

Non-sectioning method

1. Stripping off

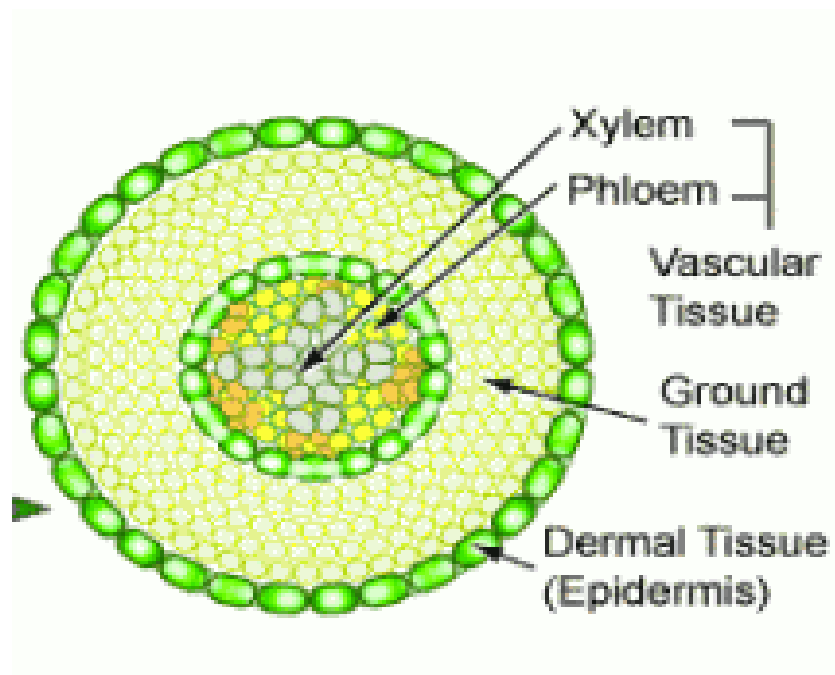
Is the method, which used to prepare epidermal layer of leaf or stem of the plant to study the types of epidermal cells, stomata, trichomes and cuticle.

Tissues are groups of cells that are structurally and/or functionally distinct. Tissues are further arranged to form tissue systems.

Plants Tissue systems:

Are the structural and functional tissue systems of plants. These tissue systems are organized into three entities:

Tissue System	Component Tissues	Function	Locations
1. Vascular tissue	Xylem & Phloem tissue	Xylem transports water Phloem transports sugars	In stems, leaves, and roots
2. Dermal tissue	Epidermis Periderm (in older stems and roots)	Protect plant tissues & Prevent water loss	Outer layer of stems, roots, and leaves
3. Ground tissue	Parenchyma, Collenchyma & Sclerenchyma	Photosynthesis food storage	Stems, roots, leaves



Epidermis

Is a single-layered group of cells that covers plants leaves, flowers, roots and stems. The epidermis in plants serves as a protective layer that prevents various microorganisms from gaining entrance into the underlying tissue of leaves and stems, and also prevents excess water loss.

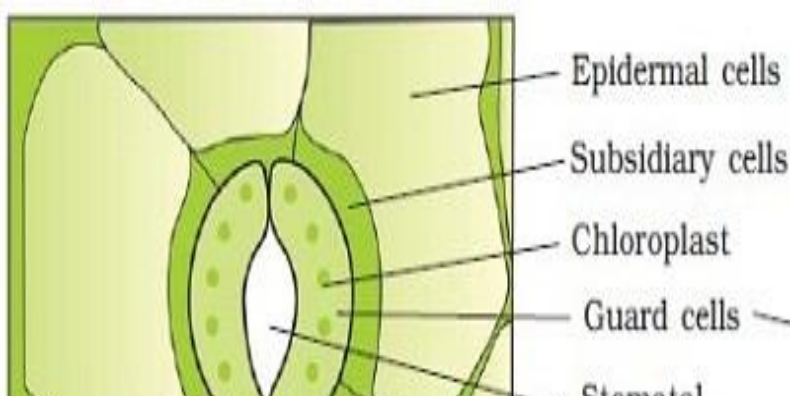
The cells of the epidermis are structurally and functionally variable. Epidermal cells are tightly linked to each other and provide mechanical strength and protection to the plant. The walls of the epidermal cells of the above ground parts of plants are covered with a cuticle. The cuticle reduces water loss to the atmosphere. The

epidermal tissue includes several differentiated cell types: epidermal cells, guard cells, subsidiary cells, and epidermal hairs (trichomes).

Stomata Guard Cells

Are parts of the epidermal tissue that serves several functions in plants. The leaf and stem epidermis is covered with pores called stomata (sing, stoma), part of a stoma complex consisting of a pore surrounded on each side by chloroplast-containing guard cells (control opening and closing of the stoma), and two to four subsidiary cells that lack chloroplasts. The stoma complex regulates the exchange of gases and water vapor between the outside air and the interior of the leaf. Typically, the stomata are more numerous over the lower epidermis of the leaf than the upper epidermis. The guard cells differ from the epidermal cells in the following aspects:

- The guard cells are bean-shaped in surface view, while the epidermal cells are irregular in shape
- The guard cells contain chloroplasts, so they can manufacture food by photosynthesis (The epidermal cells do not contain chloroplasts).



Typical Stomata

Practical Part

1. A. Preparing unstained leaf

- i. Strip a small piece of leaf and then place the tissue on the clean slide. If it is thick, try to remove some layers by a sharp blade.
- ii. Cover the slide with cover slide.
- iii. Examination under the microscope.

1.B. Preparation of Enriched Stomata

- i. Remove the leaves of the plants with a scalpel.
- ii. Put nail polish on the leaf and let it dry.
- iii. Attach each leaf to piece of clear Scotch tape.
- iv. Gentle peel off the tape.
- v. Put the peels on the slide.
- vi. Examination under the microscope.

2. Preparing epidermal tissue from plant stems

1. Strip a small piece of epidermal tissue from stem.
2. Place the tissue on the clean slide.

3. Cover the slide.
4. Examine the slide

