

# Practical Pharmacognosy

2<sup>nd</sup> Stage

2<sup>nd</sup> semester

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**Lab.2**



# Morphological and microscopically examination of crude drugs and cell inclusions

➤ For convenience of study, drugs may be arranged not only according to families and chemical constituents, but also into such **morphological groups** as barks, roots, leaves, seeds, etc. in another word drugs can be arranged into :

**A. Organized.**

**B. Non-organized drugs.**



## **A) Organized drugs:**

### **1-Leaves and tops (herbs)**

These consist of stems and leaves often associated with flowers and young fruits.

### **2-Barks**

Barks consist of all tissues outside the cambium.

### **3-Woods**

Wood consists of the secondary tissues produced by the cambium or its inner surface.

### **4- Leaves or leaflets.**

### **5- Inflorescences and flowers.**

### **6- Fruits.**

### **7- Seeds.**



## **B) Unorganized drugs:**

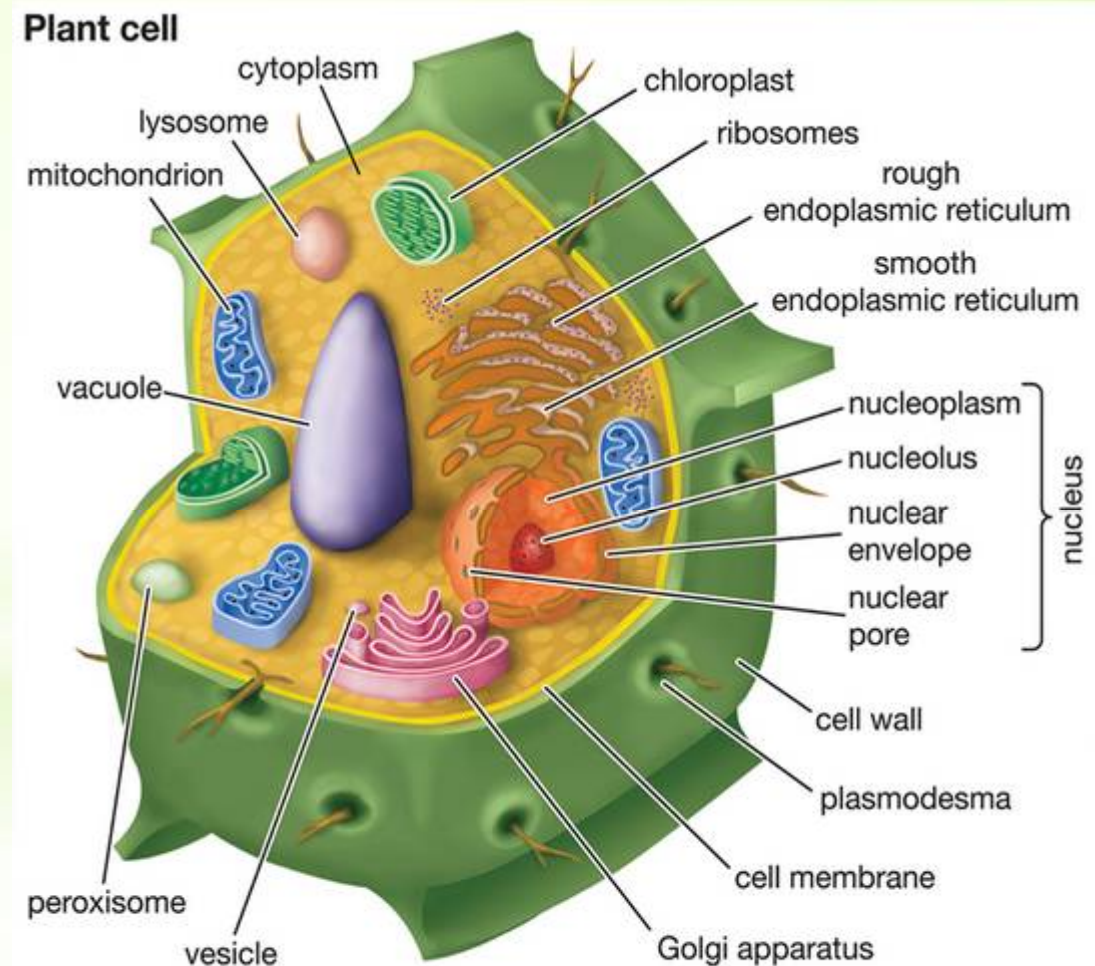
These include:

**fixed oils, fats and waxes; volatile oils; resins, oleoresins, oleo-gum-resins, balsams and gums, dried juices, extracts.**



