PHARM.D • YEAR 2

Pharmacognosy & Phytopharmaceuti

CHAPTER 7

Microscopical and Powder Microscopical Study of Crude Drugs

PPT CHAPTER COVER



DOCTOR OF PHARMACY

Microscopy: recover the identity of a drug

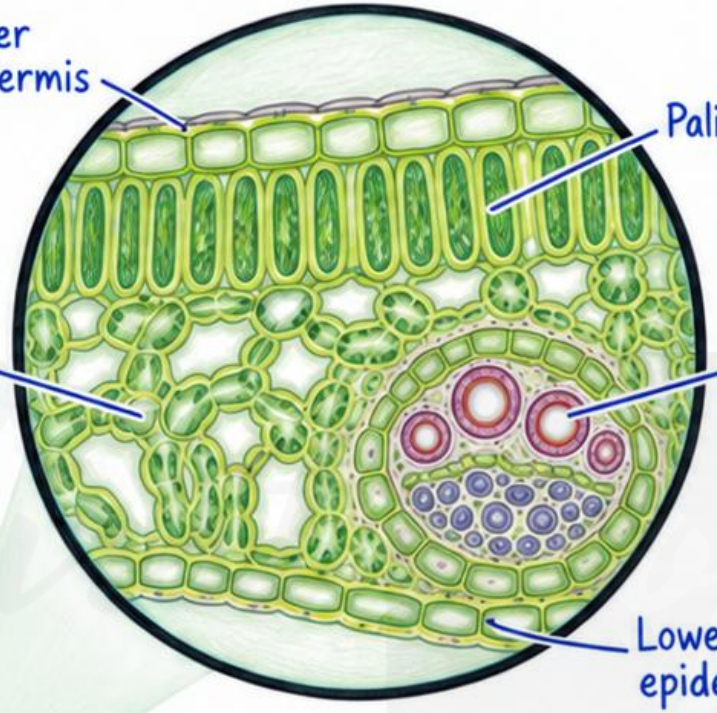
Organized drugs

Leaves, roots, stems, flowers and seeds retain recognizable anatomy. Section and powder microscopy are especially useful here.



Leaf
(medicinal plant)





Purpose

Examine tissues, cells and inclusions to support crude-drug authentication and quality assessment when outward appearance is insufficient.

Unorganized drugs

Gums, resins and latex lack the organized tissue pattern of a plant organ.



Resin tears



Latex droplet

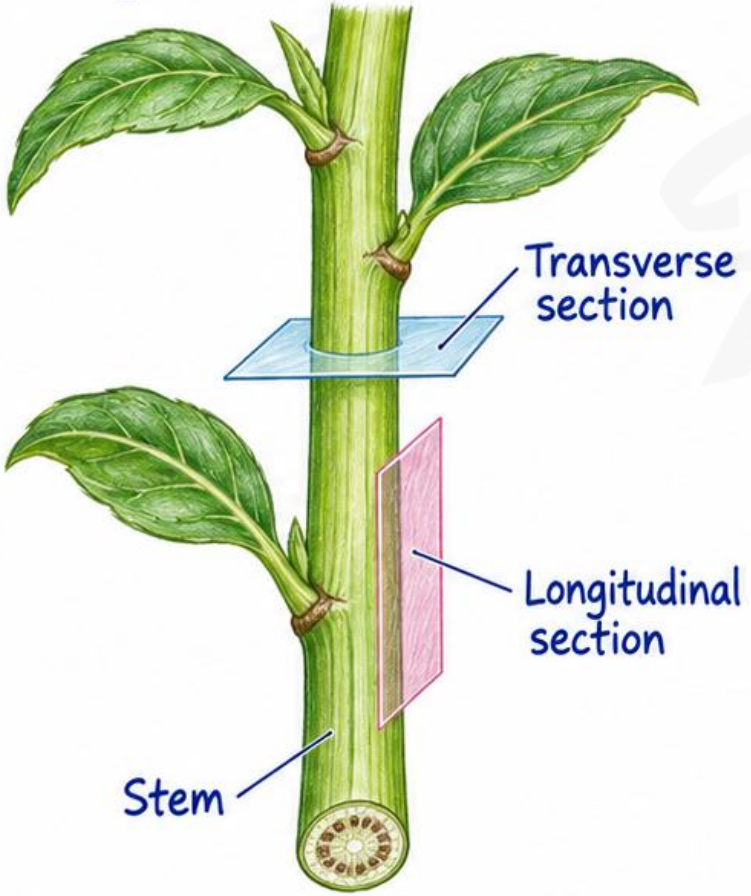
Why it matters

Diagnostic characters help detect substitutes and foreign material, support monograph standards, and document botanical identity.
A combination of features is stronger evidence than one isolated structure.

