

Anatomy of Stem and Root

By

Dr. A.Lakshmi Prabha

Professor

Anatomy of Stem and Root

- T.S. of Dicot Stem
- T.S. of Monocot Stem
- T.S. of Dicot Root
- T.S. of monocot Root

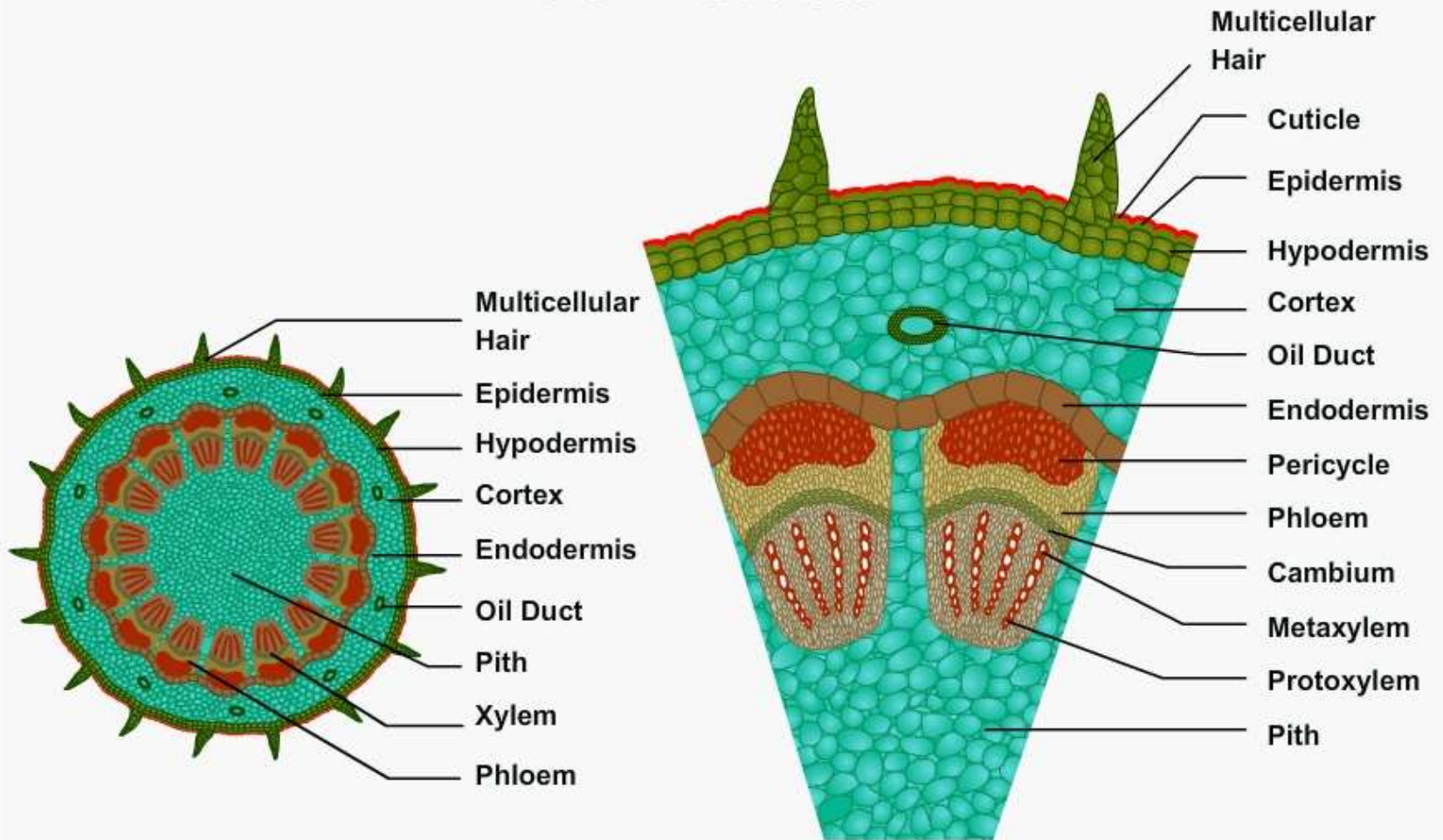
T.S. of Stem consist of three regions i.e.

