Sclereids

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Sclerenchyma

- **Sclerenchyma** is a tissue composed of cells with thickened cell walls.
- The thickening is mainly due to **lignification.**
- **Sclerenchyma** cells are strong, thick cells that provide most of the support in a plant.
- **Sclerenchyma** cells occur in many different shapes and sizes, but two main types occur: **fibres** and **sclereids**.

Fibres

- Fibres are greatly elongated cells whose long, tapering ends interlock, thus providing maximum support to a plant.
- They often occur in bundles or strands and can be found almost anywhere in the plant body, including the stem, the roots, and the vascular bundles in leaves.
- Many of these fibres, including seed hairs, leaf fibres, and bast fibres, are important sources of raw material for textiles and other woven goods.

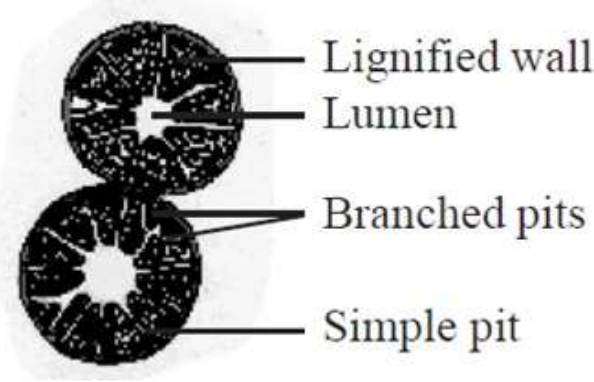
Sclereids

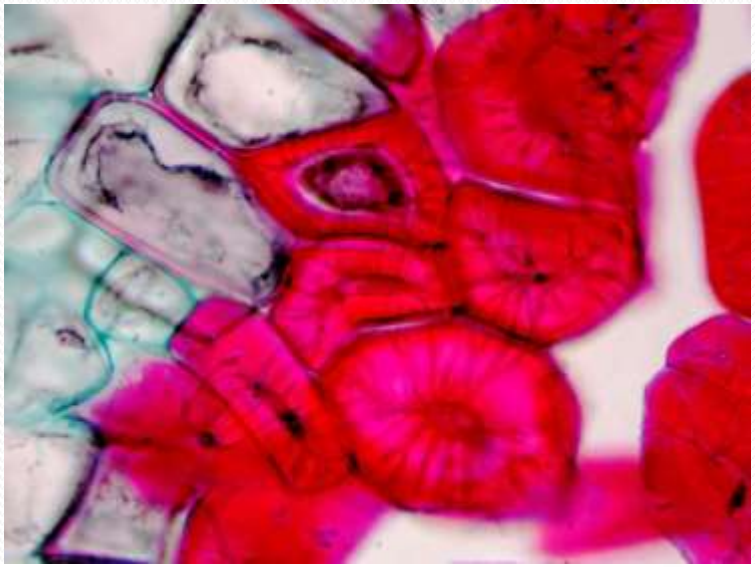
- **Sclereids** are extremely **variable in shape**
- They are present in various tissues of the plant, such as the periderm, cortex, pith, xylem, and phloem.
- They also occur in leaves and fruits and constitute the hard shell of nuts and the outer hard coat of many seeds.
- Sometimes known as **stone cells**, sclereids are also responsible for the gritty texture of pears and guavas.

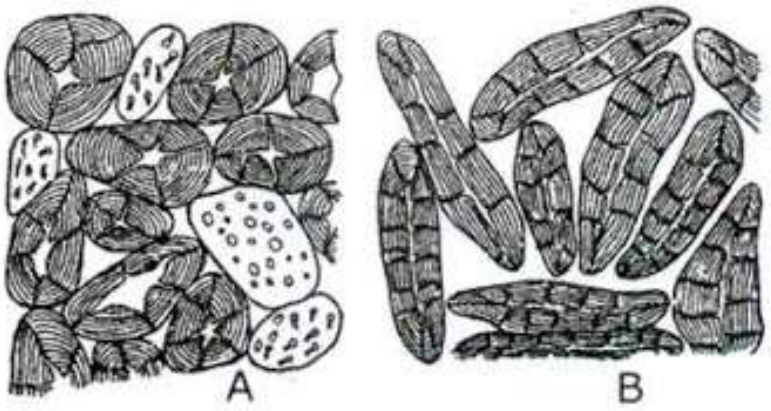
Types of Sclereids

- **Sclereids** are of various shapes and accordingly **Tschirch** in **1889** distinguished **four types**
  - Brachysclereid
  - Macrosclereid
  - Osteosclereid
  - Astrosclereid
- **Bloch (1946)** added **one more type –**the
  - Trichosclereid