## *Cell differentiation:*

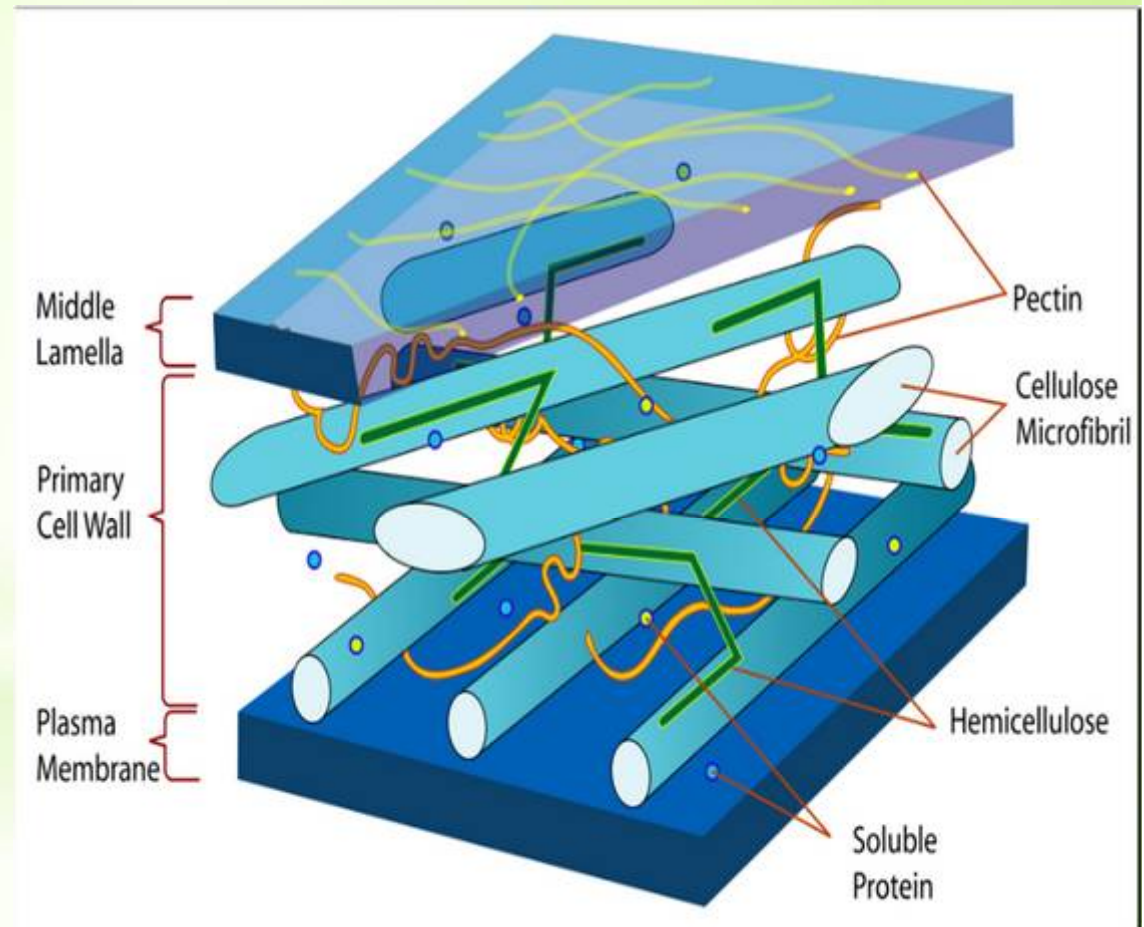
- The cell wall
- Parenchymatous tissue
- The epidermis
- Epidermal trichomes
- The endodermis
- Cork tissue
- Collenchyma
- Sclereids
- Fibers
- Xylem
- Secretory tissue



## *1-The cell wall*

There are different types of cell wall:

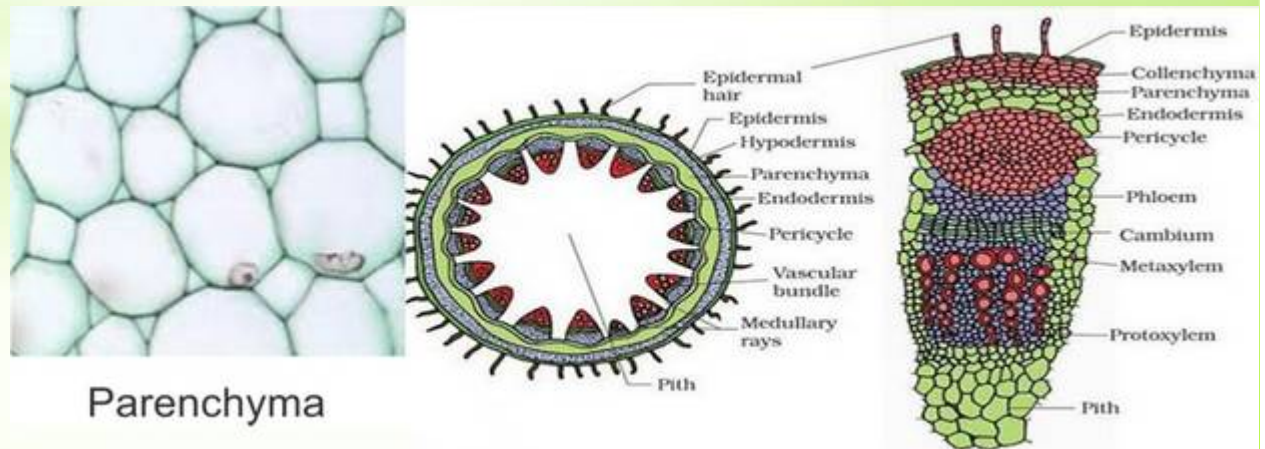
- Cellulose wall
- Lignified wall
- Chitinom wall
- Cutinized wall
- Mucillaginum wall



Molecular structure of the primary cell wall in plants

## 2) *Paranchymatous tissue*

- In plants, "**parenchyma**" is one of the three main types of ground tissue, and the most common.
- It can be distinguished through their **thin cell wall** as compared to other cells.
- Parenchyma cells make up the **bulk of the soft parts of plants**, including the insides of leaves, flowers and fruits (but not the epidermis or veins of these structures).



