



INTERNAL AND EXTERNAL PLANT PARTS

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Introduction to Botany (Bio 112)

RECAP

- (1) Early land plants The early land plants, possessed two important features
- (2) Plant are also called Metaphyta
- (3) Plant are classified into how many groups? List them
- (4) Seed plant divided into _____ and _____
- (5) What is gymnosperm
- (6) What is angiosperm
- (7) Angiosperm divided into _____ and _____
- (8) What is monocot plant
- (9) Define dicot plant
- (10) List two difference between angiosperm and gymnosperm

INTERNAL PLANT PARTS



- Cells are the basic units of plants.
- Plant reactions such as cell division, photosynthesis, respiration go on at the **cellular level**.
- Plant tissues such as meristems, xylem and phloem are large organized groups of cells that work together to perform specific functions.
- Specialized groups of cells called **meristems** are the plants growing points



II. Plant tissues- collections of similar cells that serve a specific purpose by functioning together

- A. Unlike animals, the major organs of plants (roots, stems, and leaves) are all composed of the same three tissues (epidermis, vascular tissues, and ground tissues).

- B. Each tissue carries out the same fundamental activities throughout the plant.

Three types of tissues

1. **Epidermis** - the exchange of matter between the plant and the environment.
 - a. The epidermis on aboveground organs (leaves and stems) is involved with gas exchange

 - b. The epidermis on belowground organs (roots) is involved with water and ion uptake



2. Vascular tissues - the transport of water and dissolved substances inside the plant

- a. the xylem carries water and dissolved ions from the roots to stems and leaves
- b. the phloem carries dissolved sugars from the leaves to all other parts of the plant

3. Ground tissues - metabolism, storage, and support activities

- a. the ground tissue of the leaf (called mesophyll) uses the energy in sunlight to synthesize sugars in a process known as photosynthesis
- b. the ground tissue of the stem (called pith and cortex) develops support cells to hold the young plant upright
- c. the ground tissue of the root (also called cortex) often stores energy- rich carbohydrates



Plant organs- tissues that act together to serve specific functions for the whole plant

A. Roots

Functions

- a. Anchorage
- b. Absorption of water and dissolved minerals
- c. Storage (surplus sugars transported from leaves)
- d. Conduction



EXTERNAL PLANT PARTS

- Leaves, stems, roots, flowers, fruits, and seeds are known as **organs**.
- They can be divided into sexual reproductive and vegetative organs.
- Sexual reproductive parts produce seed.
- They include flower buds, flowers, fruits and seeds.
- Vegetative parts include roots, stems, shoot buds, and leaves.
- Vegetative parts can be used in asexual forms of reproduction such as cutting, budding and grafting.

What are leaves?



- The leaf is the primary photosynthetic organ of the plant.
- It consists of a flattened portion, called the blade, that is attached to the plant by a structure called the petiole.
- Sometimes leaves are divided into two or more sections called leaflets.