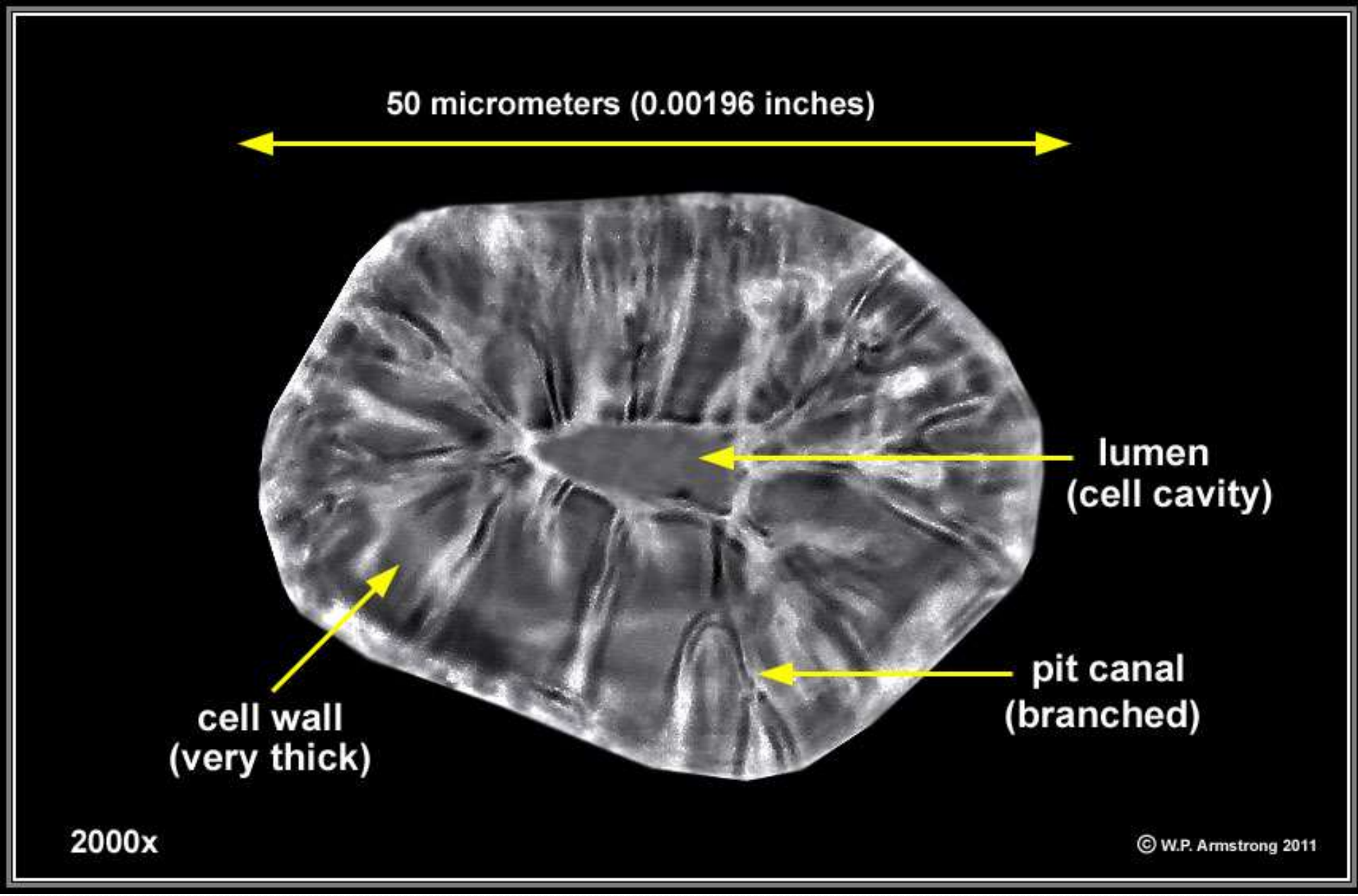
(a) Brachysclereid



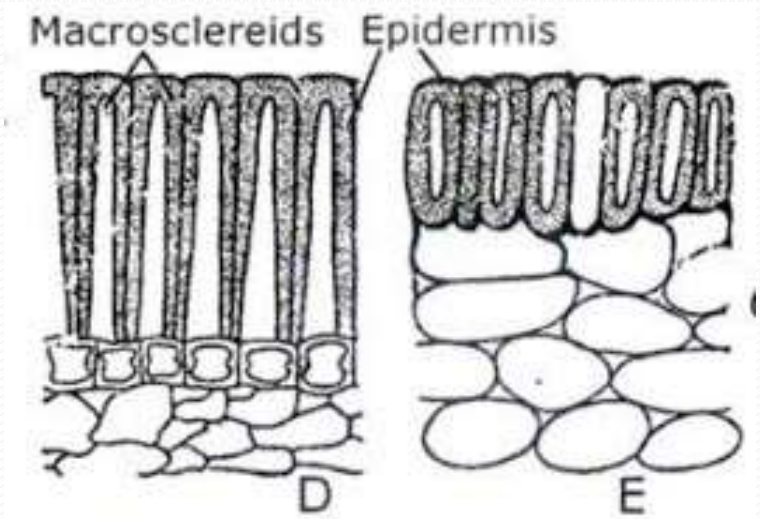




- These sclereids are more or less **isodiametric** and resemble parenchyma cells.
- These are also commonly known as **stone cell** due to hard walls.
- They are also called **grit cells** and the **gritty texture** of *Pyrus* fruit is attributable to these cells, e.g.
  - flesh of fruits of *Pyrus*,
  - phloem of *Hoya*,
  - *Cinnamomum* stem,
  - barks of *Alstonia* etc.

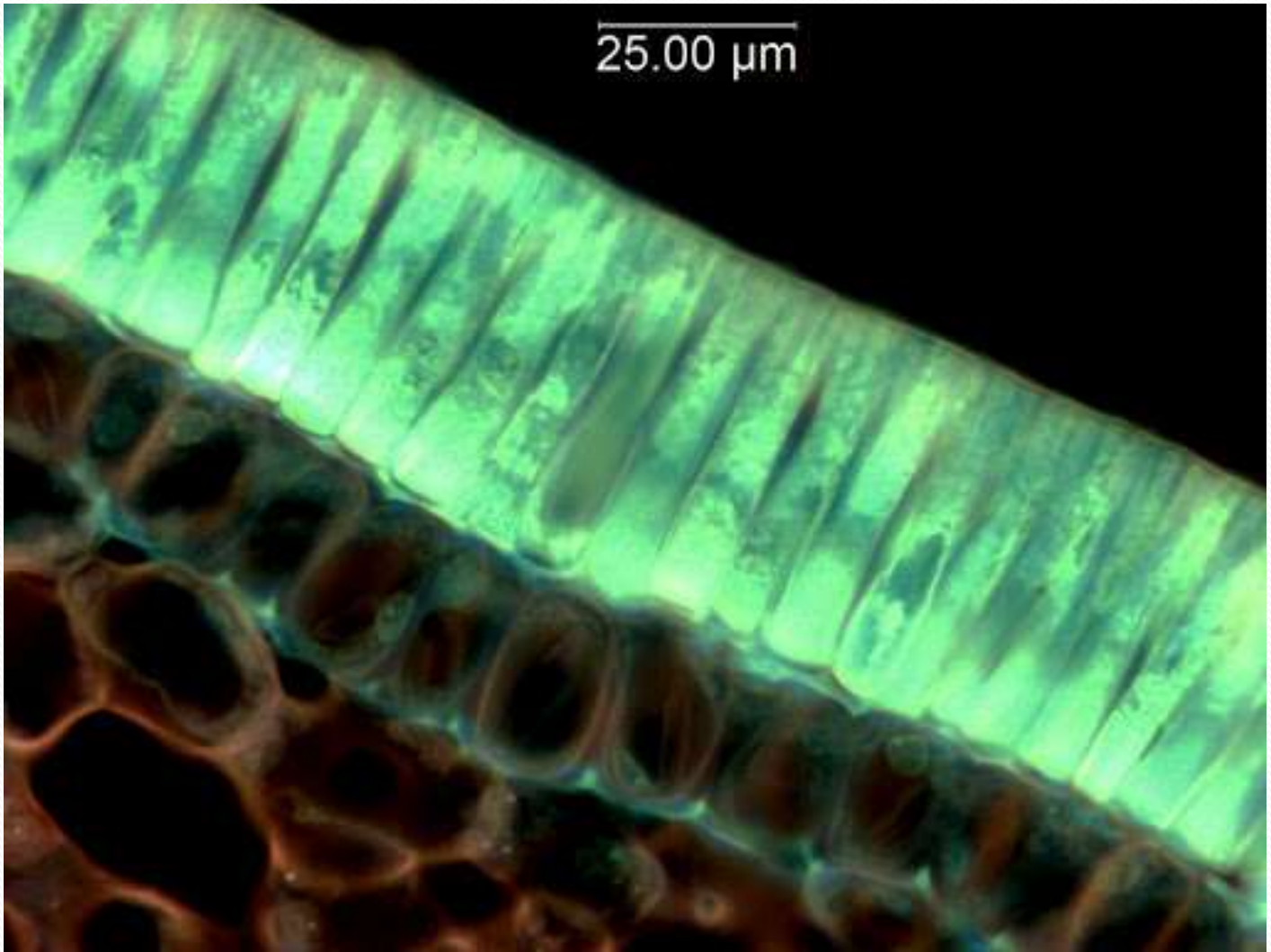

50 micrometers (0.00196 inches)
lumen
(cell cavity)
pit canal
(branched)
cell wall
(very thick)
2000x
© W.P. Armstrong 2011