### *3-The epidermis*

Single layer of cells covering the whole plant, the structure of the **epidermis and stomata** are of first important in the microscopically identification of **leaves**.

e.g. Strait – walled epidermis in Senna leaves, waxy walled in Belladonna leaves and beaded wall in digitalis.





## Types of Stomata:

- **Anomocytic stomata:** Cells resembling the other epidermal cells may surround stomata.

e.g. Digitalis purpurea leaves.

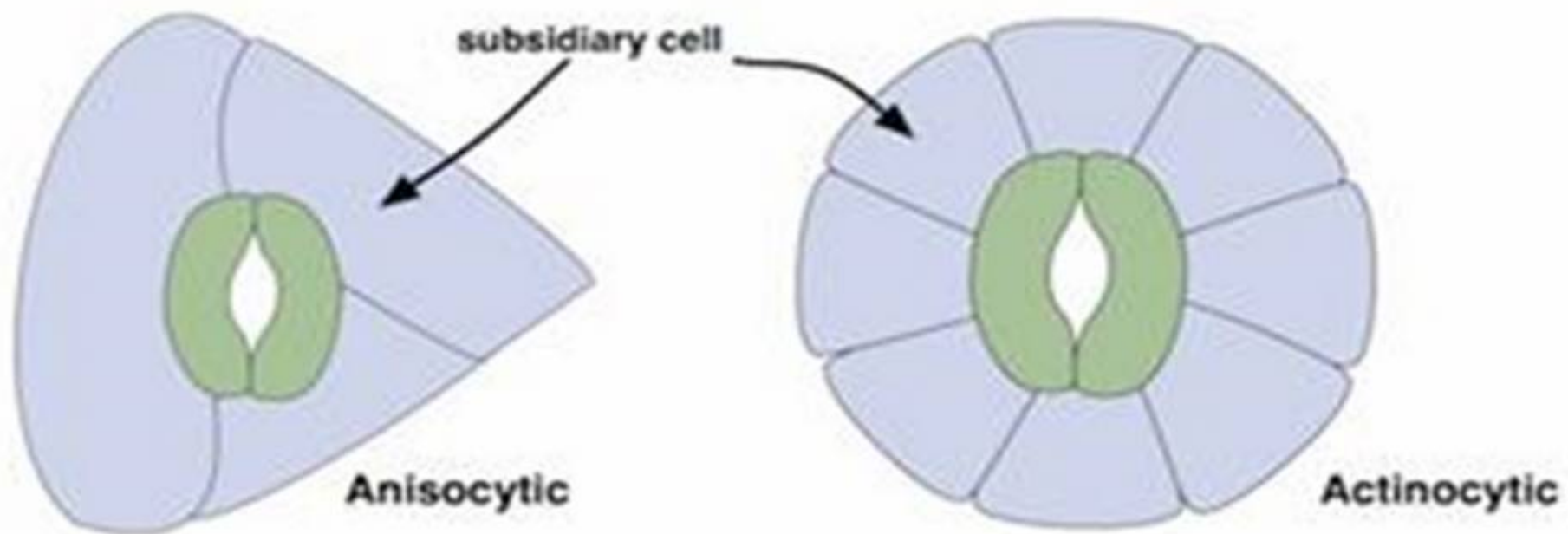
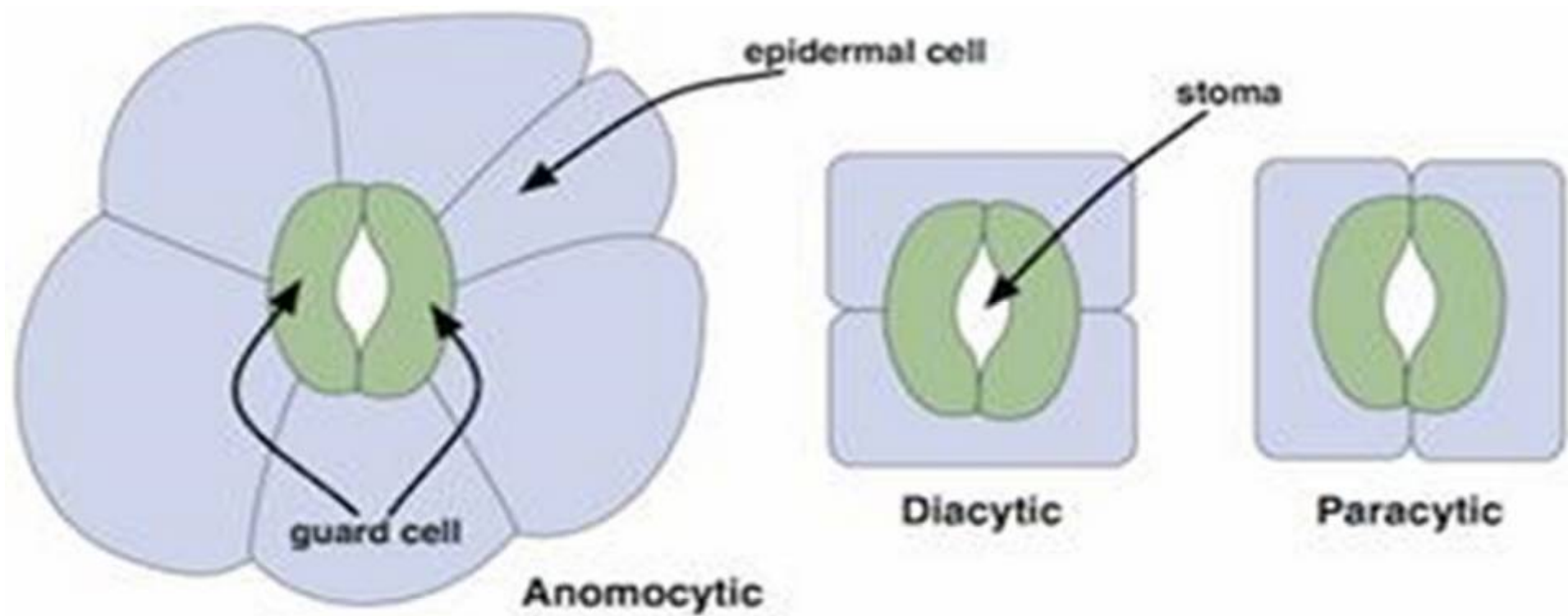
- **Anisocytic stomata:** With the stomata surrounded by 3 or 4 subsidiary cells, one of which is markedly smaller than other.  
e.g. Hyoscymus niger and Atropa belladonna leaves.

