

## Lab – 4 -

## Plant Tissue

**Tissue:** Groups or masses of cells that are alike in origin , structure and function.

Tissues classified in to:

- 1- Meristematic tissue:** consists of a group of immature cells which remains in a continuous state of division. The cells may be rounded , oval or polygonal in shape, they are always living and thin-walled. Usually the intercellular spaces are not found among these cells .
- 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. The cells of these tissues may be living or dead and thin walled or thick-walled . The thin-walled permanent tissues are generally living whereas the thick-walled permanent tissues may be living or dead.

**Plant tissues are grouped into three main systems:**

- 1- The ground tissue system is the most extensive. It makes up the bulk of the plant body.
- 2- The vascular tissue system contains two kinds of conducting tissues that distribute water and solutes through the plant body.
- 3- The dermal tissue system covers and protects the plant's surfaces.

Some tissues in these systems contain only one type of cell and are called simple. Others are complex, highly organized arrays of two or more types of cells.

**Simple Tissues**

Simple tissues are made up of only one type of cell and are called either parenchyma, collenchyma, or sclerenchyma.

- 1- Parenchyma is the most common tissue in ground tissue systems. It comprises most of a plant's soft primary growth. Cells are pliable, thin walled, and many sided. Its cells are metabolically active at maturity and retain the capacity to divide, as in wound healing. Various types of parenchyma participate in photosynthesis, storage, secretion, and other tasks. Mesophyll is a type of parenchyma that contains chloroplasts
- 2- Collenchyma cells are thickened and help strengthen the plant. Cells are specialized for support for primary tissues. The cells are elongated, with walls (especially corners) thickened with pectin. Pectin makes stems strong but pliable. Collenchyma cells are alive at maturity. The "strings" in celery are good examples of collenchyma.
- 3- Sclerenchyma supports and protects mature plant parts. It protects many seeds. Sclerenchyma cells have thick, lignified walls and are dead at maturity. Lignin is deposited in its cells where it anchors, waterproofs, and protects. There are two types of sclerenchyma, fibers and sclerids. Fibers are long, tapered cells. Sclereids are stubbier cells. Long tapered fibers flex and twist and therefore are useful in making rope.

**Complex Tissues**

Tissues composed of more than one cell type are generically referred to as complex tissues. Xylem and phloem are the two most important complex

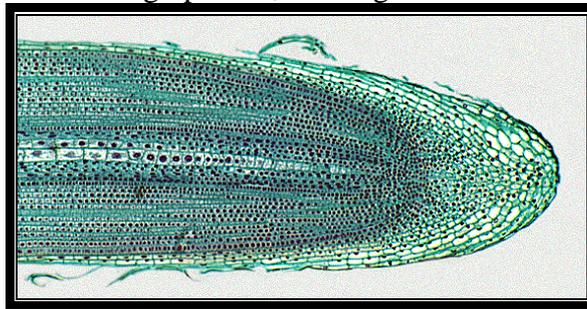
tissues in a plant, as their primary functions include the transport of water, ions and soluble food substances throughout the plant.

Several types of cells (living and non-living) make up **xylem tissue**: tracheary elements composed of tracheids and vessel elements, which conduct water and nutrients; fibers, which provide support; and living parenchyma cells, which store food. Sclereids may also be present. In monocots, vessel elements, whose walls have been stretched and broken by elongation, result in spaces (lacunae) in the xylem.

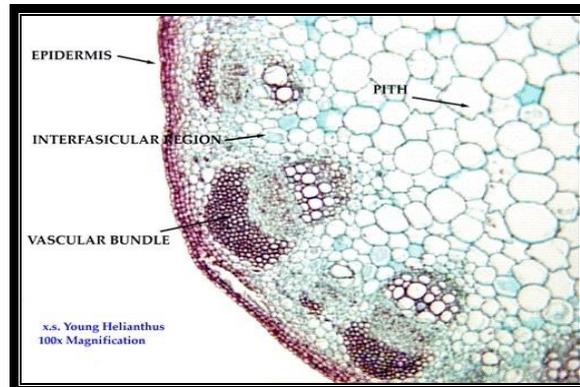
**Phloem tissue** is composed of sieve elements of sieve cells or sieve tube elements for food conduction, fibers, and parenchyma cells. Companion cells are associated with sieve tube elements.

### Practical parts:

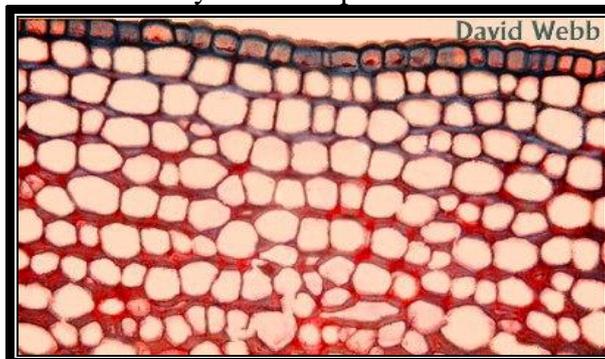
- 1- Examine the permanent slide of Onion root (L. S. **Allium cepa** root tip) and draw few cells under high power, showing the meristematic tissue.



- 2- Examine and draw the C. S. of **Helianthus** stem in cortex or pith region where parenchyma tissue are found.

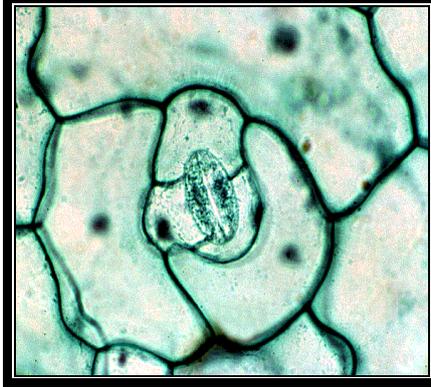


- 3- Examine and draw the C. S. of **Sambucus** stem, showing the collenchyma tissue which is located mainly beneath the epidermis.

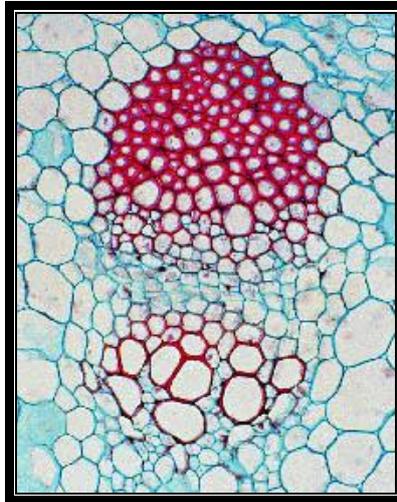


- 4- Examine and draw the C. S. of **Hakea** leaf in mesophyll layer where found the Osteosclerids as a bone shape.

- 5- Prepare and examine the epidermis of leaf in surface view of any plant and draw the followings; ordinary epidermal cells, guard cells and subsidiary cell.



- 6- Examine and draw the vascular bundle in C. S. of **Helianthus** stem , showing Xylem ,phloem and vascular cambium.



- 7- Examine and draw the L. S. of **Medicago** stem , showing the different type of thickenings walls in xylem tissue , it may be annular, spiral, reticulate, scalariform, or pitted.