(b) Macrosclereid

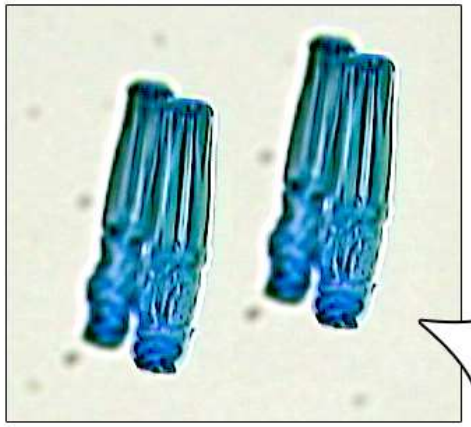


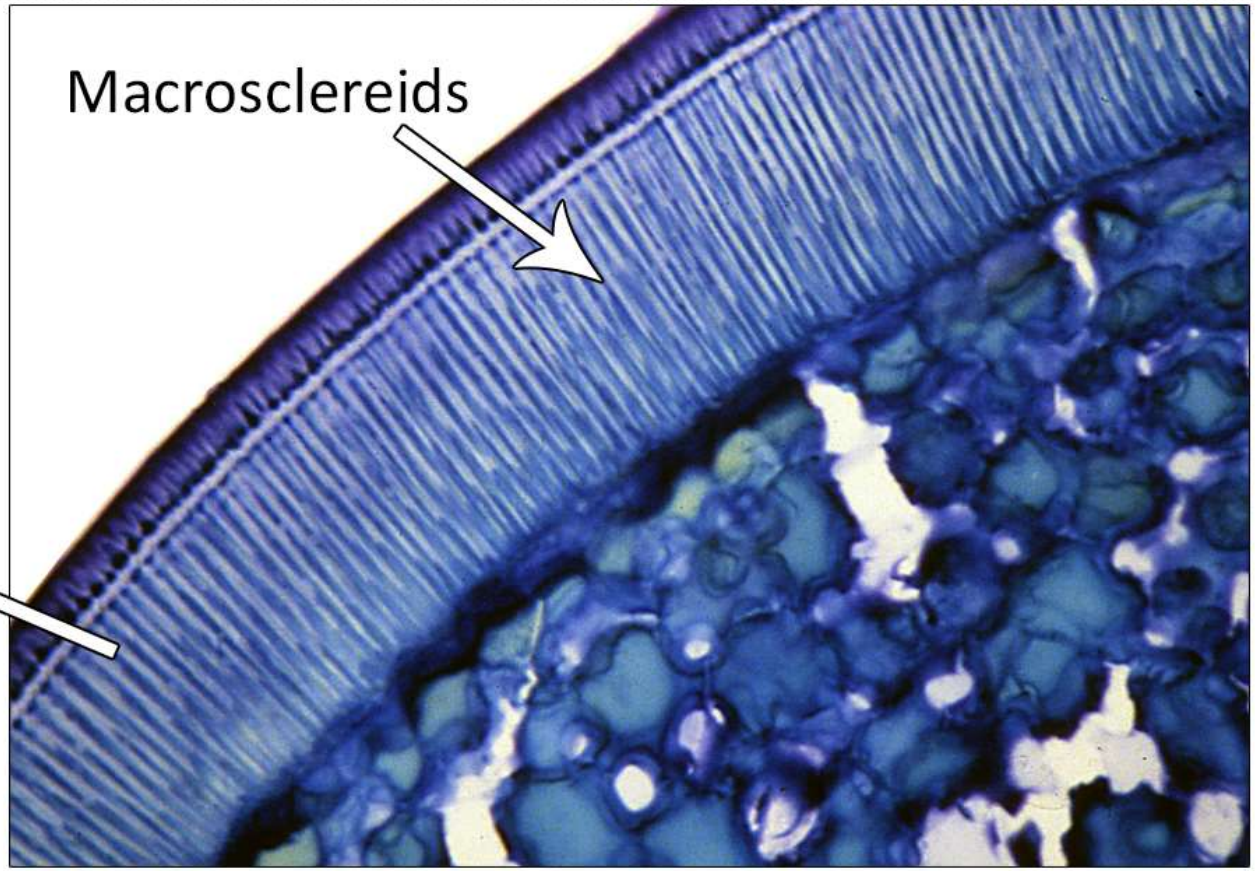
- These are elongated, rod-like or columnar in shape.
- The testa of many leguminous seeds is built entirely of macrosclereids, e.g.
  - Seed coat of *Phaseolus* (bean)
  - Seed coat of *Pisum* (pea)
  - Pulp of *Malus sylvestris* (wild apple)

Seed coat of *Phaseolus*



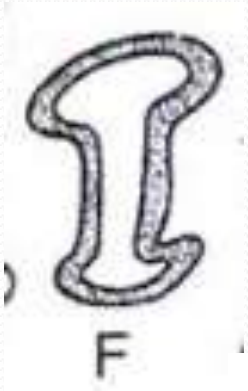
Cercis seed coat

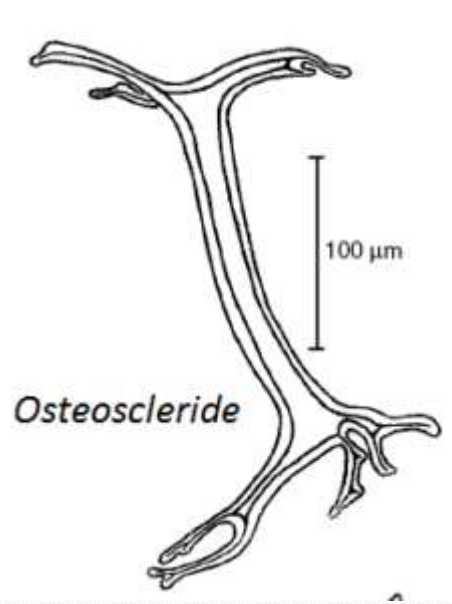




Seed coat in eastern redbud (*Cercis*).

