

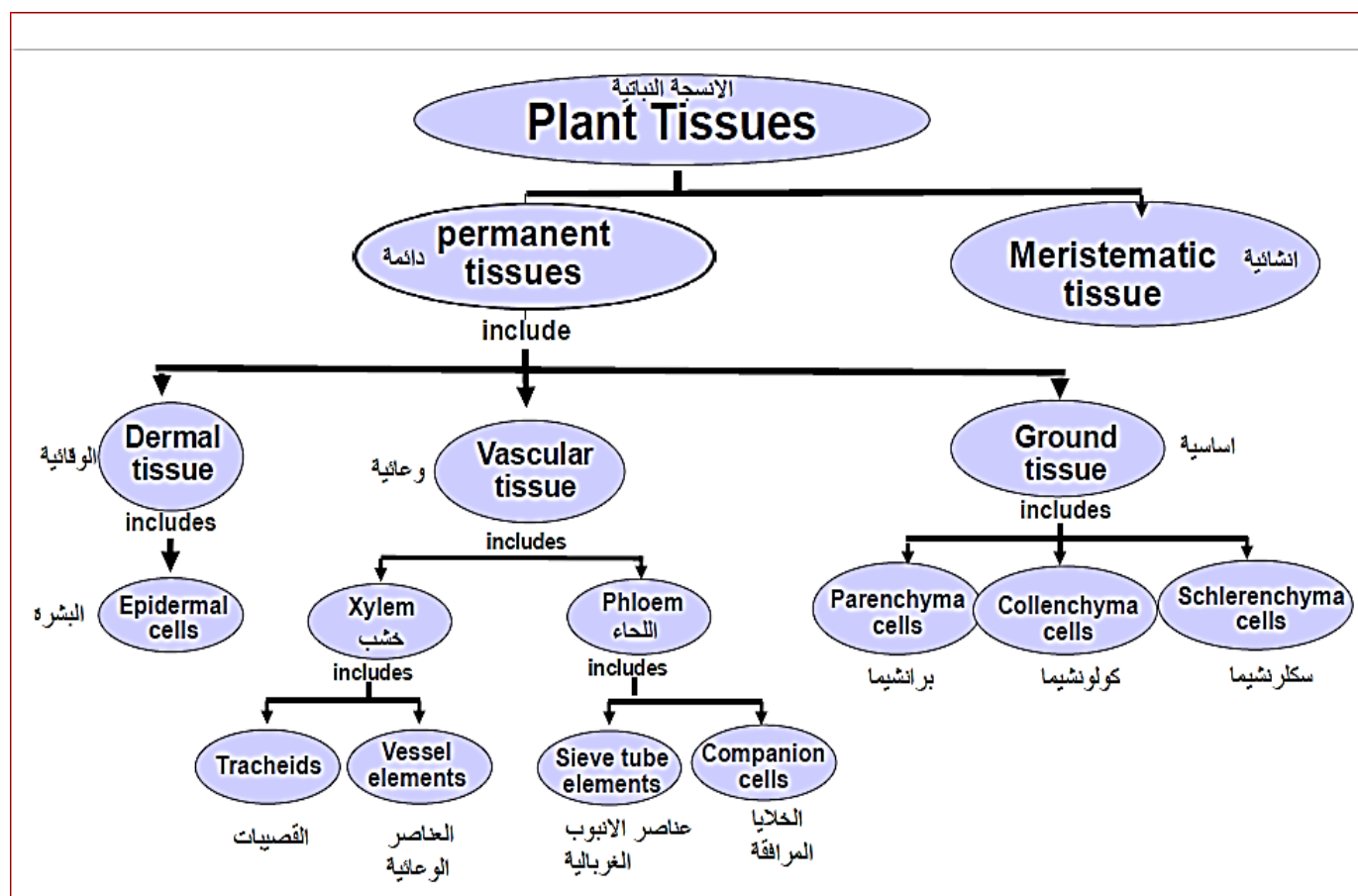
Plant Tissue: Group of cells having similar structure and function is called as tissue.