- **Paracytic stomata:** With two subsidiary cells with their long axis parallel to the pore. e.g. Cassia acutifolia ( Senna leaves).

- **Diacytic stomata:** With two subsidiary cells with their long axis at right angles to the pore of the stomata.

e.g. Mentha piperita ( Peppermint).

- **Actinocytic stomata:** Subsidiary cells are arranged along the radii of the circle. e.g. Pilocarpus jaborandi.



## ***4- Epidermal Trichomes:***

Most leaves, stems, flowers, fruit and seeds possess hairs or trichomes one kind or another. Many show hairs of more than one type.

### **(A) Covering Trichomes – example**

#### **1- Unicellular**

From Senna leaves.

#### **2- Multicellular Unbranched, Uniseriate**

From Digitalis leaves.

#### **3- Multicellular Branched**

Stellate. From Witch – Hazel leaves.

#### **4- Multicellular Branched, Candelabra**

## **5- Multicellular Branched, T-Shaped**

From Pyrethrum.

## **6- Cystolytic Trichomes**

From Cannabis

## **(B) Glandular Trichomes – Example**

### **1- Unicellular stalk with**

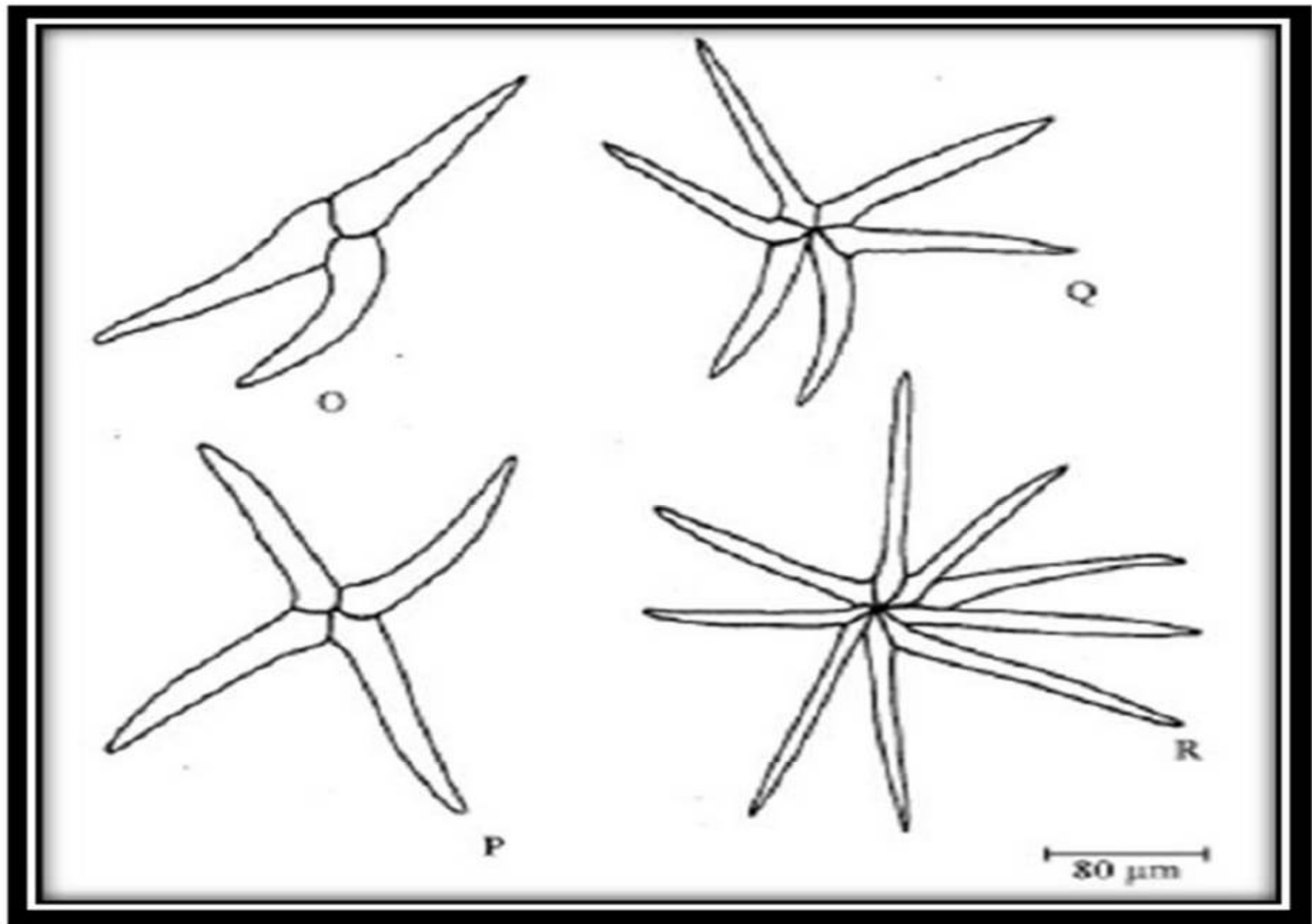
From Digitalis leaves.

