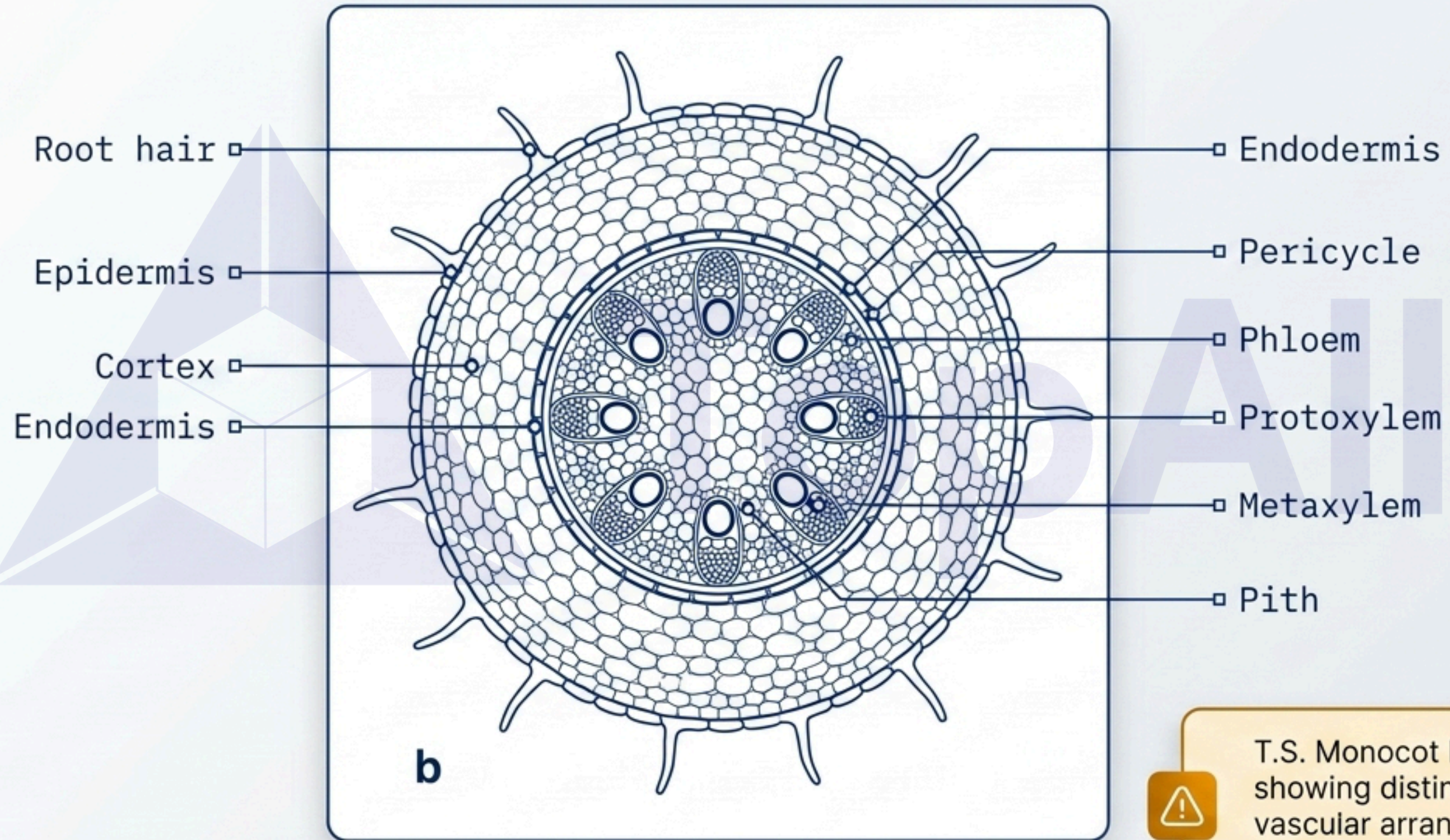


Chapter 6.2.2 Focus

Polyarch Xylem and Large Pith

An Anatomical Guide to the
Monocotyledonous Root

Master Cross-Section (T.S.)



T.S. Monocot Root (Primary) showing distinct radial vascular arrangement and a massive central core.

A Shared Architectural Foundation

Epidermis	✓ Present (Matches Dicot)
Cortex	✓ Present (Matches Dicot)
Endodermis	✓ Present (Matches Dicot)
Pericycle	✓ Present (Matches Dicot)
Vascular Bundles	✓ Present (Radial Arrangement)
Pith	✓ Present (Modified)

The functional anatomy of the monocot root is built on the exact same layer organization as the dicot root.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



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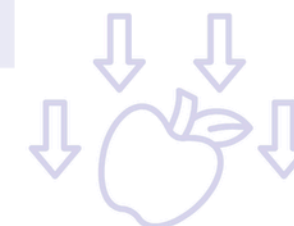
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The Outer Tissues: Soil to Stele

01

EPIDERMIS (EPIBLEMA)

Outermost boundary; many cells protrude as unicellular root hairs to absorb water and minerals. Cuticle is absent.