They are essential for the growth, development, and survival of plants.

Tissues classified in to:

1- Meristematic tissue: consists of a group of immature cells which remains in a continuous state of division.

2- The permanent tissue: are those in which growth has stopped either completely or for a time as sometimes they again become meristematic partially or wholly.



1-The Meristems or Meristematic tissue: (Also called growing tissue) are dividing , undifferentiated cells.

Functions of Meristems :

- 1-Vertical Growth (Elongation).
- 2-Thickness (increase the Diameter) .
- 3-Tissue Regeneration and Repair.

The Characteristics of meristematic tissues:

Shape of cell: each cell is oval, rounded, cuboidal or rectangular

Size: small

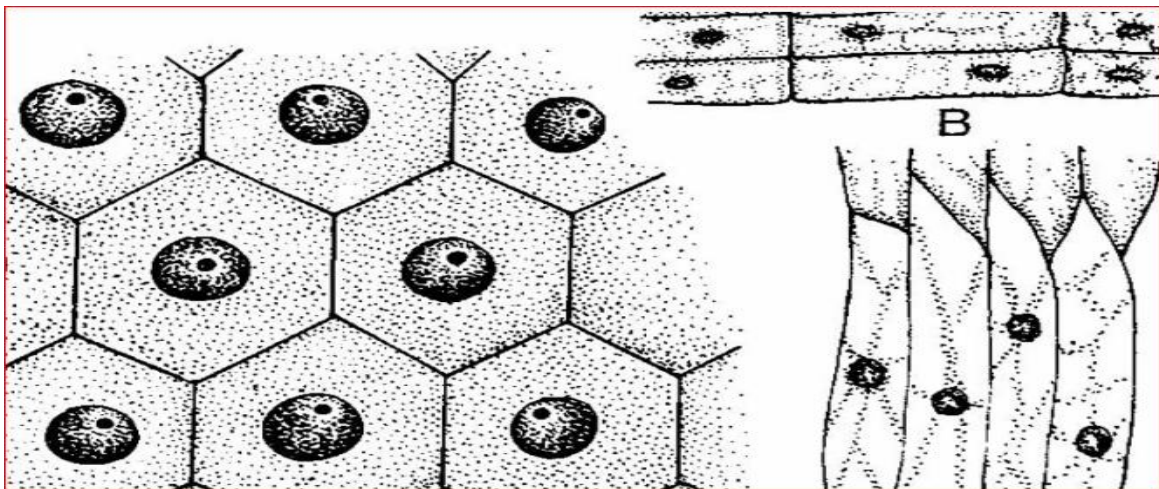
Intercellular space: Absent

Cell wall: thin walled made up of cellulose

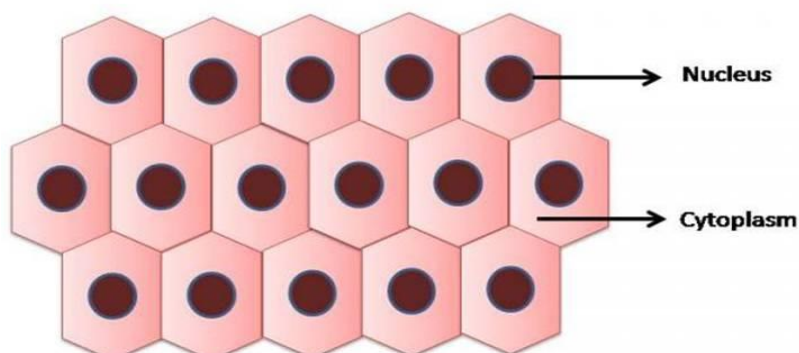
Nucleus: single large .

Cell division: high capacity and continuous

Cytoplasm :They have generally dense.