### **2- Multicellular Uniseriate Stalk**

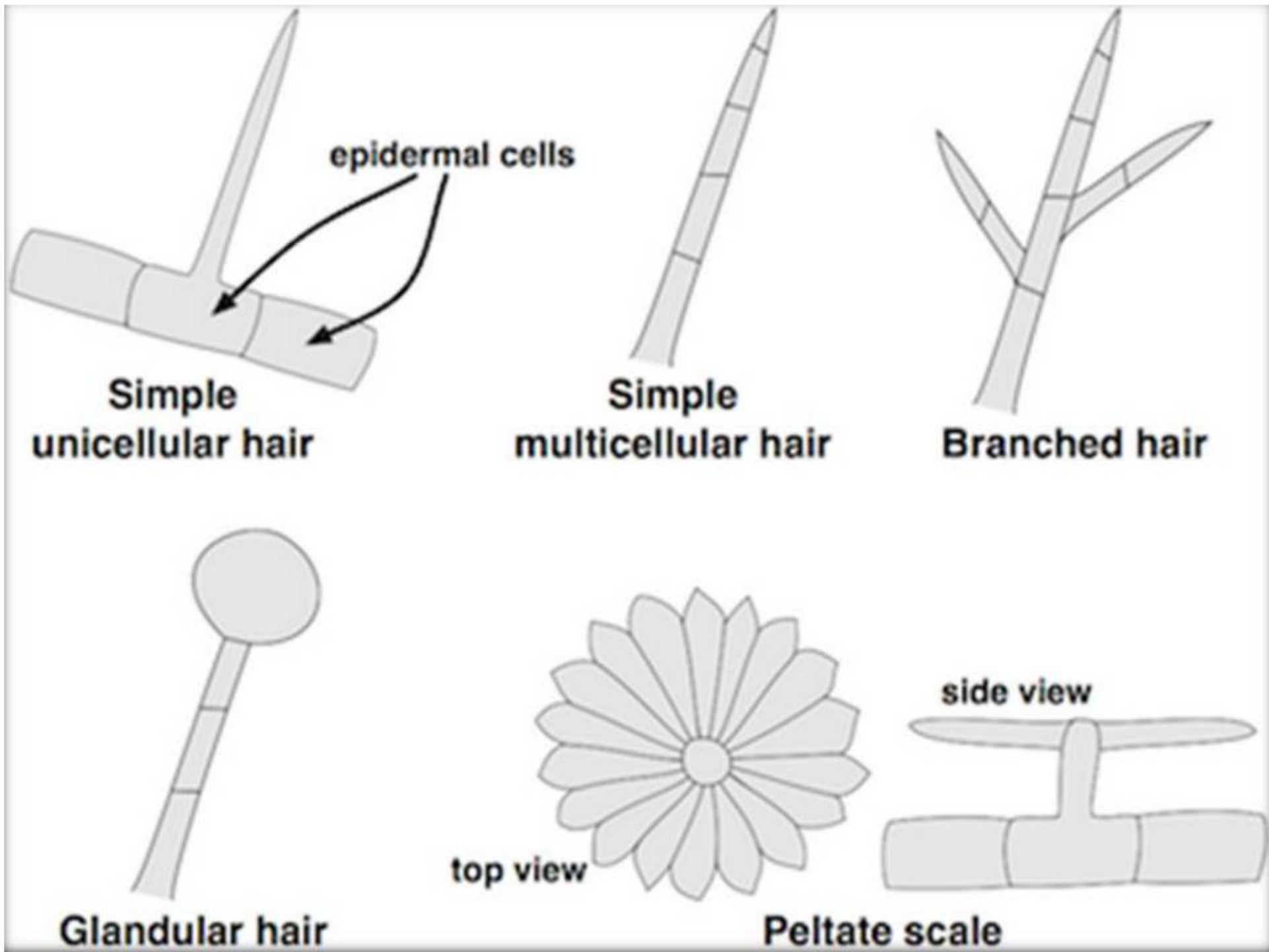
From Hyoscymus niger.