1. Epidermis
2. Cortex
3. Stele (Pericycle, Vascular Bundle and Pith)
 - **Wedge shaped** Vascular bundle- **Needle** like shape (dicot stem).
 - Oval shape Vascular Bundle (Monocot Stem).
 - Eustele (VB are arranged in a Ring)(Dicot stem)
 - Atactostele (VB are arranged in Scattered mannaer)

- **Conjoint:** Xylem and phloem occurs in same bundle.
- **Collateral:** Phloem lies towards the outer side and xylem occurs towards the inner side.
- **Open:** Cambium is present between phloem and xylem.
- **Closed:** Cambium is absent between phloem and xylem.
- **Exarch:** Protoxylem lies towards the outside and metaxylem towards the centre.
- **Endarch:** Metaxylem lies towards the outer side and protoxylem towards the inner side.

Features	Dicot Stem	Monocot Stem
Epidermis	Made up parenchyma cells.	Made up of parenchyma cells.
	Bears multicellular hair.	Usually absent.
	Cuticle present.	Cuticle present.
Hypodermis	Made up of few layers of collenchyma cells.	Made up of few layers of sclerenchymatous cells.
Ground tissue	Differentiated into cortex, endodermis, pericycle, medullary rays and pith.	Undifferentiated.
Vascular bundles	Wedge shaped.	Oval in shape.
	Arranged in a ring.	Numerous and scattered.
Nature of Vascular bundle	Conjoint, collateral, open, endarch.	Conjoint, collateral, closed, endarch.
	Lysigenous cavity is absent.	Lysigenous cavity is absent.

