells of plants, capable of giving rise to any plant cell type.

B. Parenchyma cells: These are live undifferentiated cells found in a variety of places of the plants' bodies. They participate in several mechanisms of the plant including photosynthesis, food storage, secretion of waste materials. The experimental observation indicated that they appear green.



Structure of parenchyma cells

They are live thin-walled cells with permeable walls that are undifferentiated. They do not have a specialized structure hence they easily adapt and differentiate into a variety of cells performing different functions. There are two types of parenchyma cells:

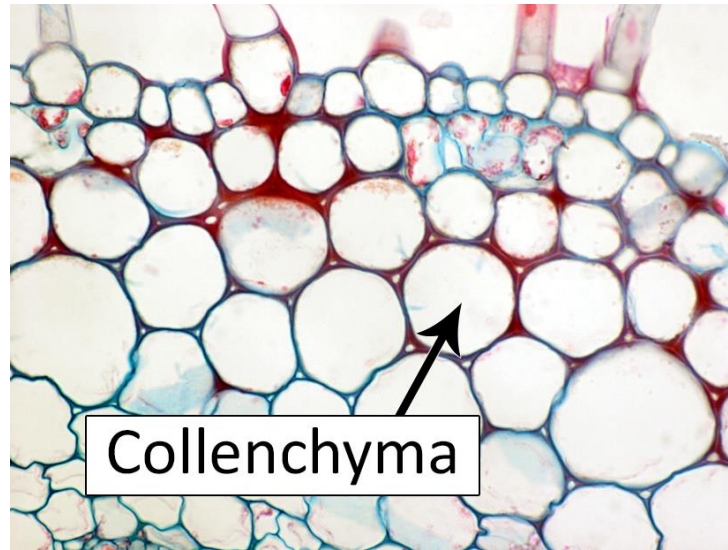
1. Palisade parenchyma: Palisade parenchyma cells are columnar elongated structured cells found in a variety of leaves, lying below the epidermal tissue. Palisades are closely linked cells in layers of mesophyll cells found in leaf cells.

2. Ray parenchyma: Ray parenchyma has both radial and horizontal arrangements majorly found within the stem wood of the plant.

Functions of the Parenchyma cells:

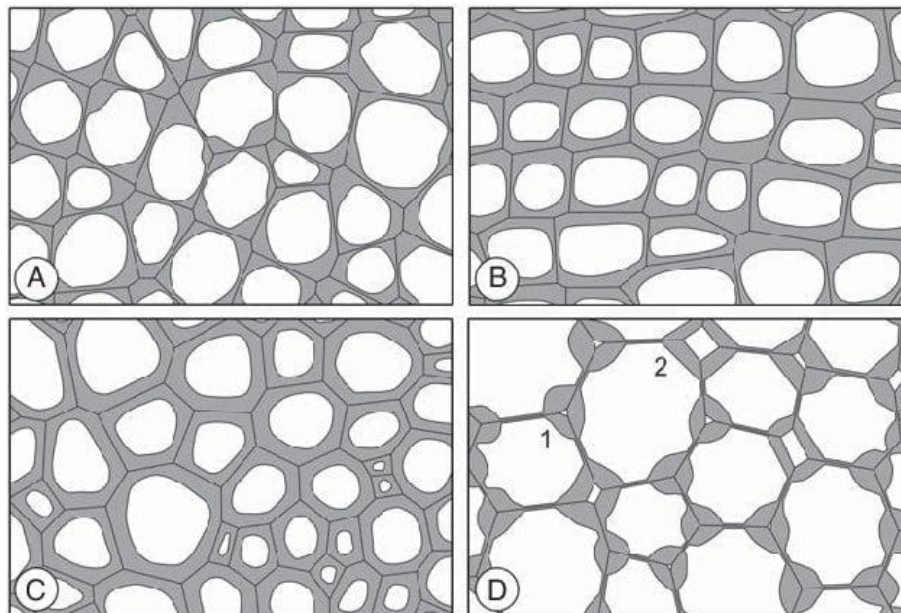
1. Parenchyma cells are closely linked to the surface epidermal cells which contribute largely to light penetration and absorption and regulate gas exchange.
2. The permeable wall allows the transportation of small molecules between the cells and the cell cytoplasm.
3. The palisade parenchyma combined with spongy mesophyll cells found below the layer of the epidermis tissue assists in light absorption used in photosynthesis.
4. Ray parenchyma cells are found in wood rays which transport materials along the plant stem.
5. The parenchyma cells are also found in good numbers within the xylem and the phloem of vascular plants, helping in the transportation of water and food materials in the plant.
6. Some are also involved in the biochemical secretion of nectar and manufacturing secondary elements that act as protective materials from herbivores' feeding.
7. And those parenchyma cells found in root tubers such as potatoes, leguminous plants, help in the storage of food.

C. Collenchyma cell: They are elongated cells found below the epidermis and/or in young plants on the outer layers of their stems and leaves. They become alive after maturing up and are derivatives of the meristems and they are found in the vascular and/or on the plant stem corners. They occur in the peripheral region of the plant and are not found in the plant roots. In experimental observation, they appear red.