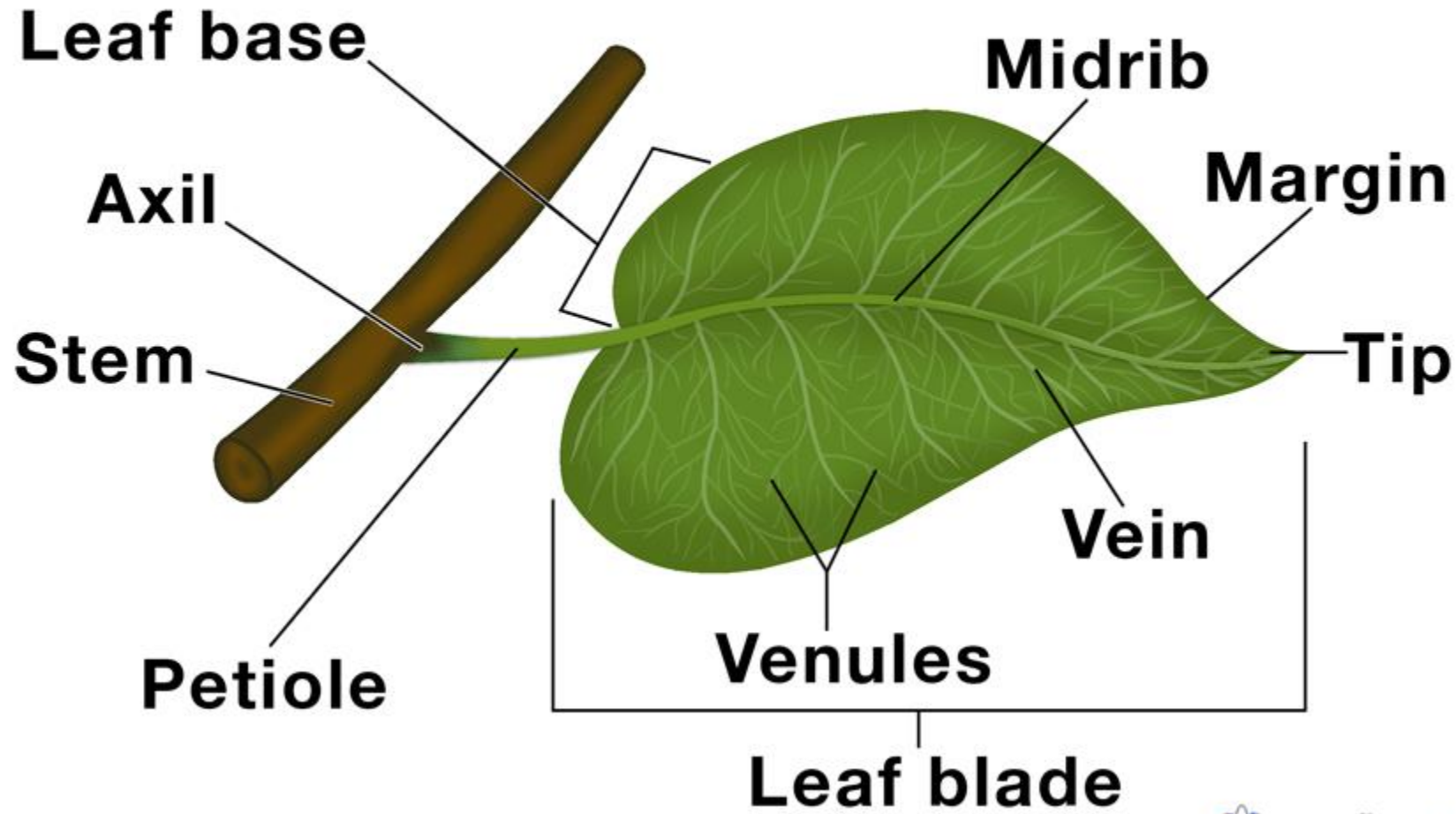
Main Functions of the Leaf

- **Photosynthesis:** Process by which plants use the sunlight energy to **produce glucose** from carbon dioxide and water
- **Cellular Respiration:** involves using the sugars produced during photosynthesis plus oxygen to **produce energy** for plant growth
- **Transpiration:** the loss of water from the plant through evaporation at the leaf surface

External Structure of Leaves

- **Lamina (Leaf Blade):** It is the large broad green surface of the leaf
- **Petiole (Leaf Stalk):** Petiole is the thin stalk that attaches the leaf to the main stem or branch
- **Leaf apex (Leaf Tip):** It is the terminal part of the leaf
- **Midrib (Main Vein):** It is the large central thick vein of the leaf that runs through the leaf blade from its base to its apex.
- **Veins:** Leaf veins branch from the midrib of the leaf and contain vascular tissue of the leaf (xylem and phloem)
- **Leaf margin (Leaf Edges):** the edge of the leaf lamina lying between the apex and base

