

PARENCHYMA

Group of cells performing a similar function is referred to as Tissue. These are divided into Meristematic and Permanent tissue based on their capacity of cell division. Meristematic tissue is known to actively divide and form new cells. The cells formed by meristematic tissue gradually change assume more or less specialised characteristics. The cells further differentiated are termed as Permanent tissue, in which growth (cell division) has stopped either completely or for the time being.

Permanent tissue varies in their cell wall content and composition. These are categorised into Simple tissue and Complex tissue. Simple tissue is made up of homogenous system of cells (only one type of cell). Common simple tissues include Parenchyma, Collenchyma and Sclerenchyma. Complex tissue is made up of more than one type of cells working as a unit. The common examples are Xylem and Phloem.

Simple Tissue

These are made up of only one type of cells. Based on cell wall thickenings simple tissue is sub divided into three main types :

- A. Parenchyma – thin cell wall, no thickenings
- B. Collenchyma – uneven cell wall thickenings
- C. Sclerenchyma – evenly thickened cell walls

A. Parenchyma

Origin : It is derived from primary meristem.

Structure and composition :

It is composed of living tissue consisting of isodiametric, round, oval or polygonal cells and generally shows the presence of intercellular spaces.

The cell wall is thin and is composed of cellulose, hemicellulose and calcium pectate.

The cells show the presence of dense cytoplasm with prominent nuclei (one or more than one) and a vacuole.

Plasmodesmata are generally present helping in communication with the adjacent cells.

Location : found in pith, mesophyll of leaves, pulp of fruits, endosperm of seeds, cortex of stem, roots. It also occurs in xylem and phloem.

Types :

The tissue can be categorised into further types based on arrangement of cells and function.

Types based on arrangement of cells, following are the sub types :

- a. Loose parenchyma – the cells are loosely arranged with large intercellular spaces.
- b. Angular parenchyma – the cells are compactly arranged with no or little intercellular spaces.

Based on function, parenchyma is sub divided into :

- i. Storage parenchyma – mainly helps in storage of substances like starch, oil, fats, resin and other reserve materials.
- ii. Aerenchyma – shows the presence of large air cavities and helps in providing buoyancy in hydrophytes and also helps in exchange of gases.
- iii. Chlorenchyma – shows the presence of chlorophyll pigment and helps in the process of photosynthesis.

Function

1. Acts as a storage tissue helping in storage of food materials like starch or resins, oils and fats. In xerophytic plants water storage parenchyma helps in retaining water.
2. Acts as a medium for various physiological processes like respiration, photosynthesis, assimilation, secretion etc.
3. In leaves showing the presence of chlorenchyma, it carries out the function of photosynthesis.
4. Provides buoyancy in hydrophytes due to the presence of air spaces and also helps in exchange of gases.
5. Helps in conduction of water and food materials in xylem and phloem.
6. Turgid parenchyma helps in providing support to the plant.
7. Facilitate vegetative propagation due to meristematic potentialities of the cells by forming buds and adventitious roots.
8. During injuries, helps in wound healing.