

TISSUES

I. **Simple Tissues** - consists of similar cells having one function in common.

- A. **Meristem** - isodiametric, large nuclei, no central vacuole, very thin primary walls; high frequency of cell division.
- B. **Epidermis** - single layer of cells; covers leaves, stems, & roots; no chloroplast; contains **stomates**; gives way to cork in old tissue.
- C. **Parenchyma** - very common; thin, even primary walls; intercellular spaces present; large central vacuole; food storage; photosynthesis.
- D. **Collenchyma** - distinctive primary wall thickening (note corners); strength & support; photosynthesis; food storage; large central vacuole.
- E. **Sclerenchyma**
 - 1. **Fibers** - long slender cells; dead at maturity; lignified secondary cell walls.
 - 2. **Stone Cell (Sclereids)** - isodiametric; dead at maturity; lignified secondary cell walls; strength & support; pit canals; forms hard covering of seed coats & nut shells.
- F. **Cork** - specialized parenchyma; cell walls impregnated with suberin; protects plant from water loss by replacing epidermis.

II. **Complex Tissues** - consists of different types of cells but have the same function; originate from chains of meristematic cells.

- A. **Xylem** - transports water & minerals upwards.
 - 1. **Parenchyma**
 - 2. **Fibers**
 - 3. **Tracheids** - long slender cells; dead at maturity; lignified secondary cell walls; support & conduction; bordered pits present; strange patterned secondary thickening.
 - 4. **Vessels** - dead at maturity; lignified secondary cell walls; cross walls partially dissolved which creates "hollow tube" structure; support & conduction; bordered pits present; strange patterned secondary thickening; best conductor.
- B. **Phloem** - transports food downwards.
 - 1. **Parenchyma**
 - 2. **Fibers**
 - 3. **Sieve Tubes** - alive at maturity with no nucleus; elongated cells; very thin cytoplasm; sieve plate (cross wall) has many holes; no secondary wall; has many holes in wall (not pits).
 - a. **Callose** - substance deposited in a cylinder about each plate.
 - 4. **Companion Cells** - nucleated & small; supplies vital support to Sieve Tube elements via plasmodesmata.
- C. **Cortex**

III. **Primary Tissues** - formed by three primary meristems.

- A. **Protoderm**
- B. **Ground Meristem**
- C. **Procambium**

IV. **Secondary Tissues** - formed by:

- A. **Vascular Cambium**
- B. **Cork Cambium**
- C. **Interfascicular Cambium**