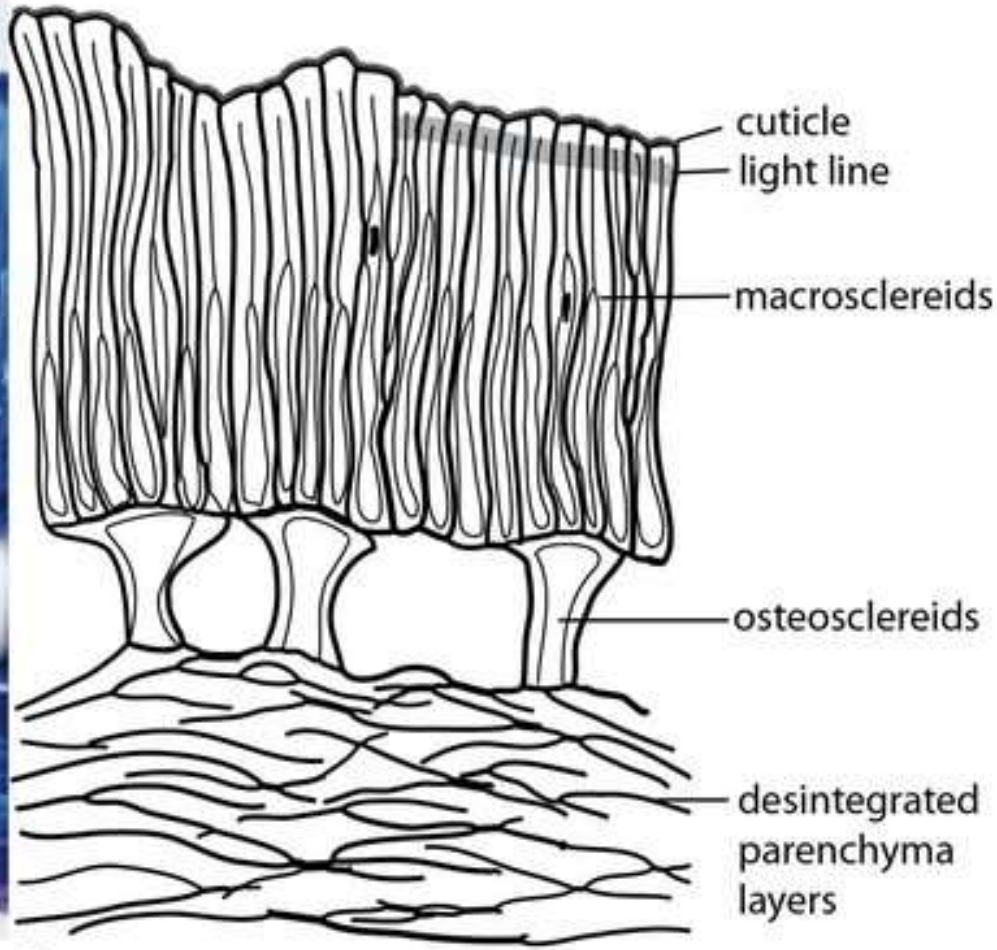
(c) Osteosclereid



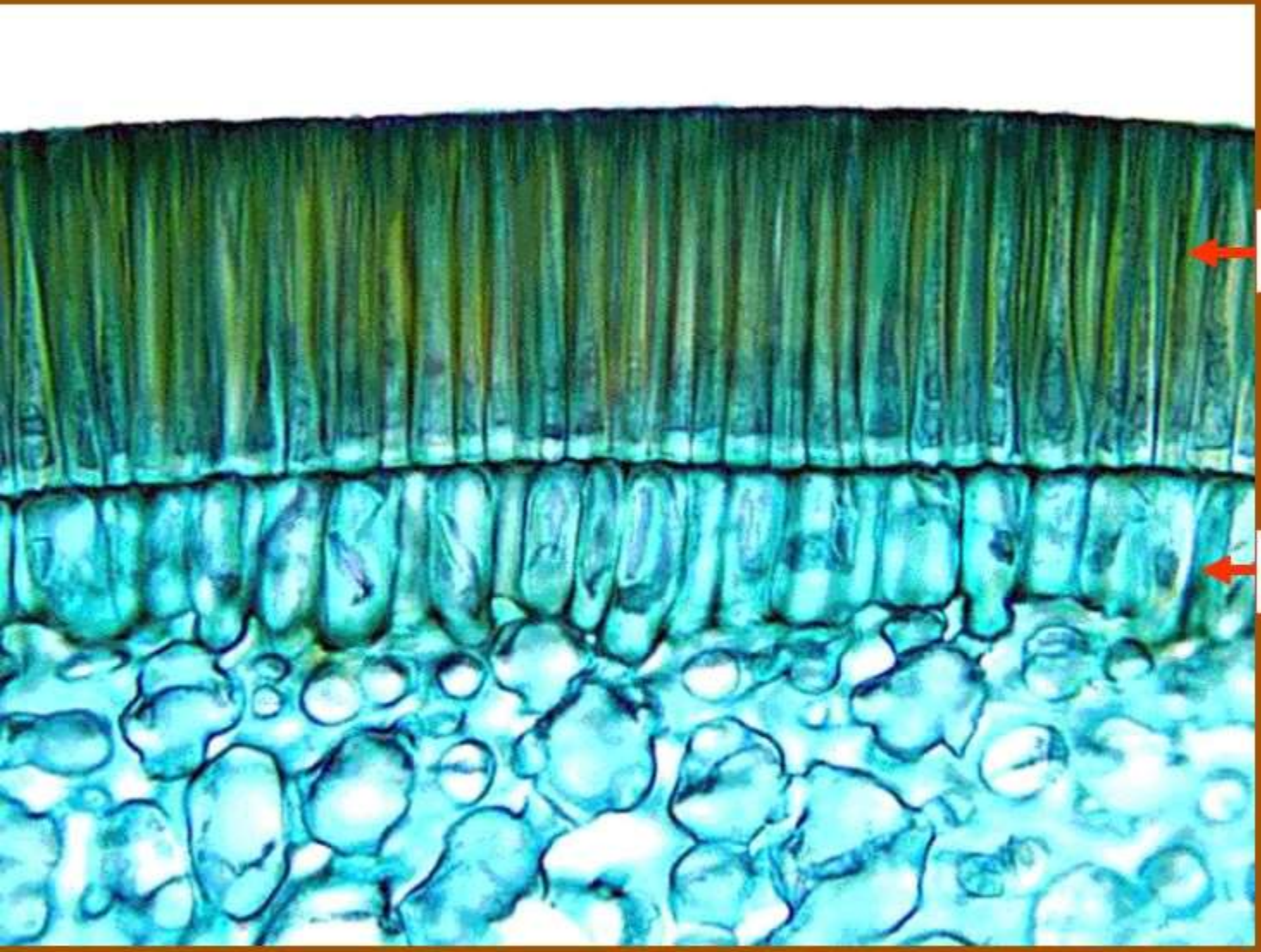


- The shapes of osteosclereids are columnar –
- the end of which may be lobed or
- branched or
- simply enlarged like a narrow bone
- e.g. the seed coats of *Pisum*,
- the leaves of *Hakea* etc.

Pea Seed Coat

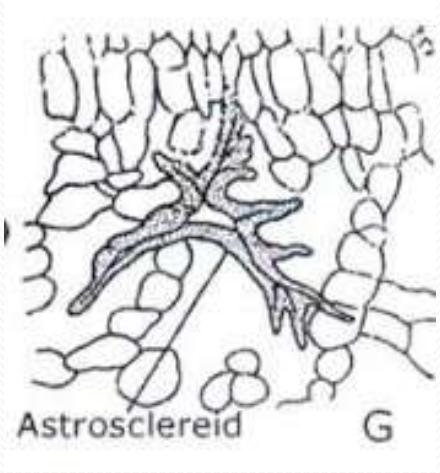


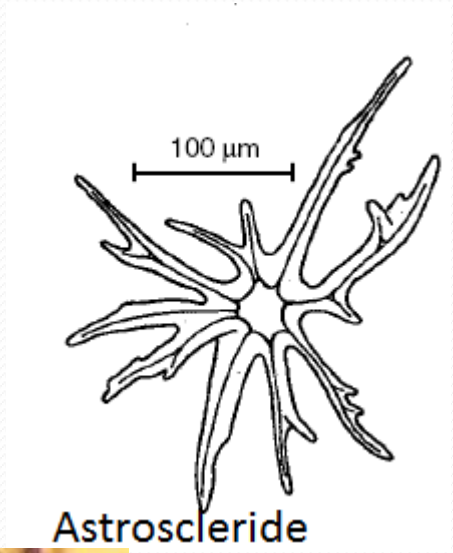
Cross section of the seed coat of a bean



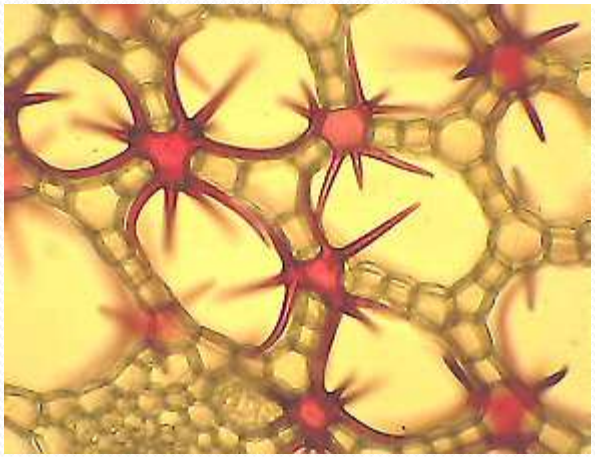
Macrosclereids: column shaped, longer than wide
Osteosclereids: bone shaped, elongated with swollen ends

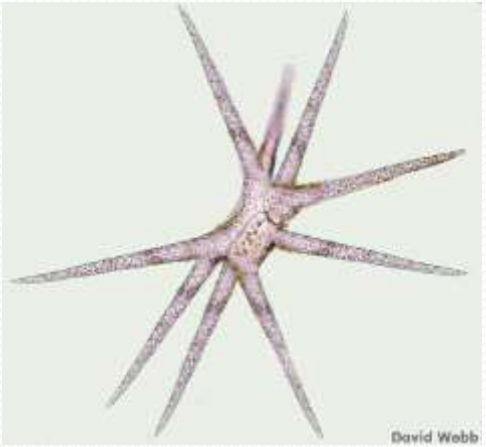
(d) Astrosclereid



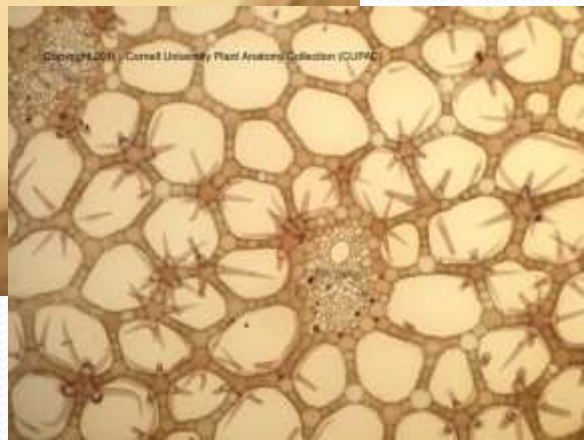


- It is stellate cell
- the cell is deeply lobed or branched in such a manner that it resembles stars, e.g.
  - leaves of *Thea* (tea),
  - leaves of *Olea*, and
  - petiole of *Nymphaea* etc.