Parts of a Leaf



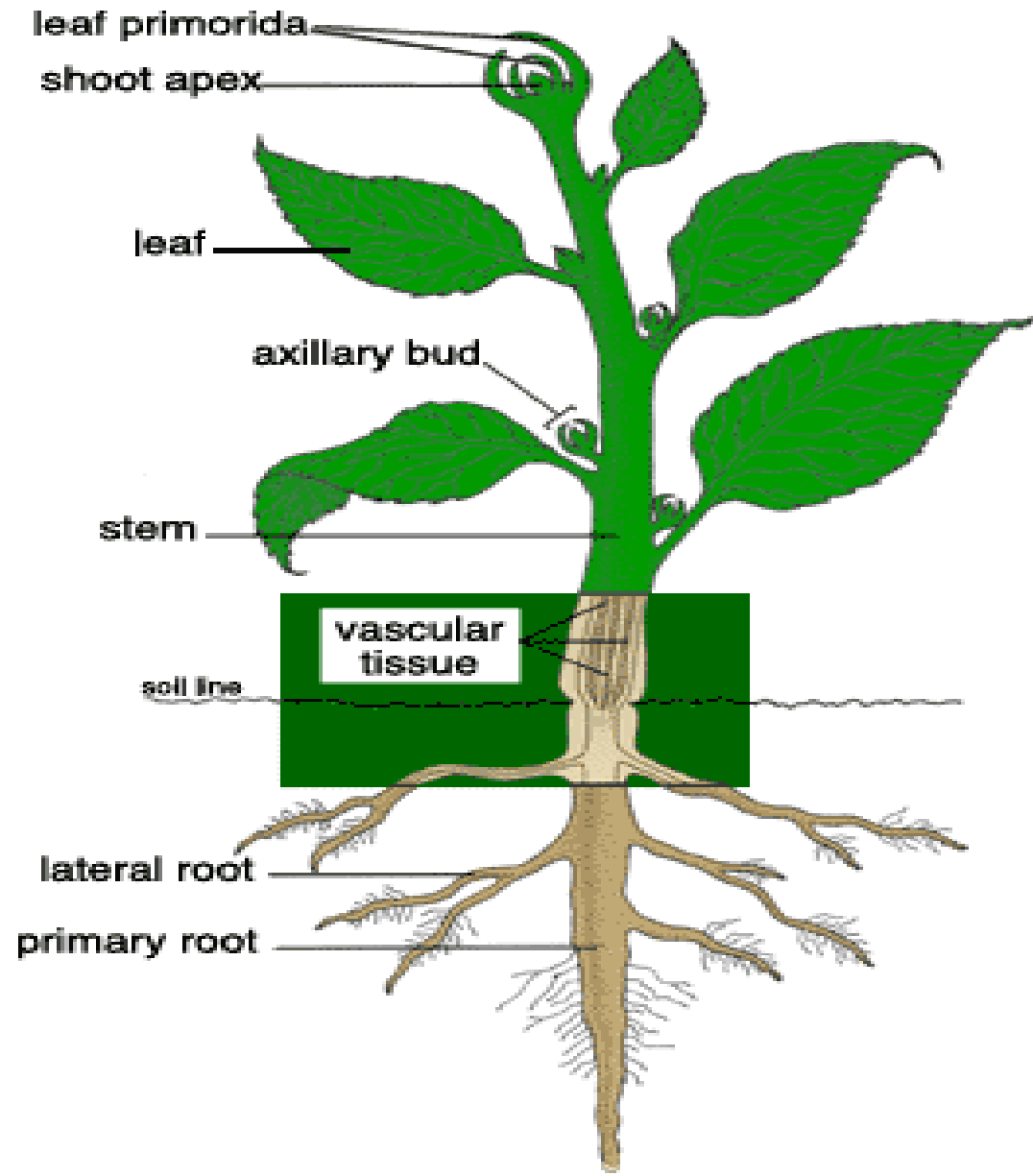