### **3- Multicellular Multiseriate Stalk**

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**Non-glandular stellate trichomes**

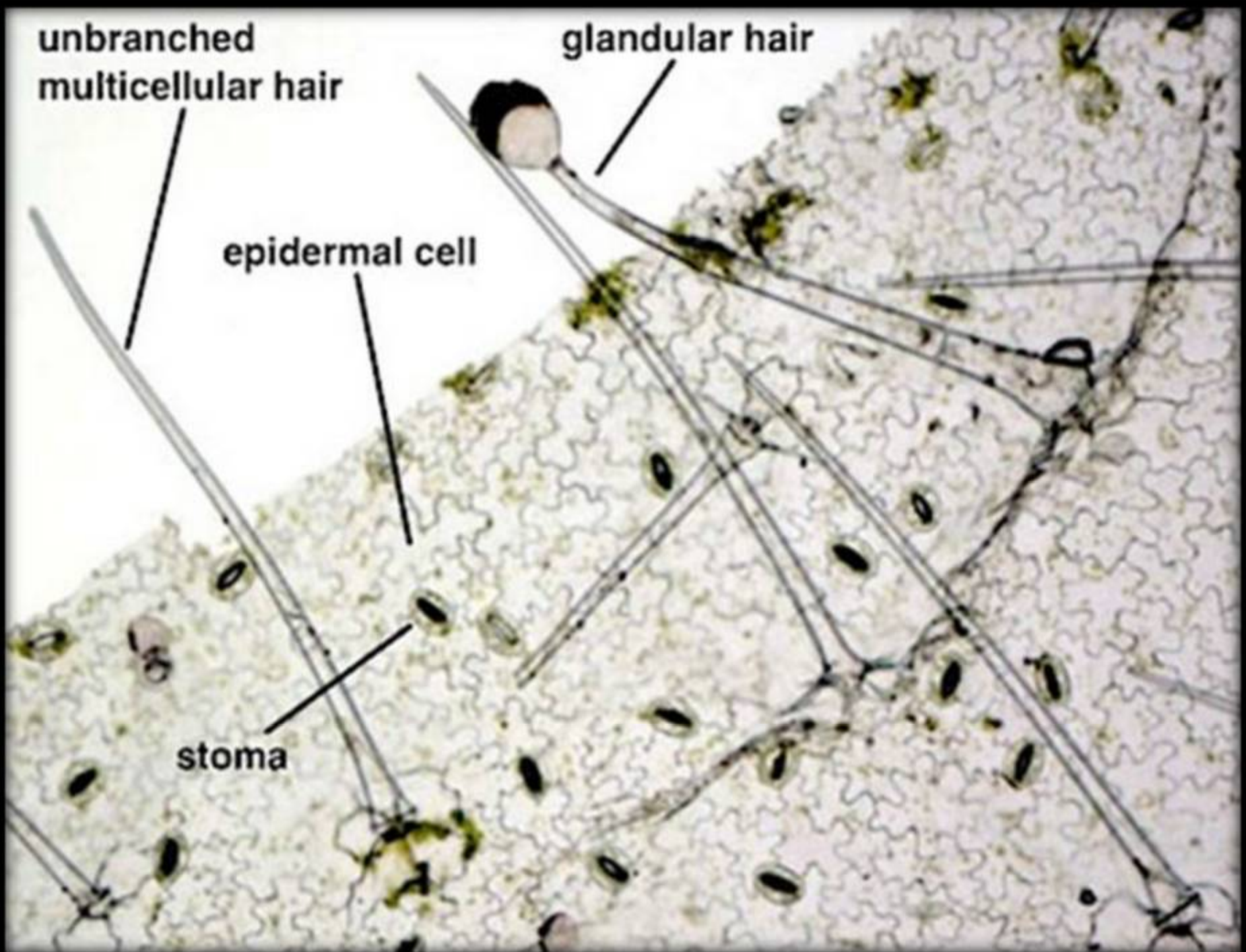


unbranched  
multicellular hair

glandular hair

epidermal cell

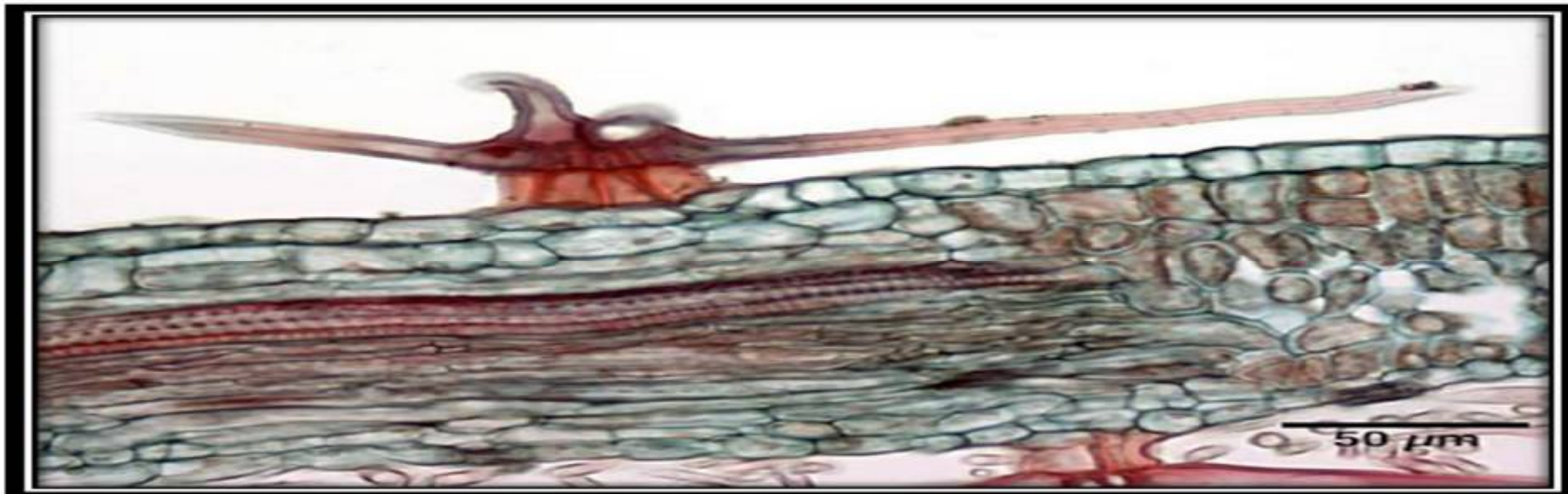
stoma



Complex trichomes are sometimes called scales:



- Peltate scales on leaves of *Elaeagnus* (whole mount)



T-shaped trichome



**5- Cork tissue:** is made up of dead cells with thick walls, with no intercellular spaces, found in older stems and roots of dicot plants.

**6- Collenchyma:** Is the tissue frequently found underneath the epidermis of many stems and leaf stalks.