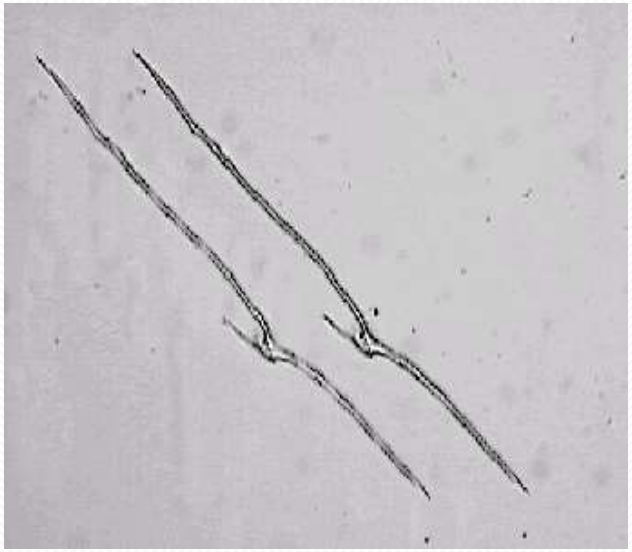


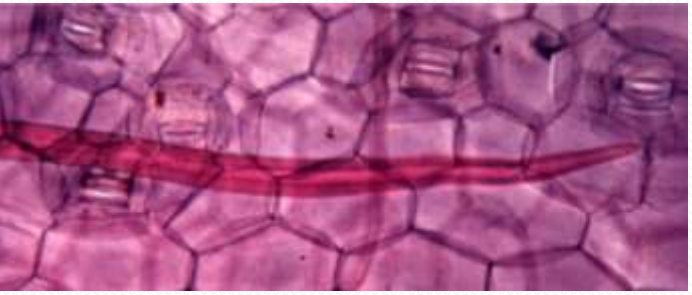


Nymphaea petiole



(e) Trichosclereid

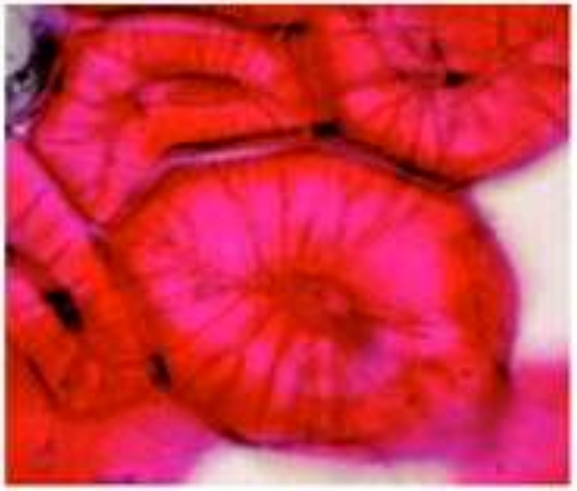




- It is hair like, very much elongated cell with branches, which extends into the intercellular spaces,
- e.g. leaves of *Olea*, *Nymphaea*, and
- aerial root of Monstera etc.
- The sclereids present in the leaf of *Olea europaea* are very much elongated, fibre-like and about one millimetre in length.
- Arzee (1953) termed these as filiform sclereids.

