

**Topic 8: Structure and Function of Vascular Plant Cells and Tissues (Chs. 35-39)**

**I. INTRODUCTION**

- A. Most vascular plants continue growing throughout their lives
  - 1. can achieve great size and attain great age
  - 2. genetically identical individuals have propagated for generations
- B. Vascular plants have a fundamental unity of structure
  - 1. two basic parts: root system, shoot system
  - 2. three basic organ types: roots, stems, leaves
  - 3. three basic tissue types: dermal, ground, vascular
- C. Vascular plants have a modular body plan (redundancy of units, general ability to replace units)

**II. ORGANIZATION OF THE VASCULAR PLANT BODY**

- A. Vascular plants have a root system and a shoot system
  - 1. **root system**
    - penetrates the soil/substrate and anchors the plant
    - absorbs water and ions for plant to use
  - 2. **shoot system**
    - **stems**: serve as framework and support to position leaves
    - **leaves**: primary location for photosynthesis
    - structures that serve reproductive functions (cones, flowers, fruits, seeds, etc.)
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- B. **meristem**
  - 1. give rise to all other cells of plant
  - 2. composed of small, unspecialized cells that divide continually
    - after division, one cell remains meristematic
    - other cell becomes part of plant body; may or may not go through more mitosis before differentiating



C. **primary growth**

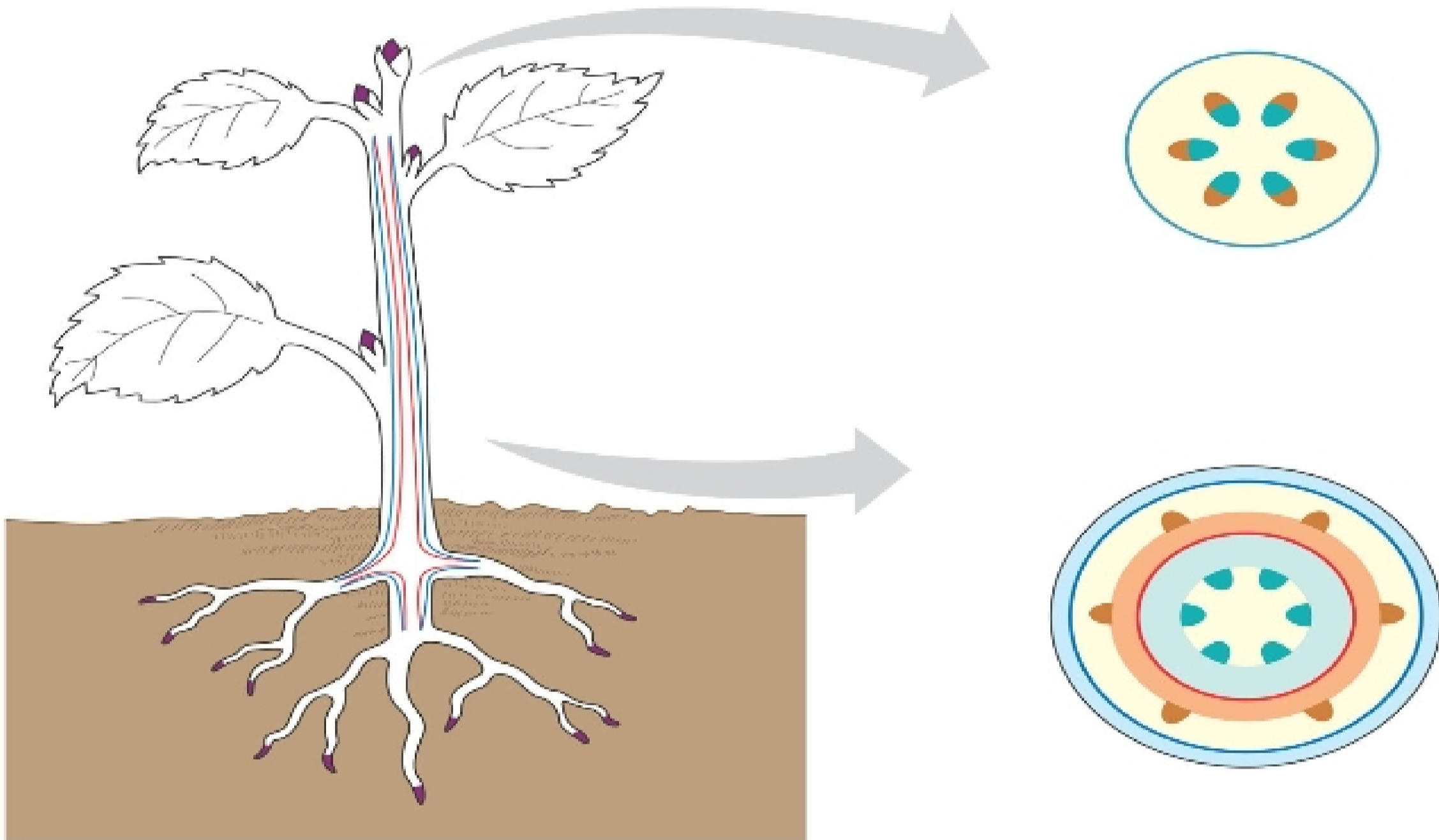
1. initiated by **apical meristems** near tips of roots, shoots
2. lengthening of primary plant body results
3. produces “primary” tissues that are partially differentiated
  - **ground meristem** – produces ground tissue
  - **protoderm** – produces epidermis
  - **procambium** – produces primary vascular tissue

D. **secondary growth**

1. initiated by **lateral meristems** – internal meristematic cylinders
2. expand girth of plant (thickening of plant body)
3. produces “secondary” tissues; allows thick, woody trunk in some plants
  - **cork cambium** – cork cells in bark of woody plants (outer bark)
  - **vascular cambium**: secondary vascular tissue
    - secondary phloem – closest to cork

## BIOL 1030 – TOPIC 8 LECTURE NOTES

- secondary xylem – internal; main component of wood
4. appears to have evolved independently in different plant groups



### PLANT TISSUES AND CELL TYPES

E. 3 basic tissues: dermal tissue, ground tissue, vascular tissue

F. **dermal tissue, or epidermis**

1. protective outermost cells, cover all parts of primary plant body
2. usually only one cell thick
3. cells usually flattened
4. covered on outside by waxy **cuticle** layer that varies in thickness (depending on the species, plant region, and environmental conditions)
5. most lack chloroplasts
6. includes some specialized cell types for protection or absorption: guard cells, trichomes, root hairs