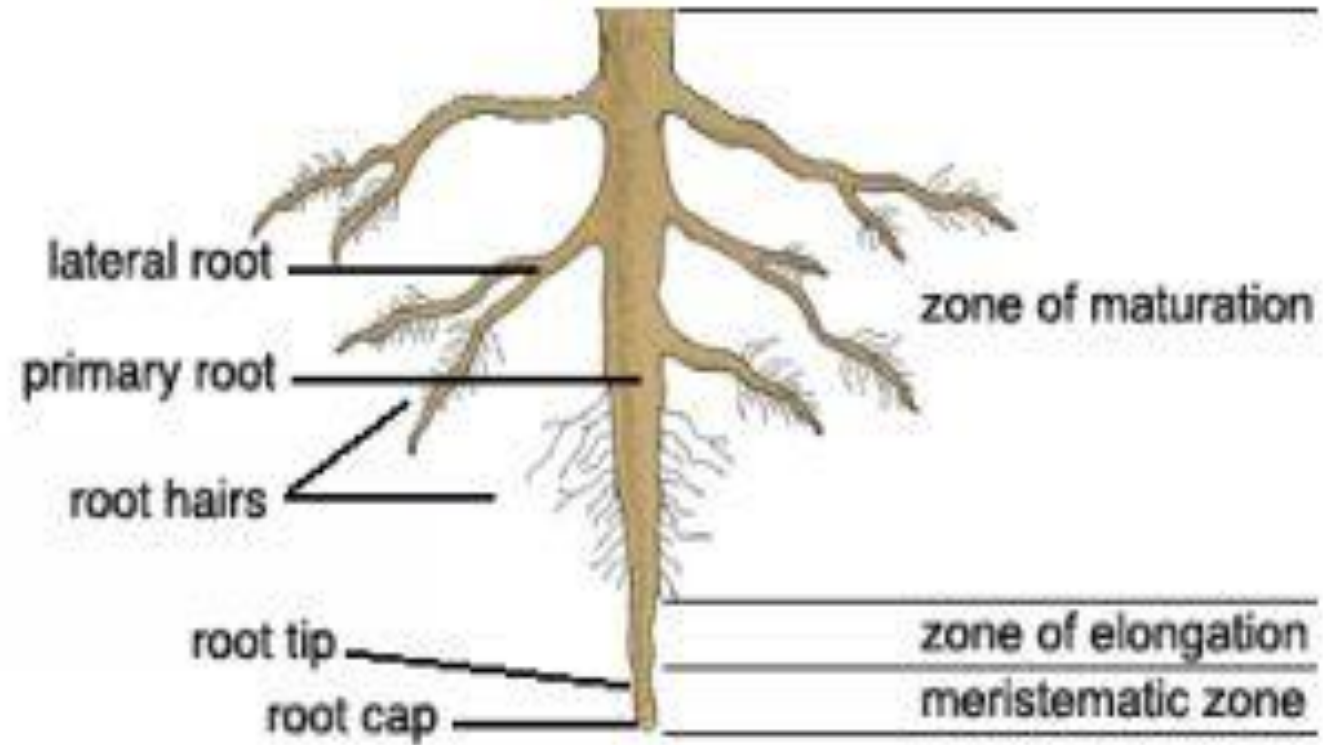