**7- Fibers:** Tissue composed of spindle- shaped or elongated cells with pointed ends and thick walled. e.g. ginger.

**Fibers** are best differentiated on the basis of the tissue in which they occur. e.g. **Cortical fibers, pericyclic fibers, xylem fibers and phloem fibers.**

## *8-Xylem:*

Elongated water- conducting cell with lignified and thickened – pitted cell wall.

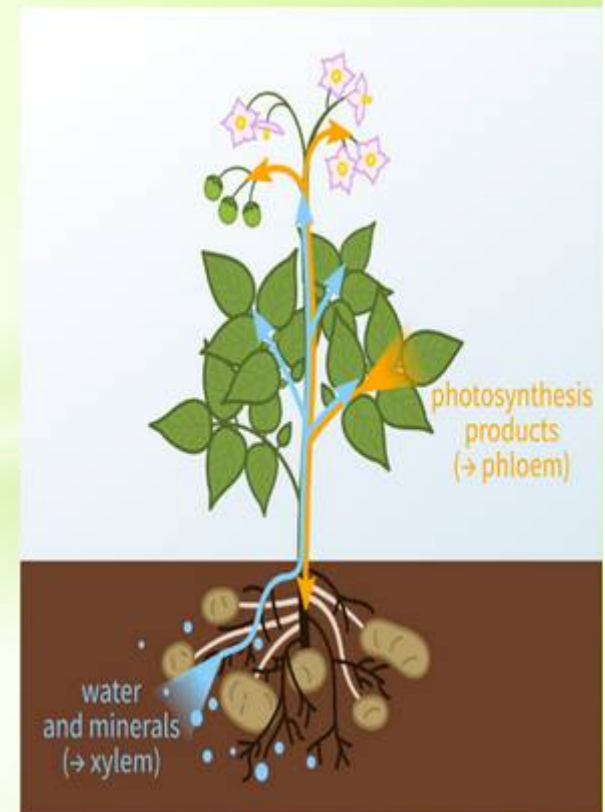
*9-Vessels:* Are the fundamental conducting elements of the xylem of the angiosperms. There are different types of vessels:

a- Spiral (Senna and Belladonna).

b- Annular (Senna and belladonna).