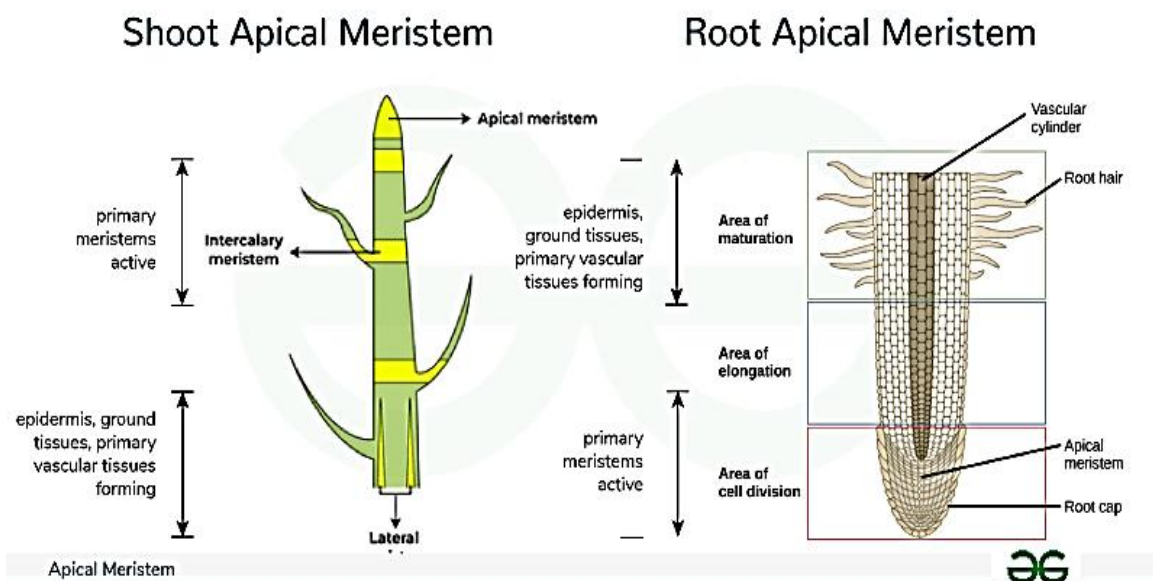
A typical meristematic tissue



Main types of Meristematic tissue Based on position in the Plant

Body: On the basis of position meristematic tissues can be divided into 3 types :

- 1) Apical Meristem: Tips of roots/shoots; causes vertical lengthening. زيادة الطول.
- 2) Lateral Meristem: Sides of stems/roots; causes widening. زيادة المحيط.
- 3) Intercalary Meristem: Found at base of leaves/internodes; causes leaf growth and regeneration. زيادة الطول بين العقد.