Section microscopy: prepare a clear specimen

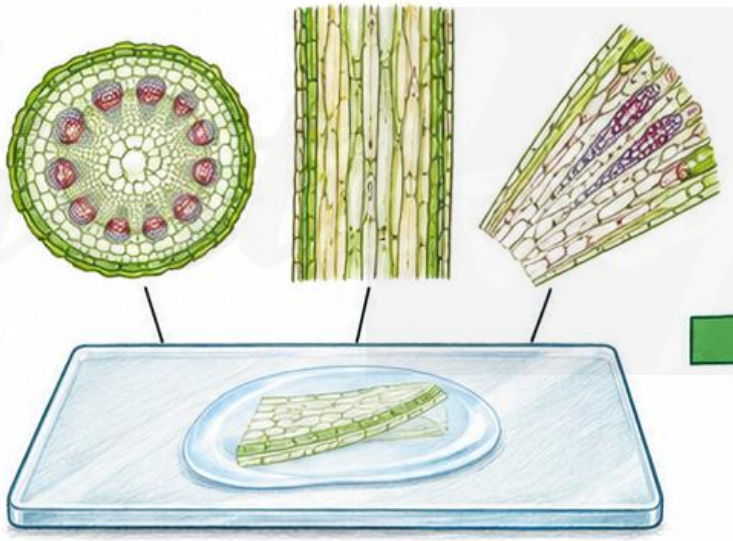
Prepare

Select a representative, well-preserved organ. Soften dry material when needed using a method suitable for that tissue.



Section and mount

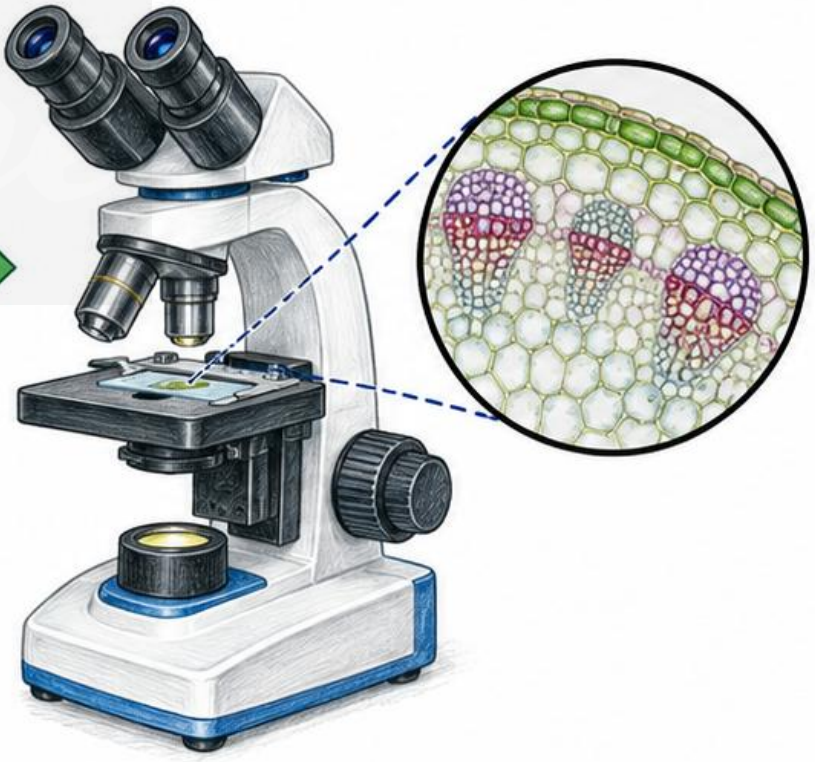
Cut thin transverse, longitudinal or radial sections. Choose the orientation that reveals the diagnostic anatomy.



Use a suitable stain, mount in an appropriate medium and apply a coverslip without bubbles. Glycerol suits many temporary mounts; permanent methods need compatible processing.