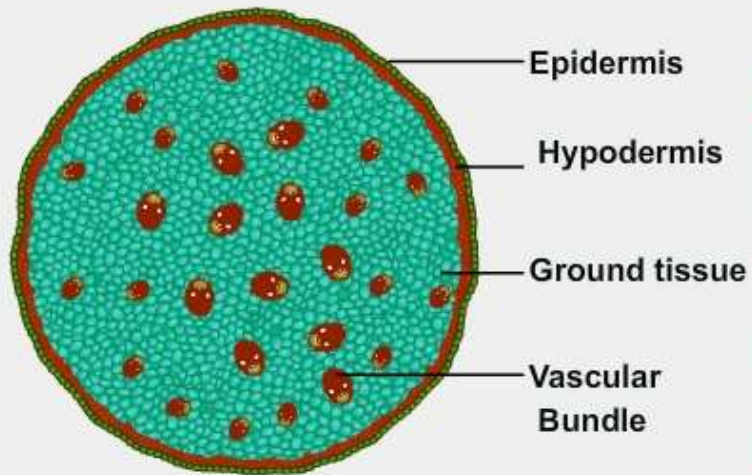
T.S of Dicot Stem



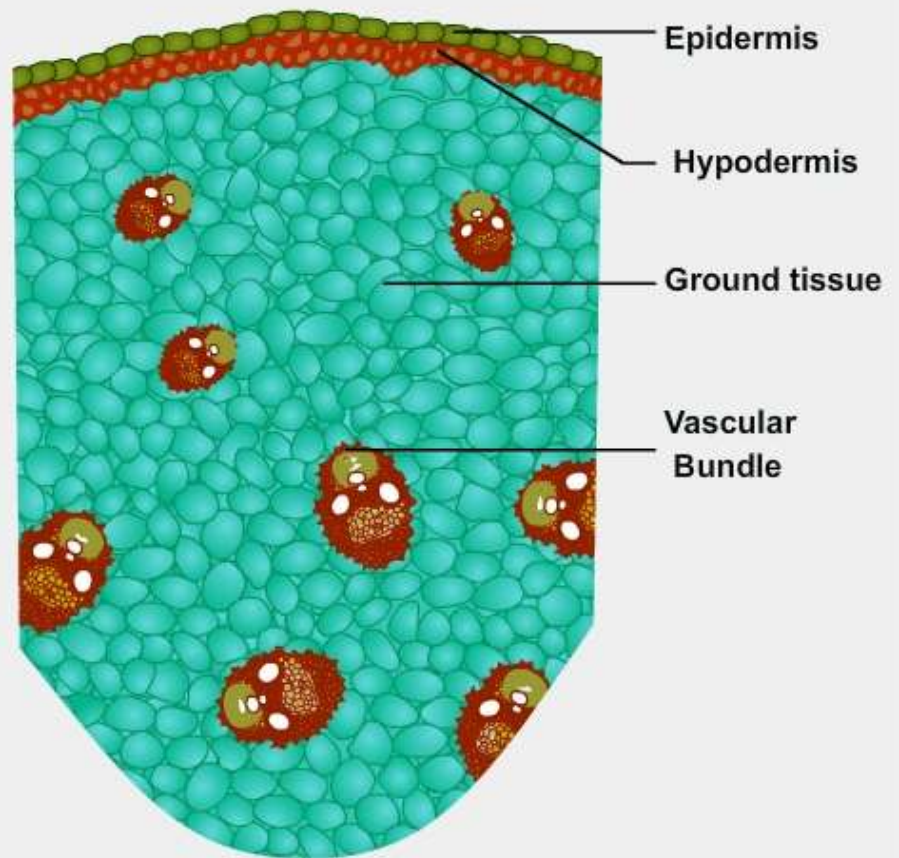
Diagrammatic

Detailed structure of a part of T. S of dicot stem

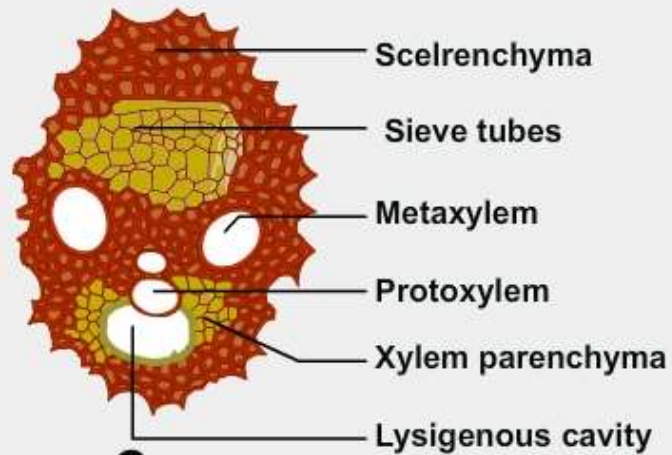
T.S of Monocot Stem



A



B

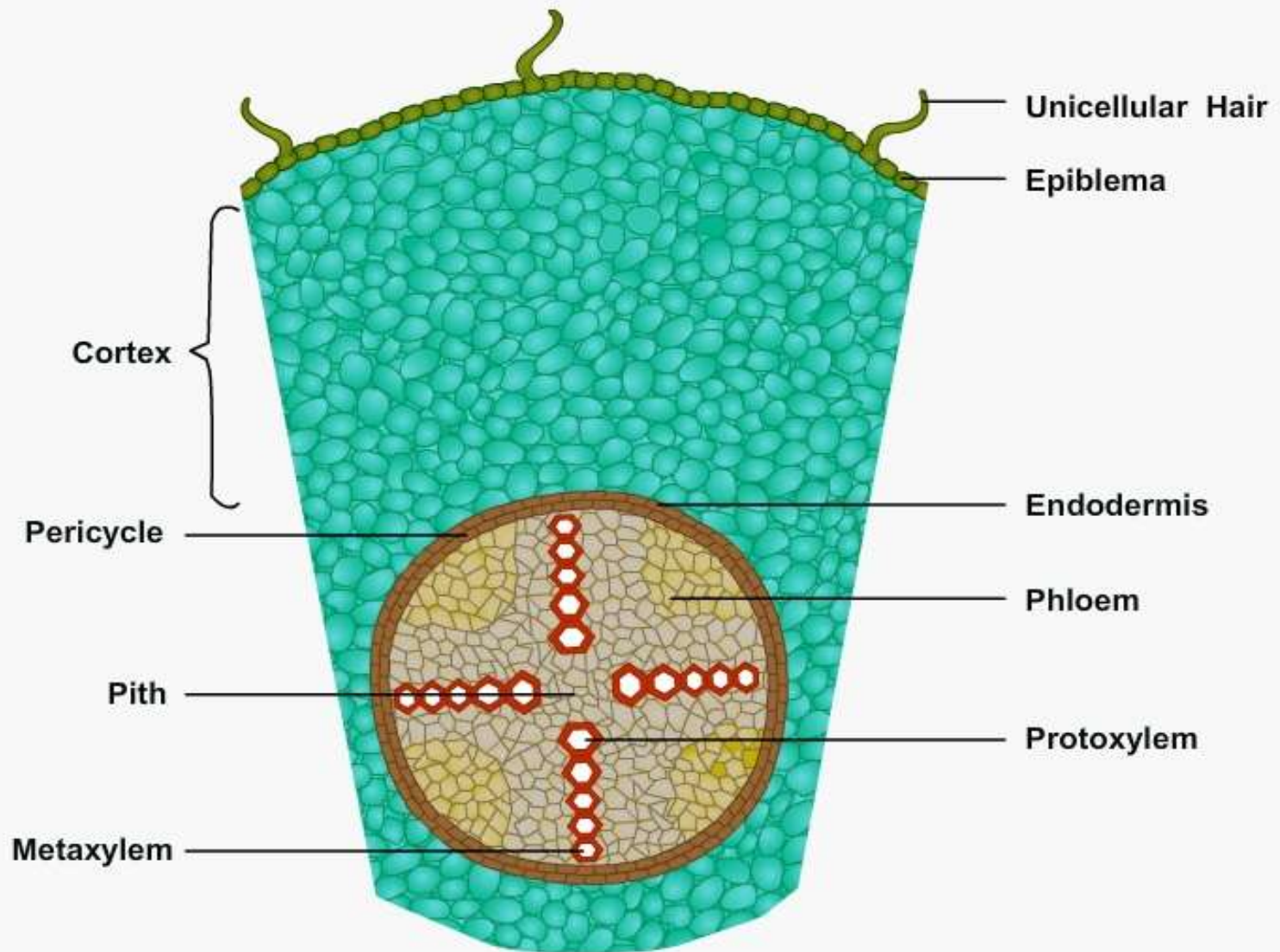


C

A. Diagrammatic; B. Detailed structure of a part of T.S. of monocot stem; C. Single vascular bundle

Features	Dicot Root	Monocot Root
Epiblema	Single layer of compactly arranged cells.	Single layer of compactly arranged cells.
	Bears thin walled root hairs.	Bears thin walled root hairs.
Ground tissue	Differentiated into cortex, endodermis, pericycle and pith.	Differentiated into cortex, endodermis, pericycle and pith.
Vascular bundles	2-6 alternate bundles of xylem and phloem.	8 or more alternate bundles of xylem and phloem.
Nature of Vascular bundle	Xylem bundles are exarch.	Xylem bundles are exarch.
	Xylem vessels are polygonal.	Xylem vessels are oval.

T.S. of Dicot Root



T.S of Monocot Root