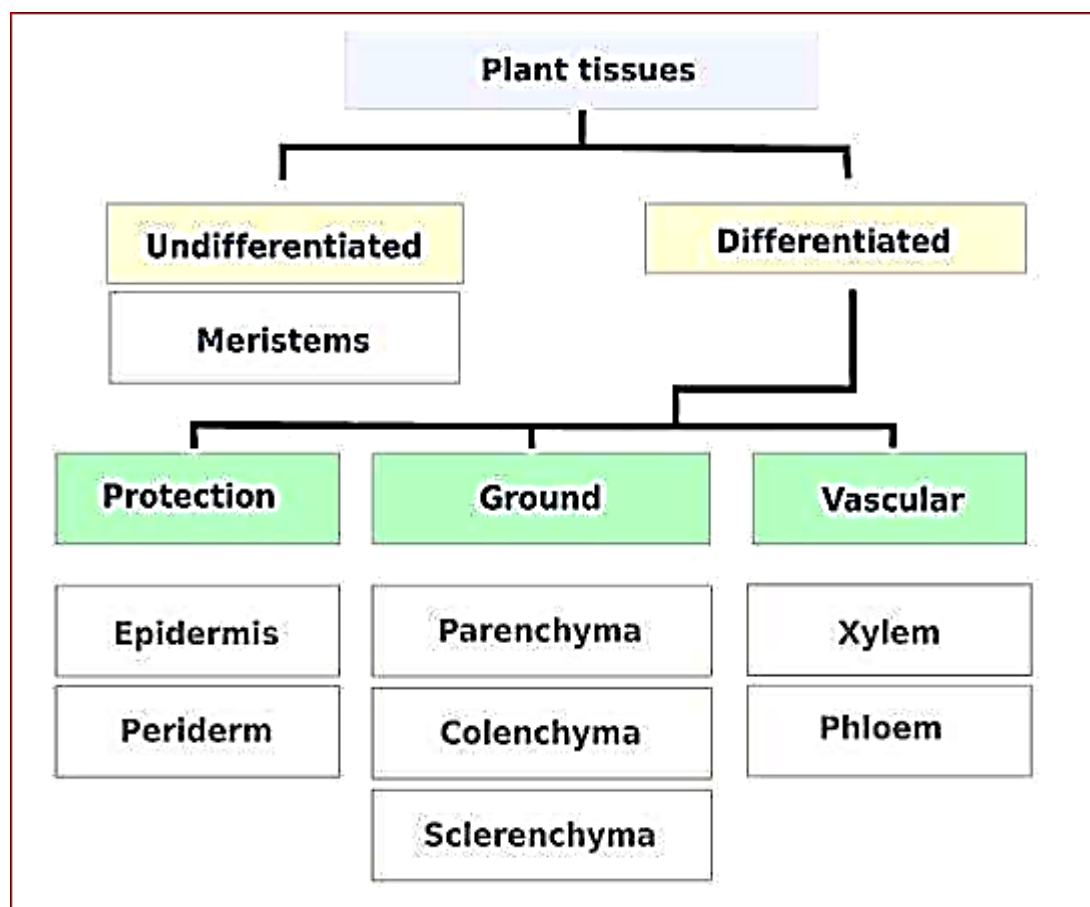


2. Permanent Tissues

Permanent tissues: permanent tissues are a group of mature , living or dead cells which are formed by meristematic tissues that have lost their ability to divide.

Types of Permanent Tissue :

- Simple : Ground tissue which are parenchyma, collenchyma and sclerenchyma .
- Complex : which are xylem and phloem.



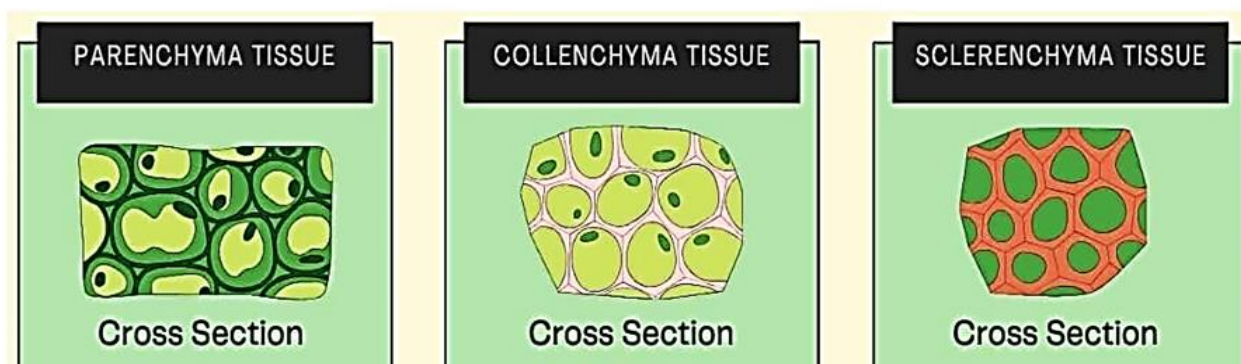
Characteristics of Permanent Tissue:

- 1) Differentiation: Permanent tissues have differentiated into specific cell types with specialized functions. Unlike meristematic tissues, they do not divide actively.
- 2) Specialization: Each type of permanent tissue has a unique function, such as support, transport, or storage.
- 3) They possess defined shapes, sizes, and thick cell walls, and can be living (parenchyma, collenchyma) or dead (sclerenchyma).