Types of collenchyma cells:

The most common types of collenchyma. (A) Angular collenchyma. (B) Tangential collenchyma. (C) Annular collenchyma. (D) Lacunar collenchyma. This type often occurs as an intermediate type with angular and lamellar collenchyma, in which the size of the intercellular spaces can vary from minute spaces to large cavities surrounded by collenchymatous walls



Schematic drawings of the most common types of collenchyma. (A) Angular collenchyma. (B) Tangential collenchyma. (C) Annular collenchyma. (D) Lacunar collenchyma.

There are four types of collenchyma based on the thickness of the wall and the cell arrangement

Angular collenchyma

- The cells appear to have an angle and a polygonal shape.
- The cells are thickened at the corners of the cell
- The cells do not have intracellular spaces since they are closely packed together
- They are found below the epidermis as hypodermis
- They are the most common type of collenchyma

Annular collenchyma

- The walls are uniformly thickened.
- The cells appear to be circular in shape
- Lamellar collenchyma
- The cells are thickened on the periphery making them appear tangentially arranged in rows
- They are closely packed together and therefore they don't have intracellular spaces.
- They are commonly formed and found in the leaves petioles.

Lacunar Collenchyma

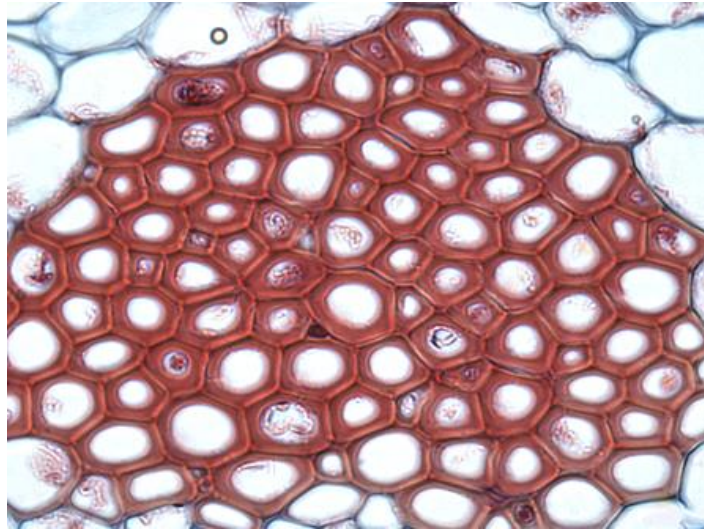
- These are cells are formed spaciouly leaving intracellular spaces between each other.
- The cell wall thickens around the intracellular spaces
- They appear spherically shaped
- They are formed and found in the walls of fruits

Functions of the Collenchyma cells

1. Being the living cells in plant tissues, they give support to the plant areas that are growing and maturing in length. Since the cell wall lacks lignin, it remains supple giving the plant parts like young stems, young roots, and young leaves plastic (stretchable) support.
2. They offer flexibility and tensile strength to plant tissues, allowing the plants to bend.
3. They also allow the plant parts to grow and elongate.

4. Collenchyma can combine with the chloroplast and perform the process of photosynthesis.

D. Sclerenchyma cells: These are collenchyma cells that have an agent of the cell wall that plays a major role in hardening its cell wall. Therefore, these are mature Collenchyma cells with a secondary cell wall, over the primary cell wall. They are found in all plant roots and they are important in anchoring and giving support to the plants.



Structure of sclerenchyma cells

They have a lignified cell wall, making them extremely hard. These make them more rigid in comparison to the parenchyma and the collenchyma cells. They also have suberin and cutin, which makes them waterproofed. Because of their rigidity and waterproof effect, they do not live for long since they cannot exchange materials for cellular metabolisms to sustain their longevity. Therefore, in the event of fully developing their functional maturity (a phase for cytoplasm formation), they are dead.

Types of sclerenchyma cells

- A. Fiber sclerenchyma cells
- B. Sclereid sclerenchyma cells

Functions of the sclerenchyma cells

1. Due to their thickened cell wall, they offer protection and support to other plants' tissues especially the tree trunks and fibers of large herbal trees.

2. The hardened cell wall discourages herbivory. Ingestion of the hard cell wall causes damage to the digestive tract of larval stage insects, especially in peach fruits.
3. Sclerenchyma found fibers are used in making fabric, thread, and yarns.

E. Reproductive cells

Unlike animals, plants have an alternation of generations, i.e., the alternating phases of sporophyte and gametophyte. A sporophyte is a plant form in diploid. It eventually bears sporangia that produce spores. A spore is a haploid reproductive cell involved in asexual reproduction and gives rise to a gametophyte.

Each haploid spore divides mitotically to become the gametophyte. Thus, a gametophyte is a plant form in a haploid condition. It bears gametangia that produce sex cells (gametes). The sex cells are reproductive cells involved in sexual reproduction. The female sex cell is an egg cell whereas the male sex cell is a sperm cell. These cells are haploid. Thus, when they unite, they form a diploid zygote. The zygote, then, develops into a new sporophyte.