02

CORTEX

Multi-layered ground tissue. Consists of thin-walled parenchymatous cells with conspicuous intercellular spaces.

03

ENDODERMIS

Single innermost layer of the cortex. Barrel-shaped cells contain water-impermeable suberin depositions (Casparian strips).

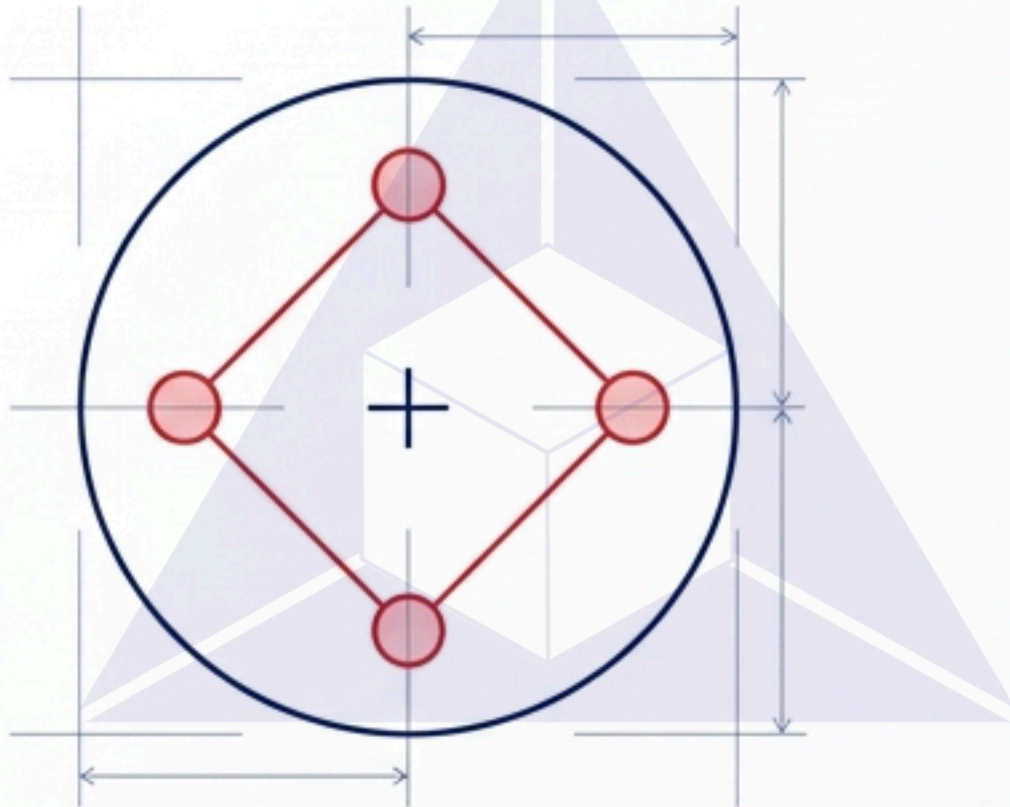
04

PERICYCLE

Thick-walled parenchymatous cells resting just inside the endodermis. Marks the beginning of the central stele.