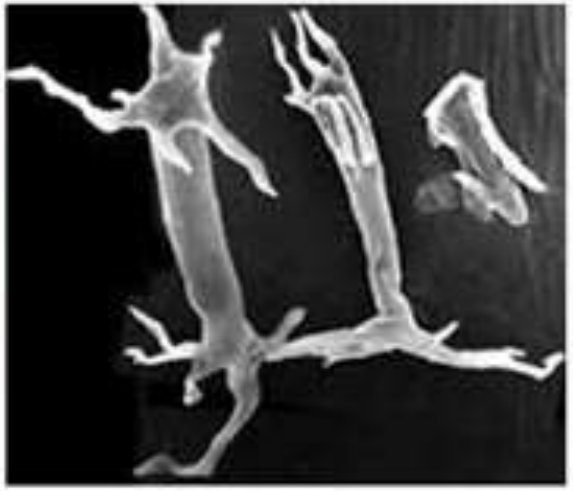
Types of Sclereids

Brachysclereide

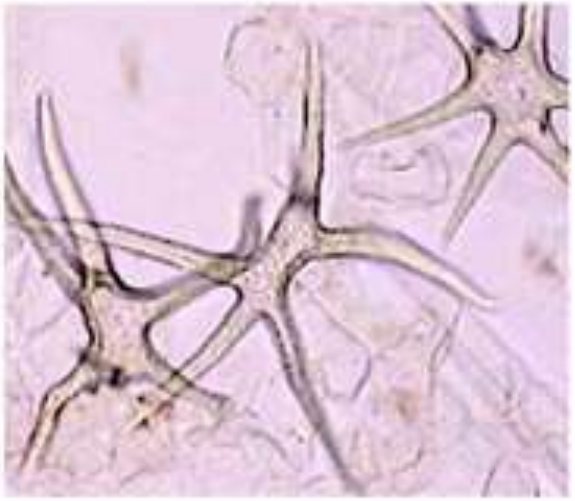


Macrosclereide

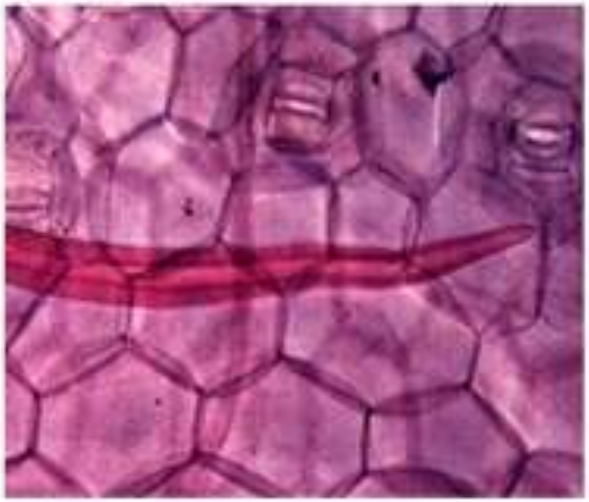
Osteosclereide



Asterosclereide



Trichosclereide



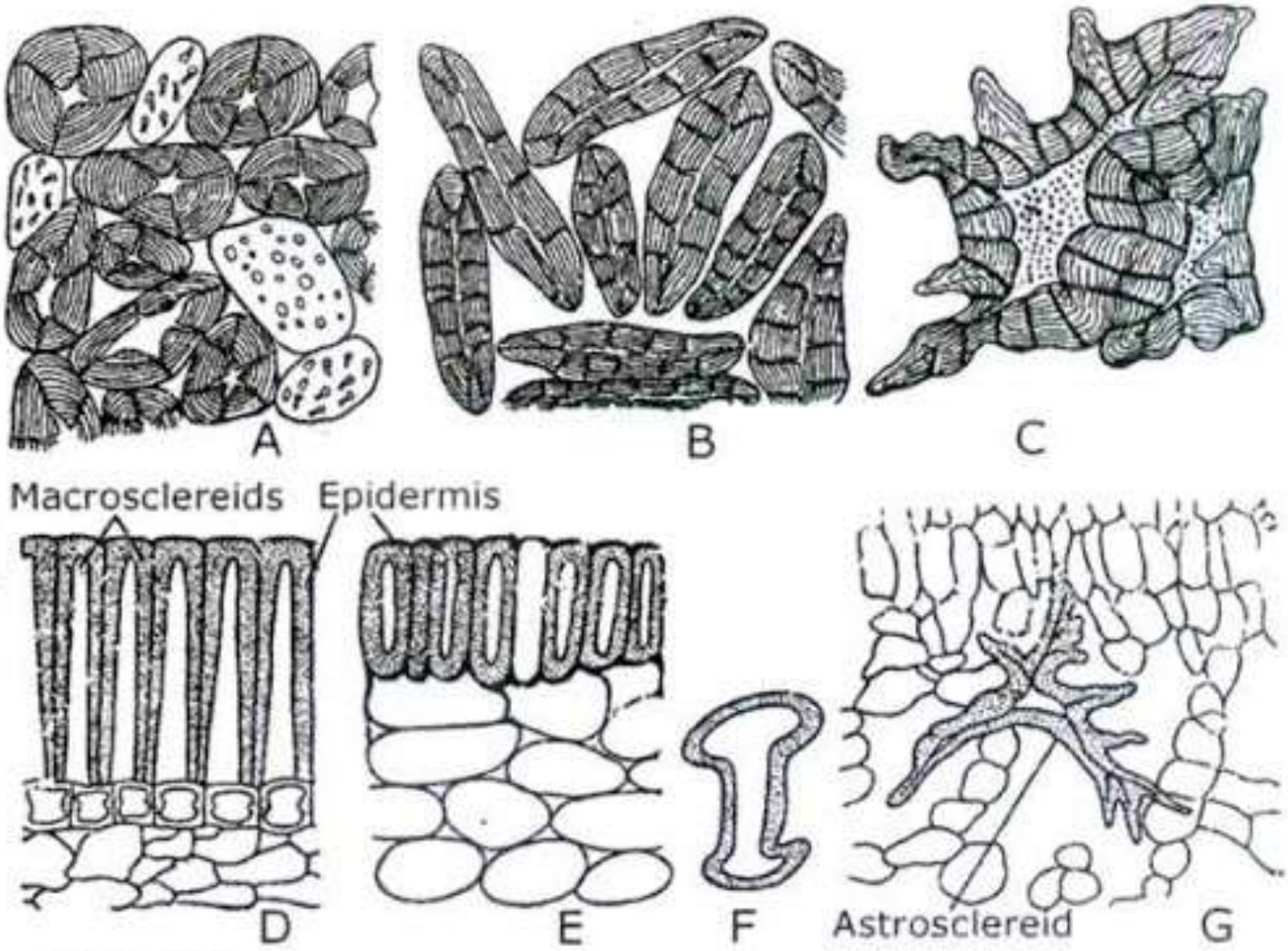
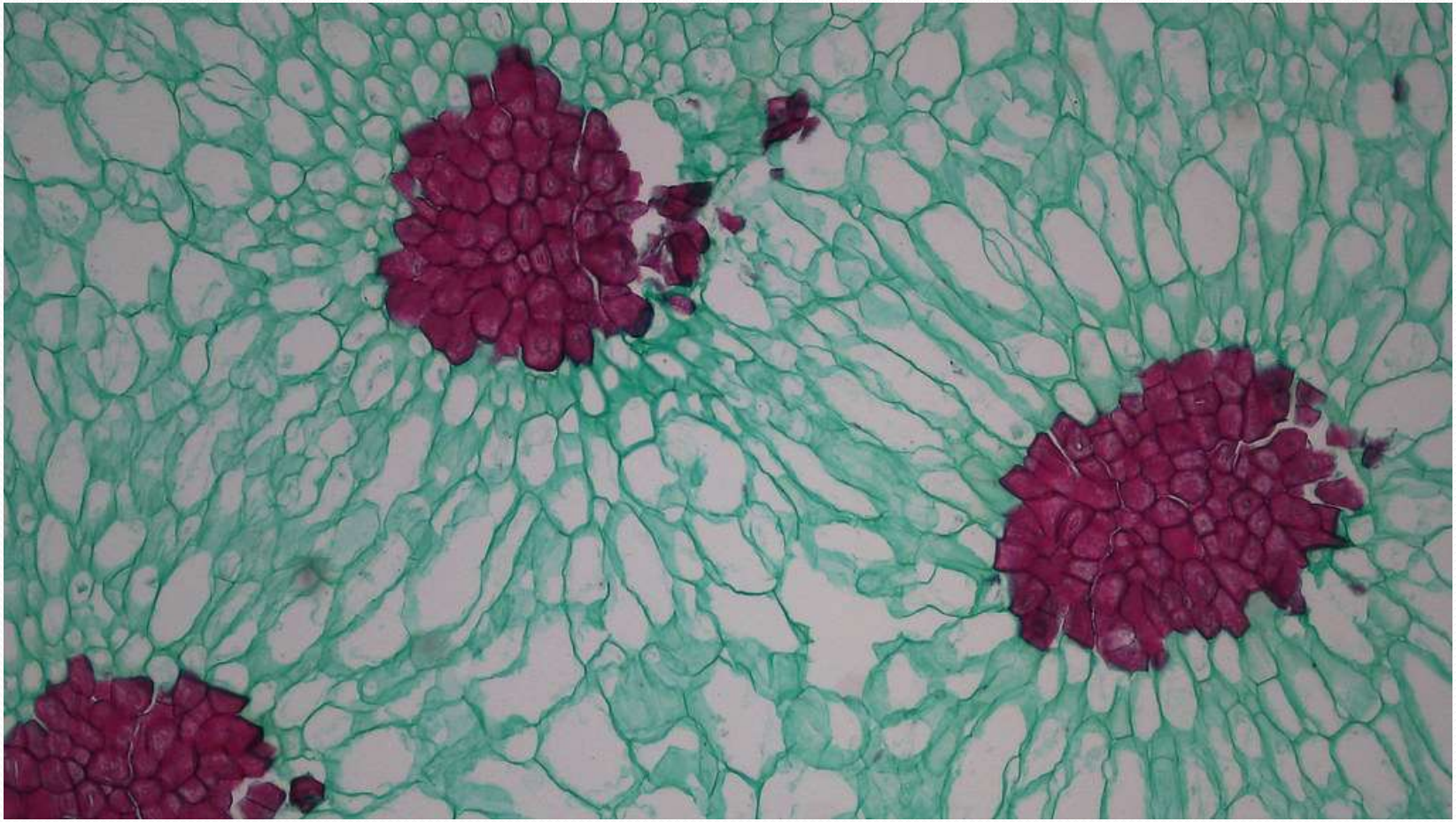


Figure 8.5

Sclereids. A. Brachysclereids from flesh of *Pyrus*. B. Same from *Cocos*. C. Irregular sclereids from *Tsuga*. D. Macrosclereids from epidermis of *Phaseolus* and E. from epidermis of *Allium sativum*. F. Osteosclereids from seed coat of *Pisum*. G. Astrosclereid from a leaf.

Identify



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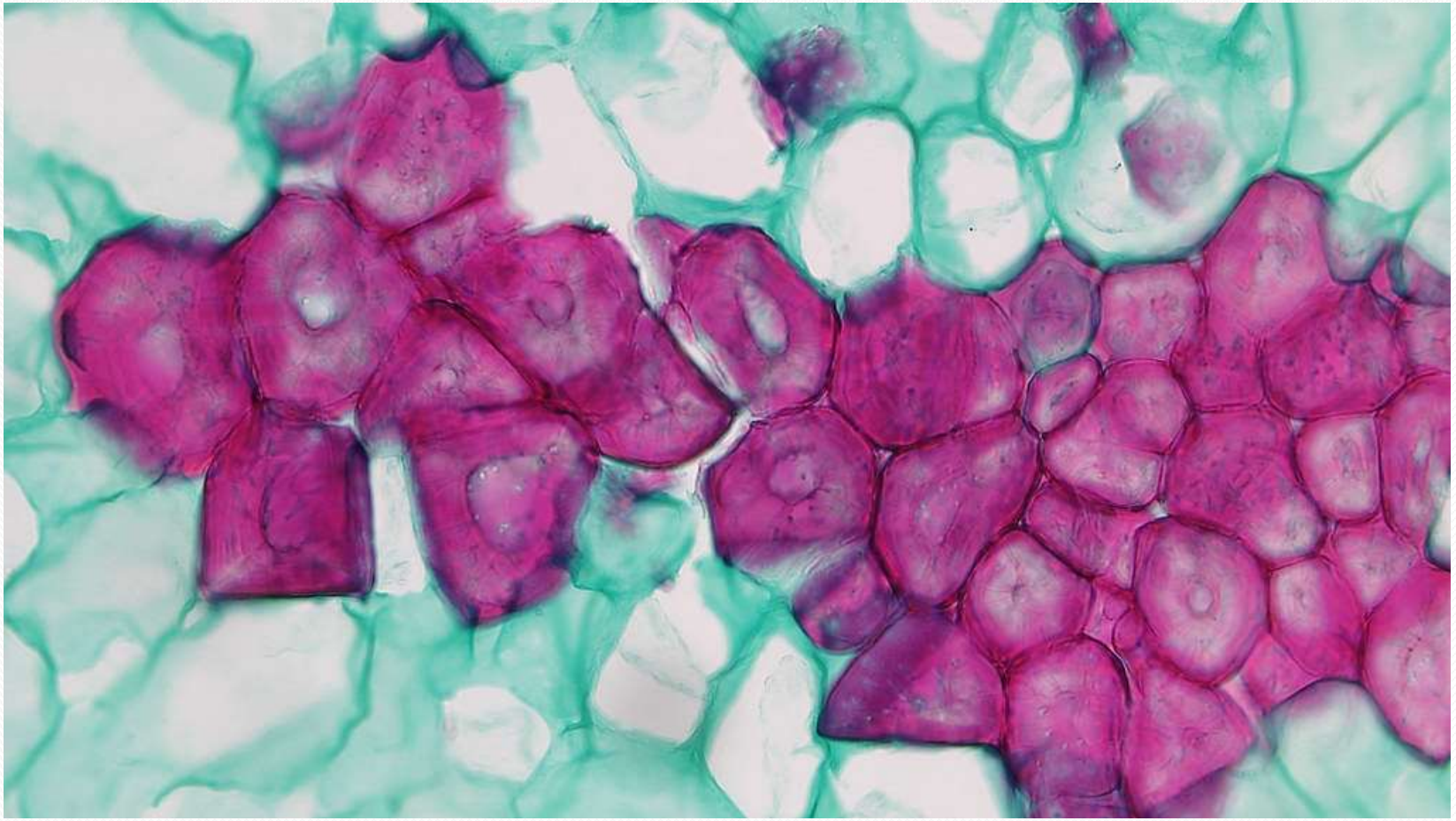