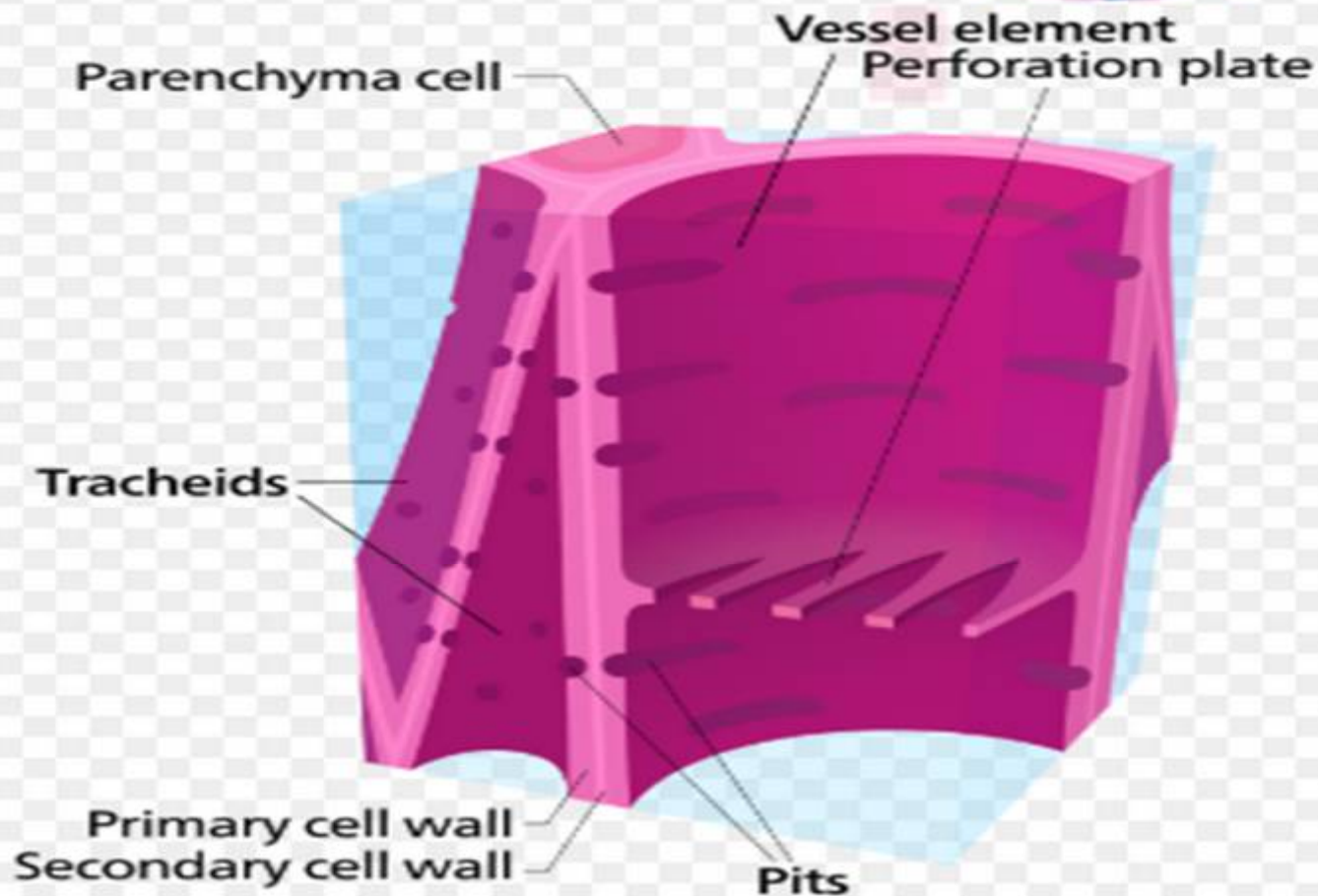
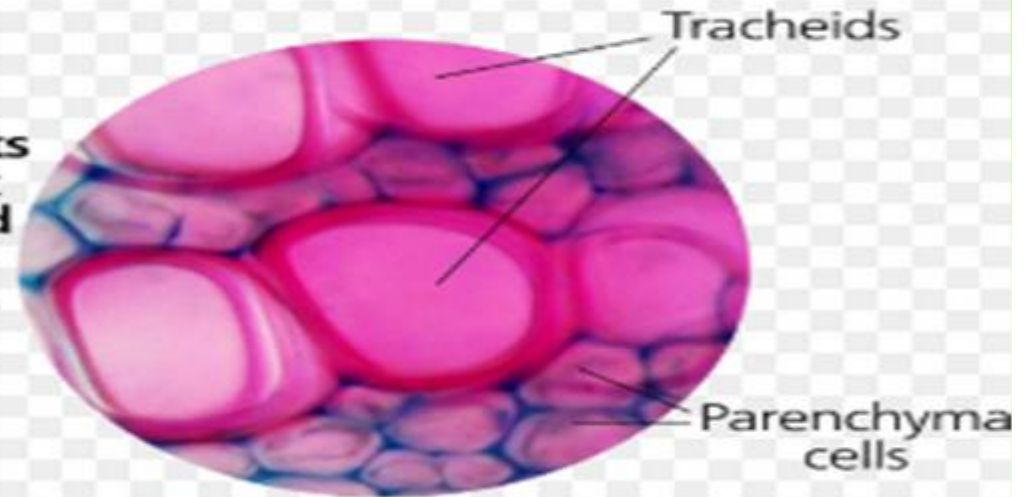
c- Reticulate ( Gentian, Ginger, Rhubarb).

d- Pitted vessels.



## Xylem

Xylem transports water and minerals through vessel elements and tracheids, which are dead at maturity and have a primary and secondary cell wall. In pits, the secondary wall is thin or missing, allowing water to flow laterally.





Thank  
You