Simple Permanent Tissues: These consist of one type of cell and include:

- o Parenchyma (filler tissue) : Involved in storage of food + water+ air, photosynthesis, and tissue repair.
- o Collenchyma: Provides the support, this supporting of is used against the mechanical stresses like wind .
- o Sclerenchyma: Offers structural support and strength, with cells often lignified and dead at maturity.

Types of Plant Tissues



The Characteristics of Parenchyma :

The cells have limited capacity for division or ability to multiply (the regeneration of damaged plant cells).

The cells have an oval or round shape &The cell is thin-walled.

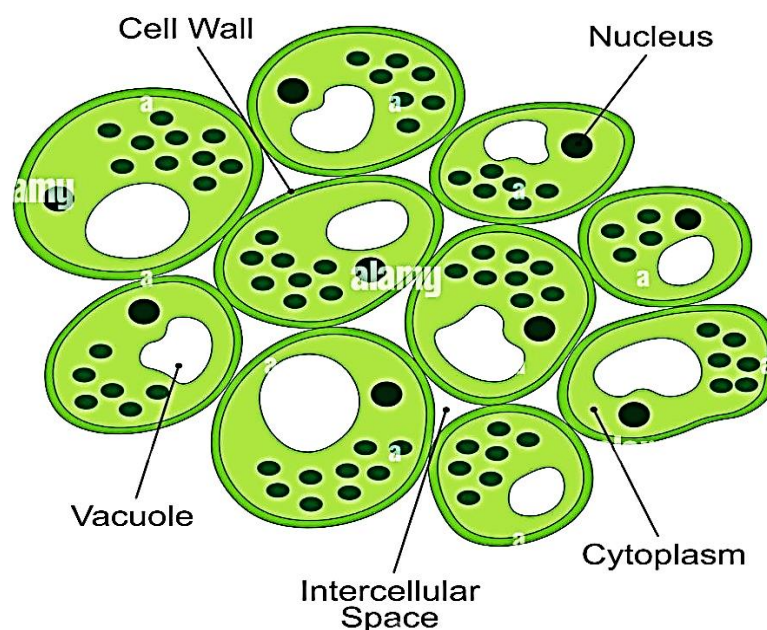
The cell wall is made up of hemicellulose or cellulose.

Intercellular spaces are often present.

The cells have vacuoles and very small nucleus.

The cell is living and has dense cytoplasm.

Parenchyma Structure



The Characteristics of Collenchyma:

Cells are thick-walled in the corners.

Living cells.

It also provides mechanical support to plants.

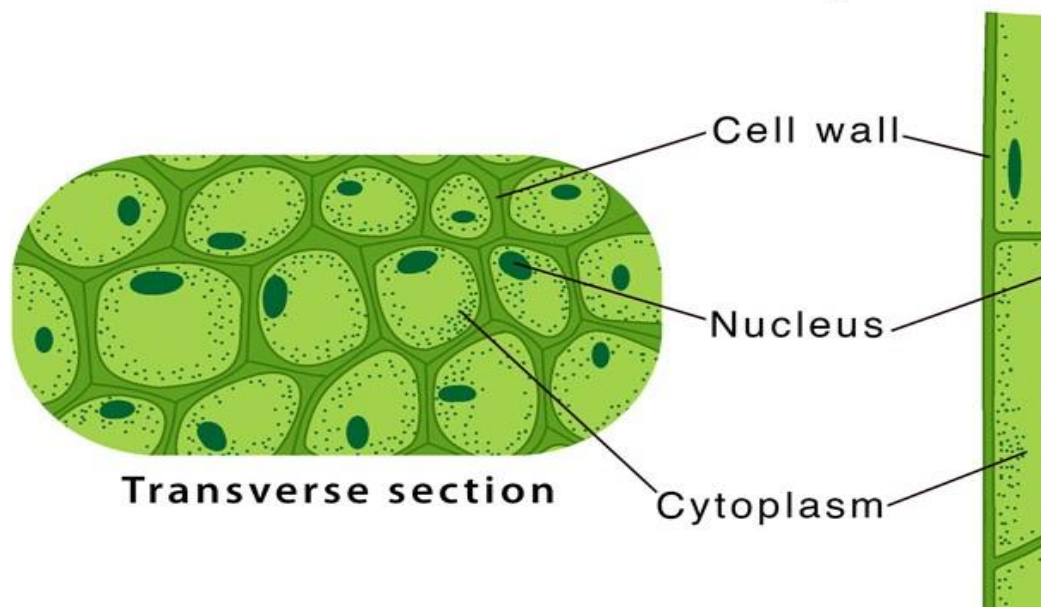
The cells have no intercellular spaces.