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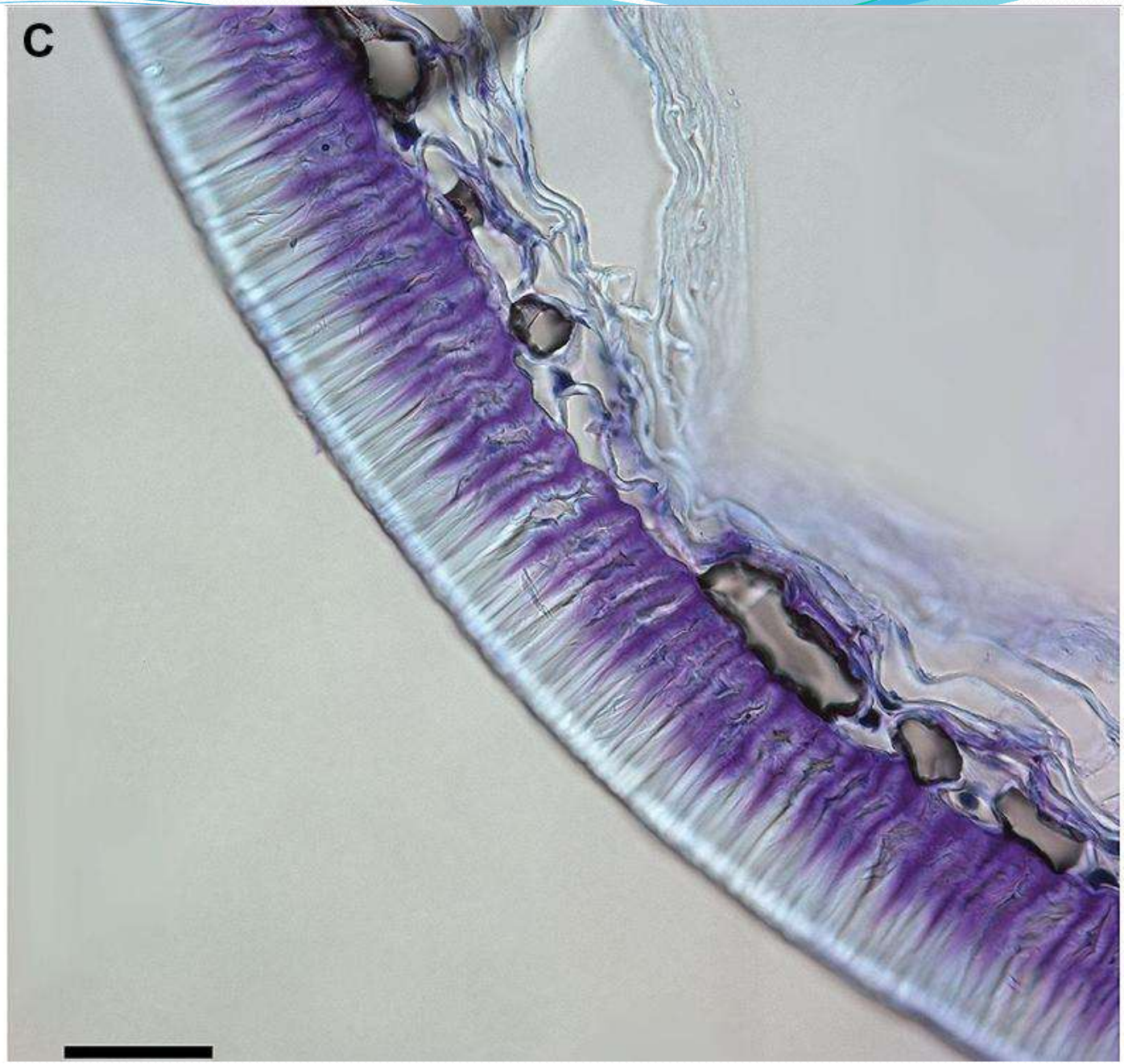
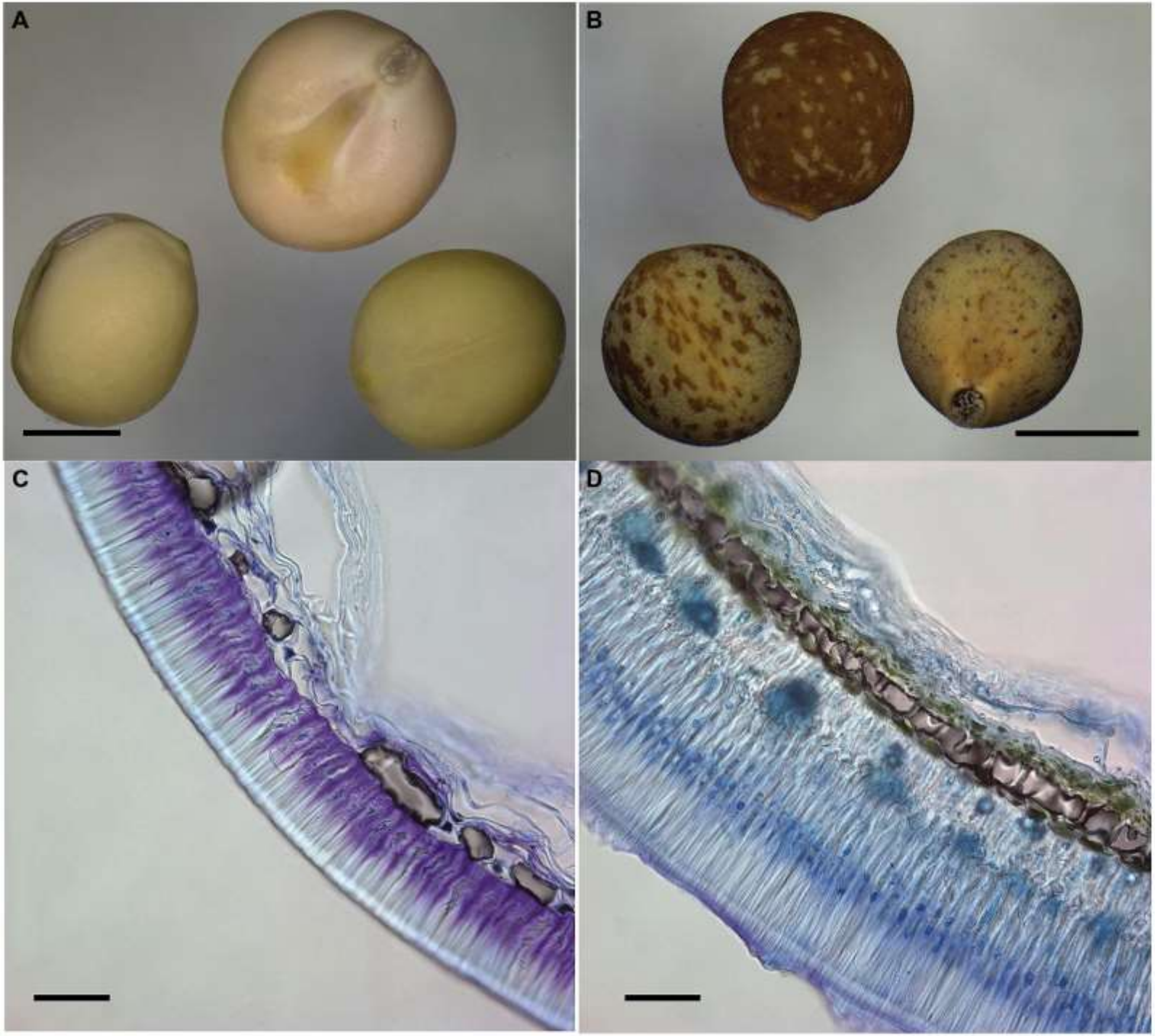
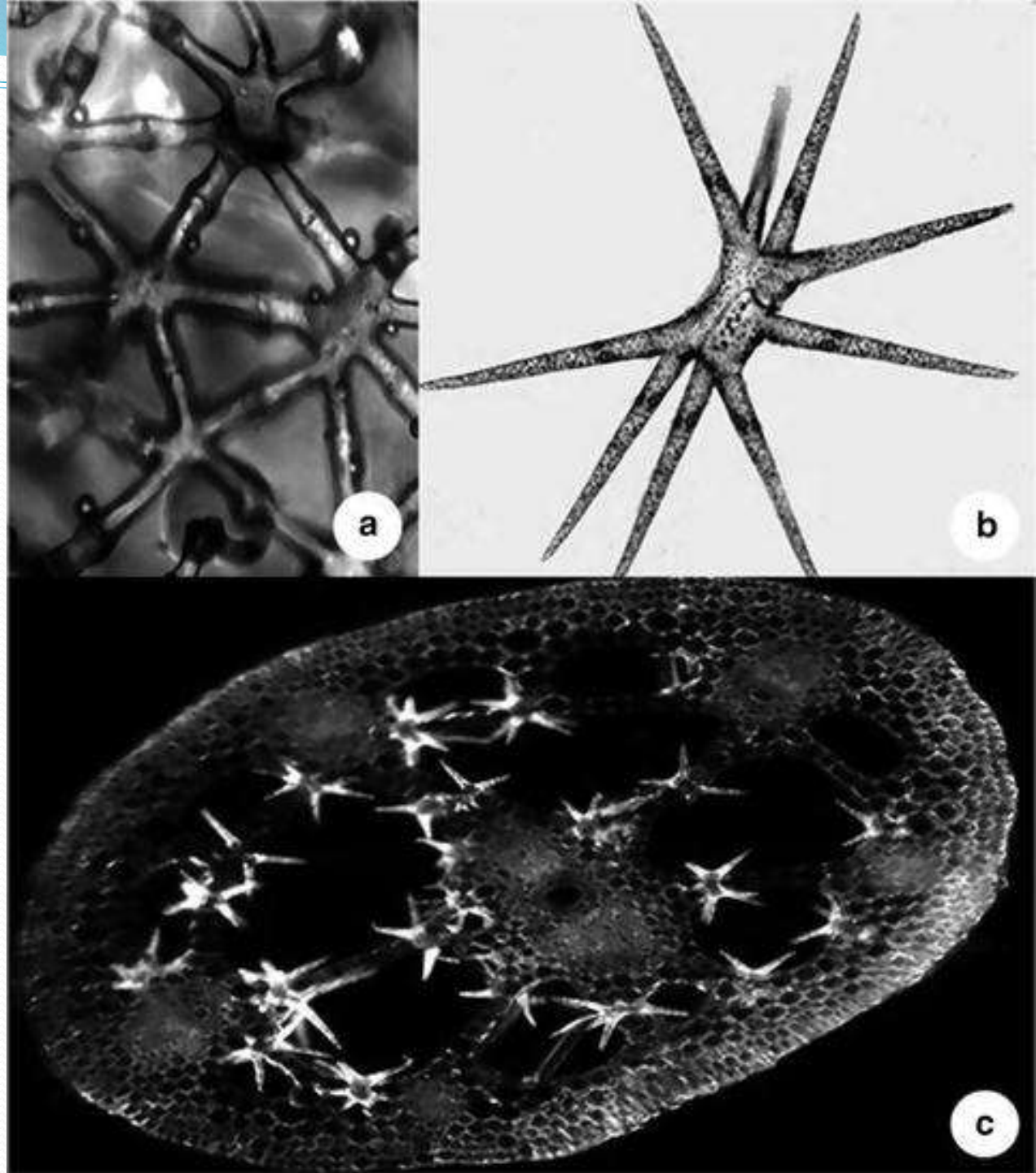