The Polyarch Xylem Condition

Dicot Root Baseline

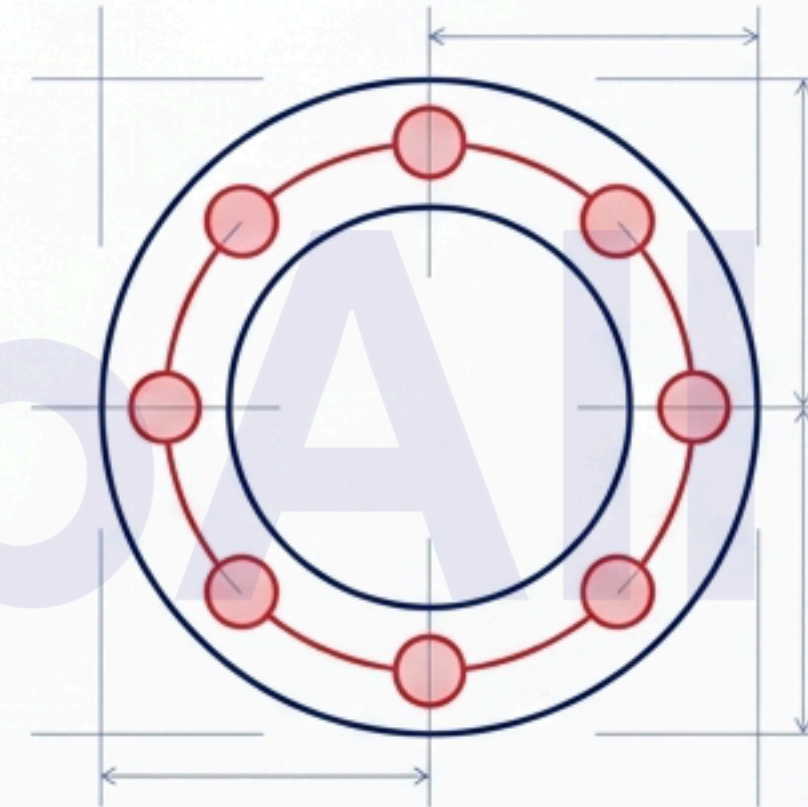


Typically features restricted vascular patches.

Xylem Patches: 2 to 4

VS

Monocot Root Anatomy



Defined by a high number of primary xylem bundles arranged in a wide radial pattern.

Xylem Patches: Polyarch (>6)

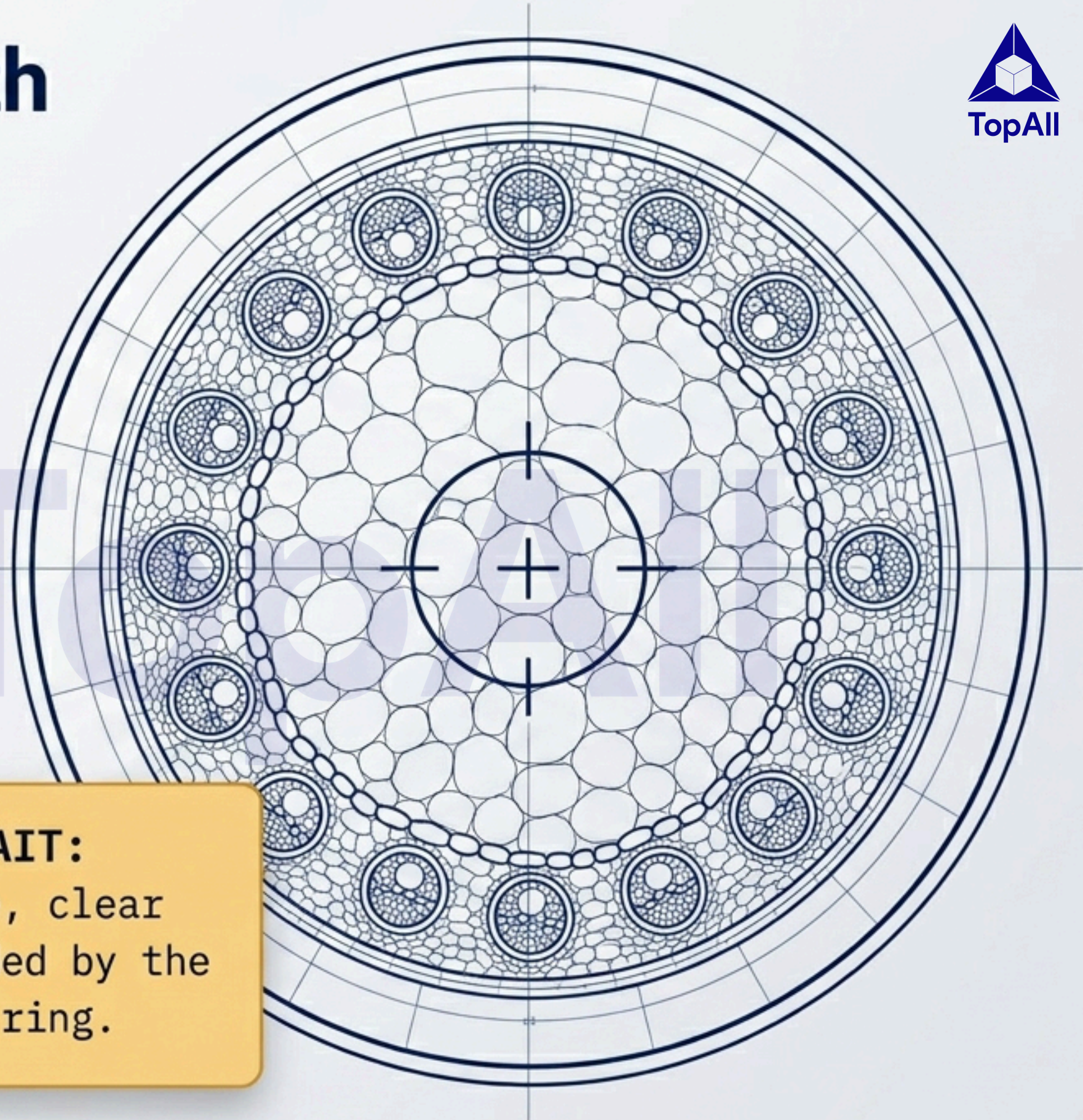
Large, Well-Developed Pith

Unlike dicotyledonous roots—where the central pith is remarkably small or entirely inconspicuous—monocot roots are characterized by a massive central ground tissue core.