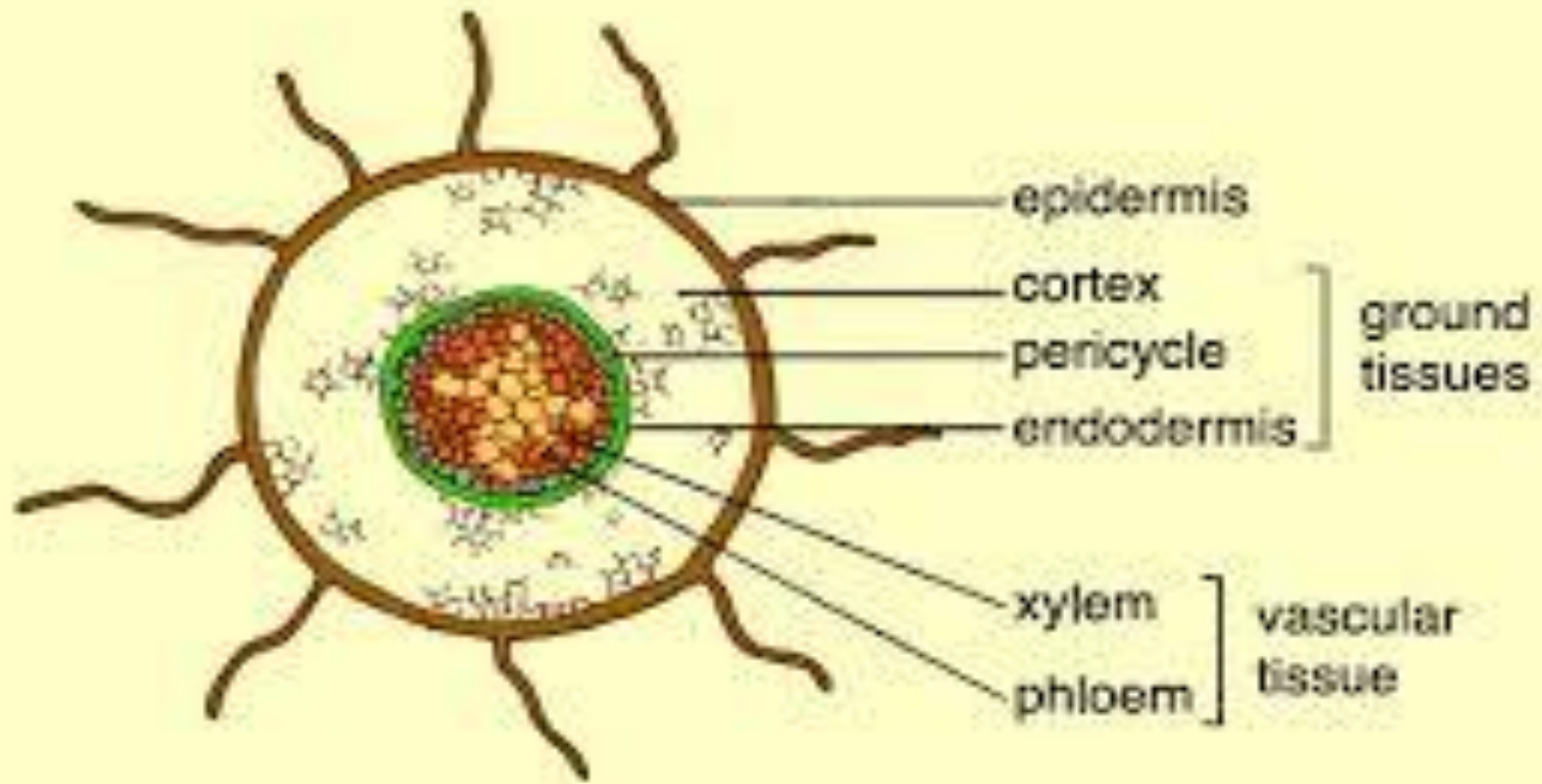
Figure 1. Principal Parts of a Vascular Plant