A
B
C
D

Identify



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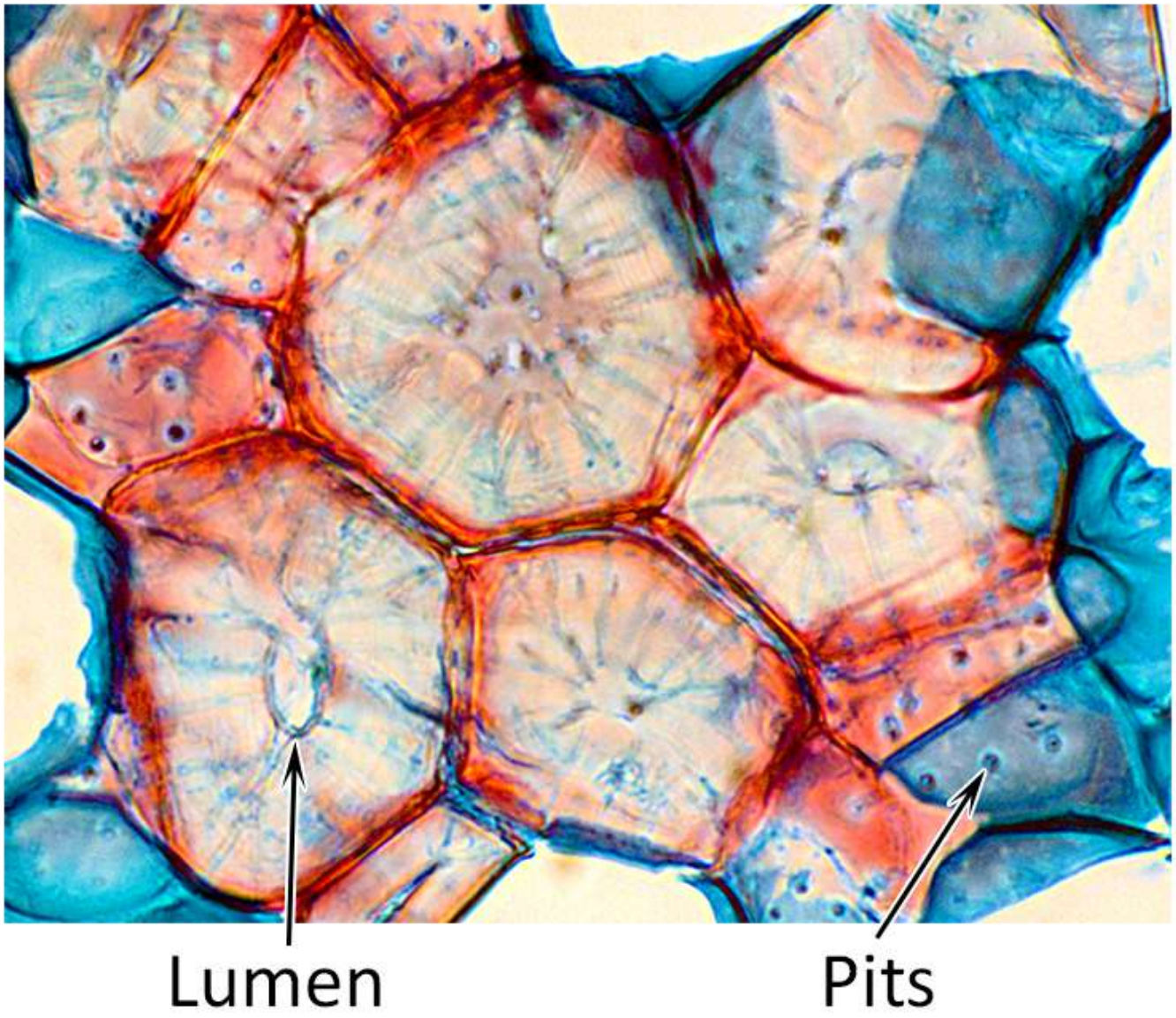

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