Examine

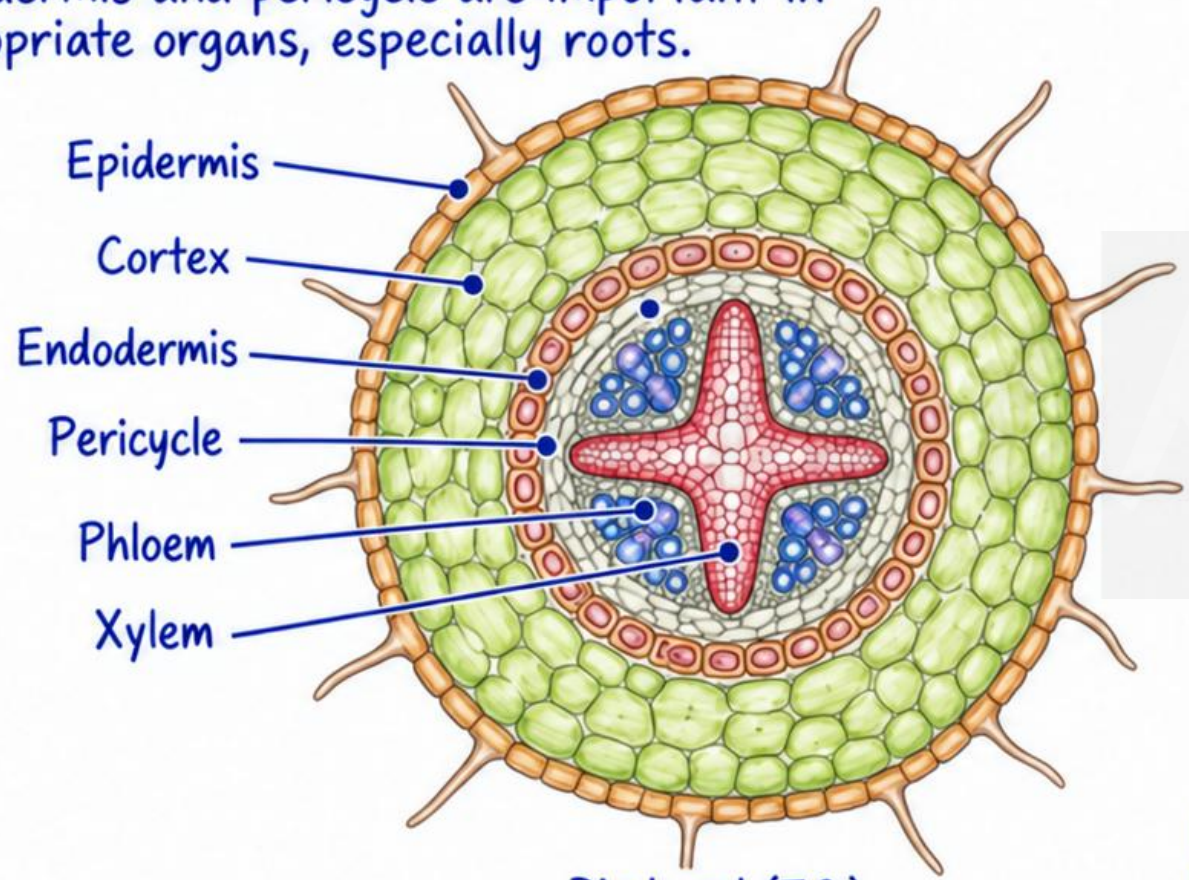
Survey at low power, then study selected details at higher power. Record the organ, orientation, preparation method and observed structures.