The cell wall is made up of cellulose and pectin.

The flexibility in plants. It allows easy bending in various parts of a plant (leaf, stem) without breaking.

The amount of chloroplast is less in the cells.

Collenchyma



The Characteristics of Sclerenchyma:

These are dead tissues, very hard and rigid in texture; the main structural support to a plant.

Cells are thick-walled with various size and shapes.

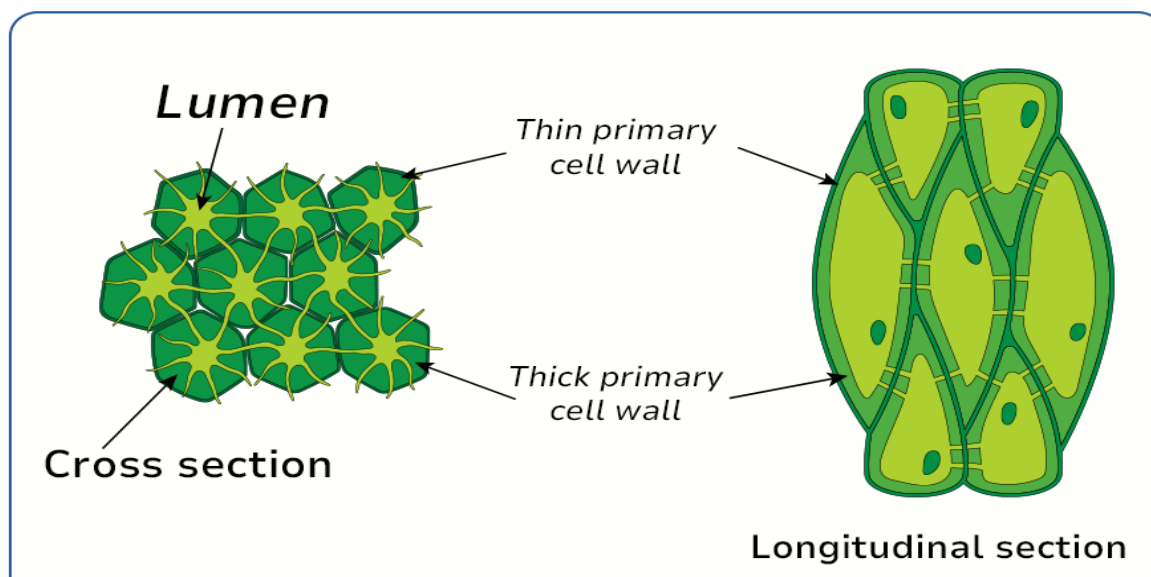
No internal space.

Sclerenchyma, often containing cellulose, pectin, or lignin (a component of wood; Therefore they are found in woody plants. We have seen the husk of a coconut.