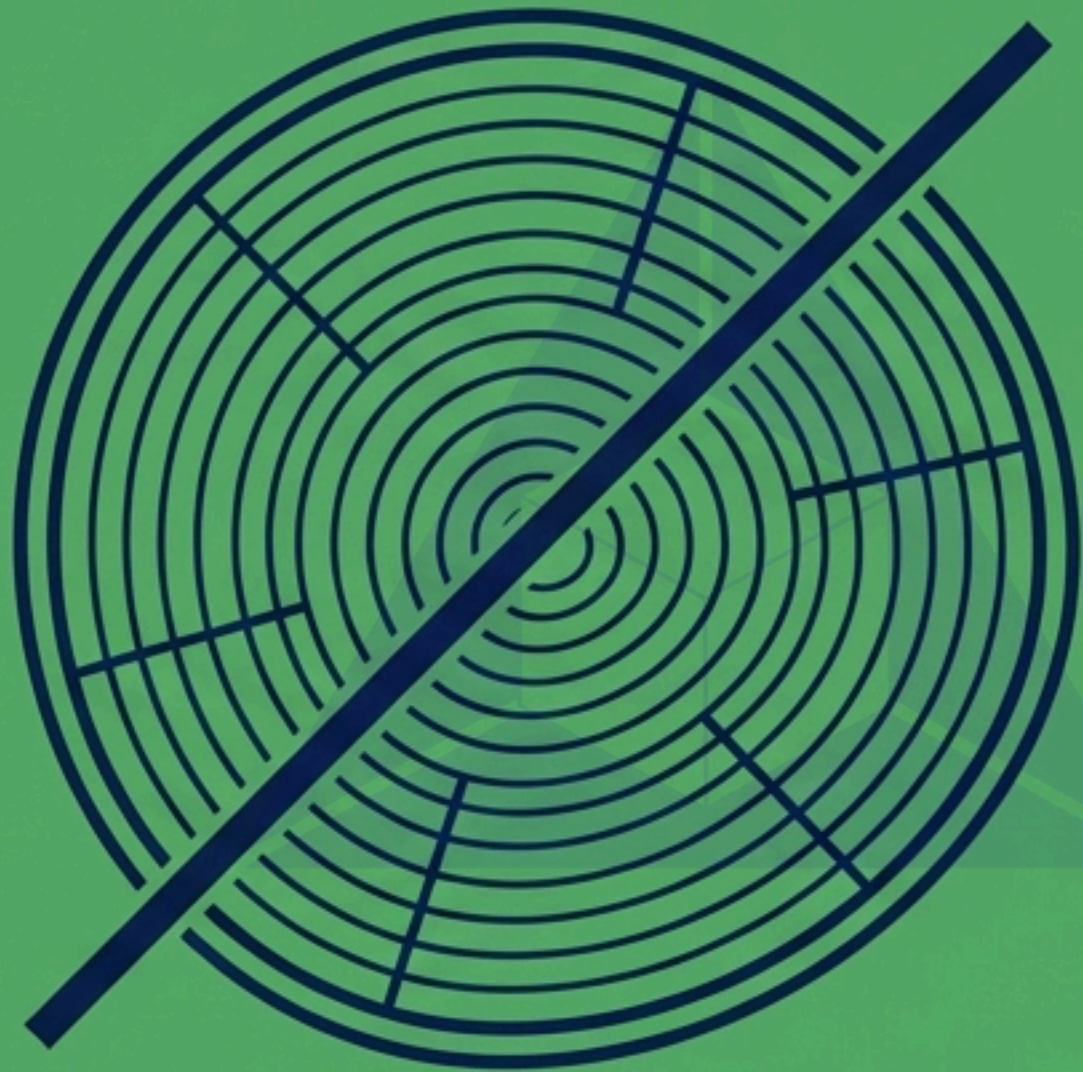
- Made of distinct parenchymatous cells.
- Occupies a massive volume of the central stele.

DIAGNOSTIC TRAIT:

Look for a wide, clear center surrounded by the polyarch xylem ring.



Physiological Consequence



Key Takeaway: No Secondary Growth

Mon-ocotyledonous roots do not undergo any secondary growth.

Because monocots feature 'closed' vascular bundles lacking a cambium ring, they are entirely incapable of forming secondary xylem or phloem. The primary structure you observe under the microscope is permanent—the root cannot increase its structural girth over time.



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