Tissue position makes a section meaningful

Outer and ground tissues

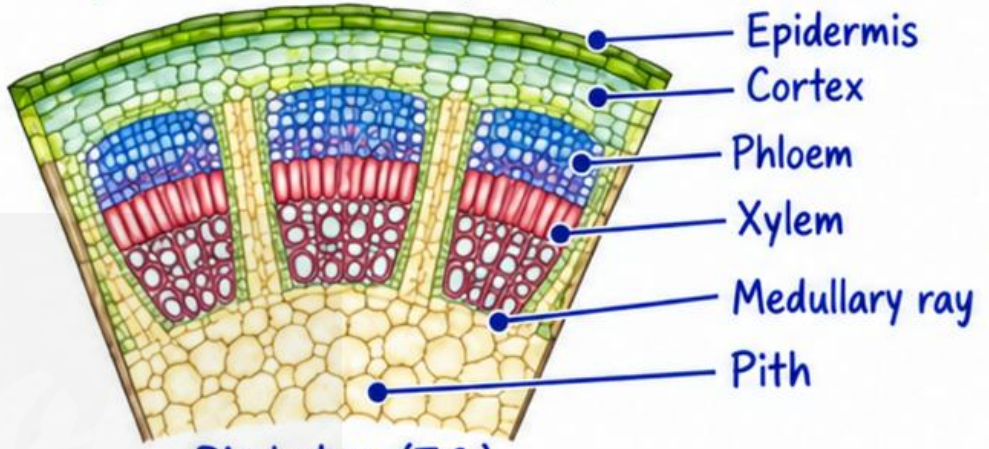
Identify epidermis or cork, then cortex. Endodermis and pericycle are important in appropriate organs, especially roots.



Dicot root (T.S.)

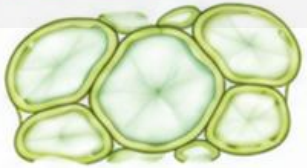
Conducting region

Recognize xylem and phloem arrangement. Look for pith and medullary rays where present.



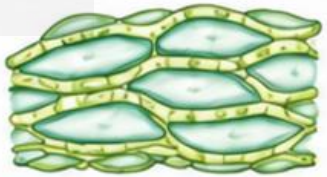
Dicot stem (T.S.)

Cell types



Parenchyma

Parenchyma usually has relatively thin walls.



Collenchyma

Collenchyma provides flexible support.



Sclerenchyma

Sclerenchyma has thick supporting walls.

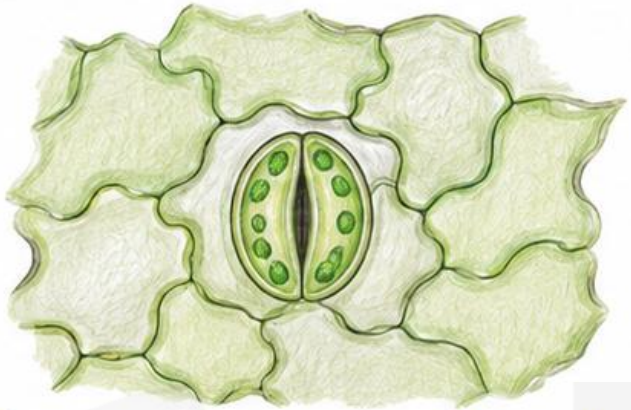
Read the pattern

The presence, position and arrangement of tissues matter together. Leaf, stem and root anatomy differ, so every listed tissue is not expected in every specimen.

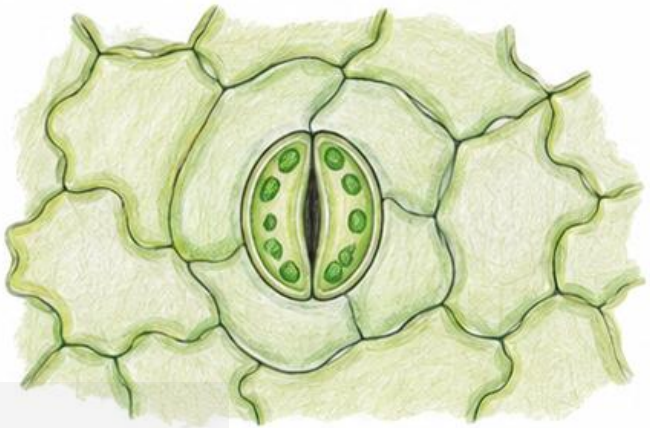
Epidermal clues: stomata and trichomes

Stomata

Record type, distribution and surrounding cells.



Anomocytic: surrounding cells do not form a distinct specialized arrangement.



Anisocytic: typically three surrounding subsidiary cells, one noticeably smaller.

Trichomes

Record covering or glandular type, cell number, branching, size and surface features.



Glandular hairs may have a stalk and secretory head; peltate hairs have a broad shield-like head.

Powder relevance

Epidermal fragments, intact hairs and hair bases can survive grinding and provide useful diagnostic combinations.



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