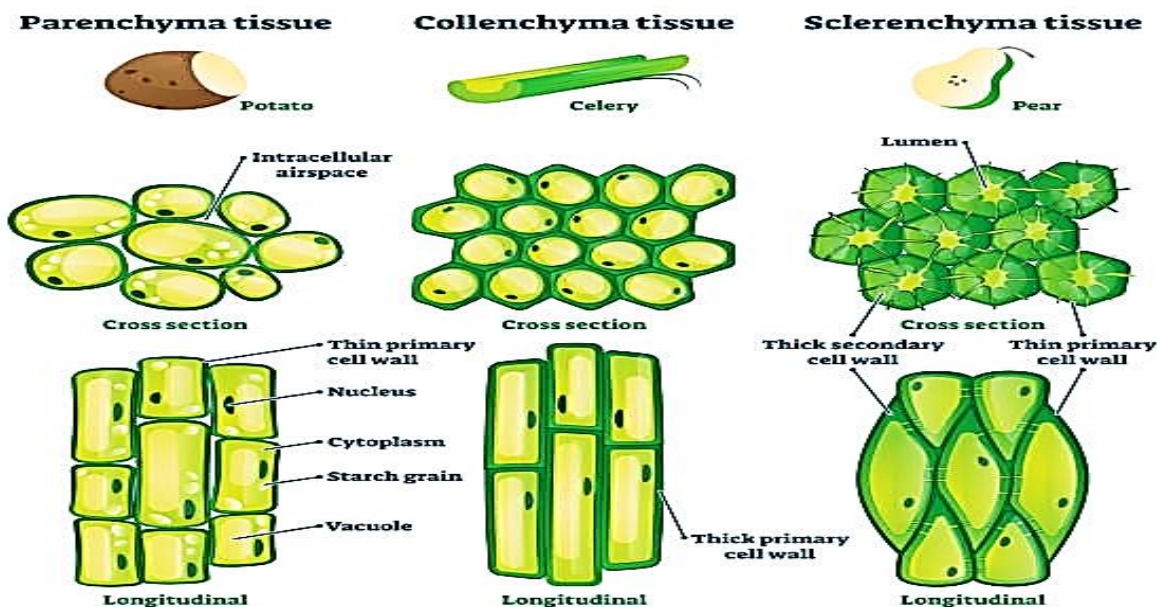
This tissue is present in stems, in the veins of leaves and in the hard covering of seeds and nuts. It provides strength to the plant parts.

This tissue is found in the stem , roots , leaves , fruits of many plants.

Diagram of Sclerenchyma



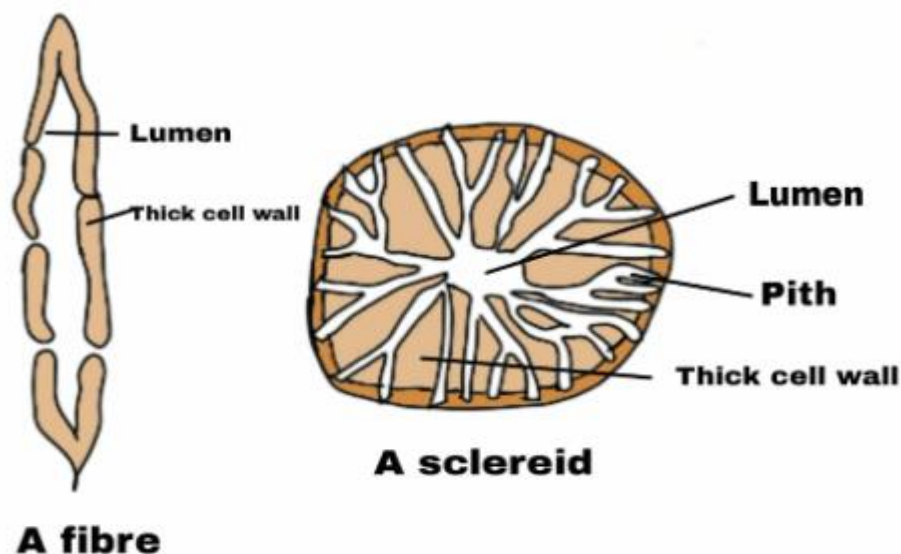
TYPES OF PLANT TISSUE



There are two types of sclerenchyma cells: elongated fibers and variously shaped sclereids.

1. Fibers often organize into bundles.

They are long, have tapered ends, and are thick-walled. The fully developed fibers are always dead.



2.Sclereids :They are externally thick-walled.

Shape :may be spherical, oval, cylindrical ,stone , bone & star cells.

May be make pack together very densely. (Sclereids are found in fruits such as pears and are what given them their hard texture.)