External Plant Parts-roots

- Their principle functions are to absorb nutrients and moisture, anchors the plant, support the stem, and store food (Carrot).
- The meristematic zone manufactures new cells.
- Zone of elongation: cells increase in size and push the root through the soil.
- Zone of maturation: cells become specific tissues: epidermis, cortex or vascular tissue.



Root Structure



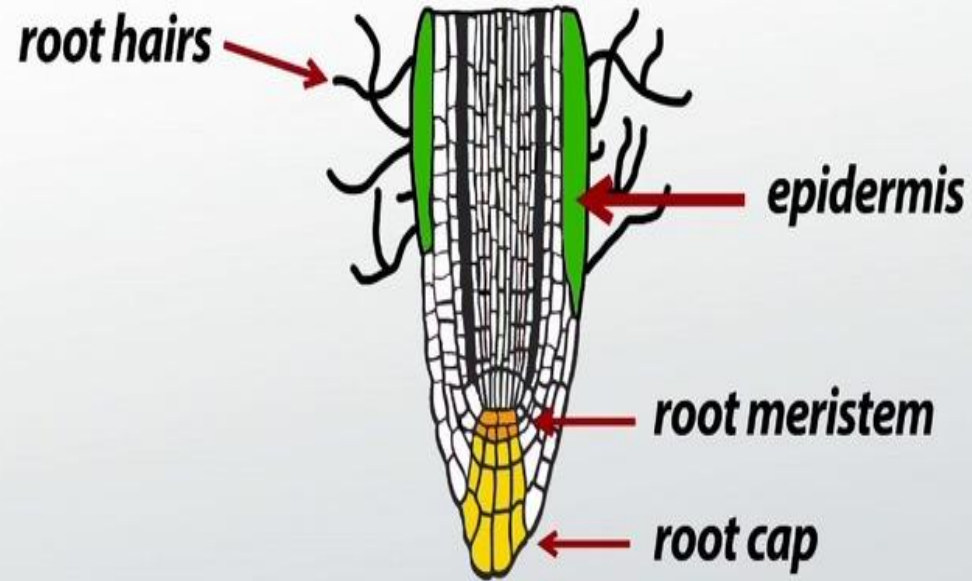
Cross section of a root


Epidermis

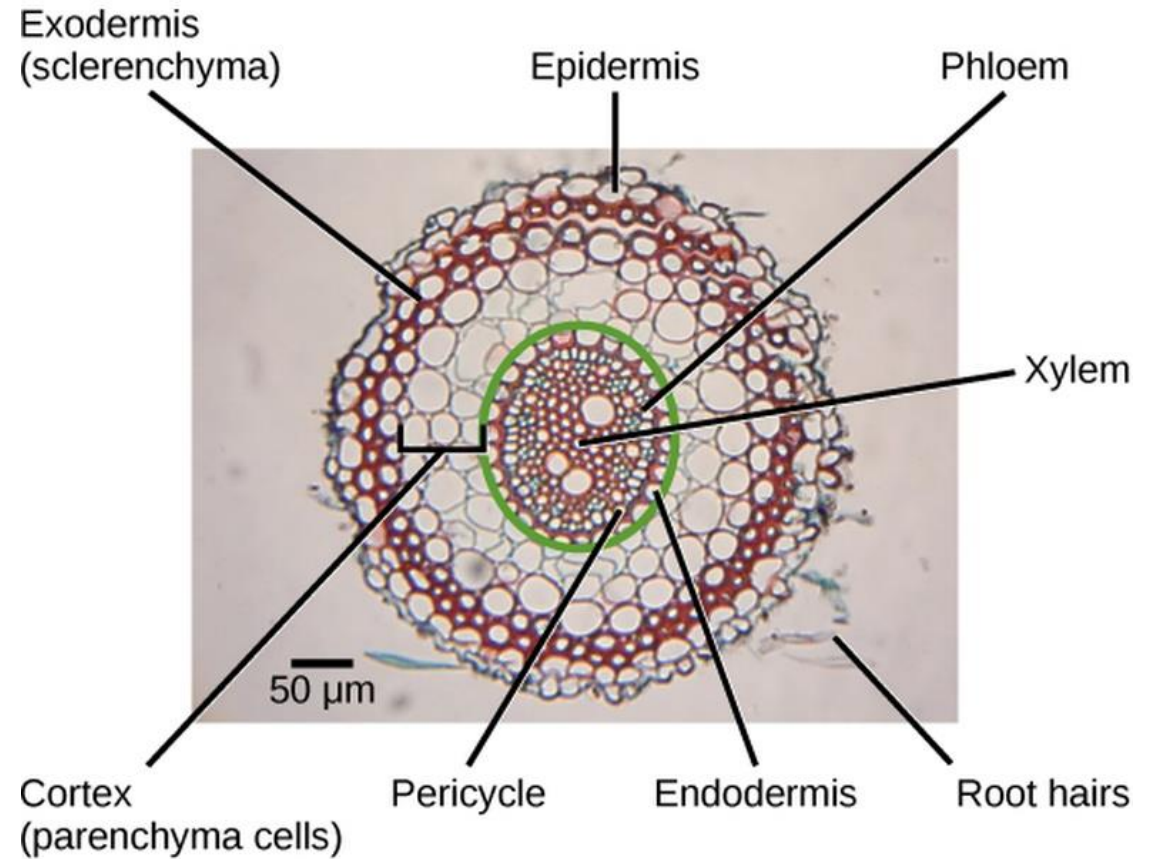
- Outermost layer which absorbs water and nutrients.
- Cortex cells: help move water to vascular tissue and storing food.
- Root cap: protects the end of the root.



EPIDERMIS AND ROOT HAIRS



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- **Root hairs** are epidermal cells that occur in a small zone behind the root's growing tip.
- They increase the absorptive capacity of the root.
- They usually live one or two days.
- Roots often have a symbiotic relationship with certain fungi-mycorrhizae (fungus + root)





Reference

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