

Cells & Tissues

- I. Three basic cells types in plants
 - A. Plants are made up of 3 vegetative organs (stems, leaves, roots) & reproductive structures (gametangia & sporangia)
 - B. Plants may be herbaceous with only 1^o growth or woody with 1^o followed by 2^o growth
 - C. Regardless of organ or growth type, plants are made up of combinations of 3 basic cell types: Parenchyma, Collenchyma & Sclerenchyma

- II. Basic Organization (from small to large)
 - A. Basic structural unit is the cell
 1. Cells are organized into tissues
 - a. Simple tissues are composed of *essentially* 1 type of cell
 - (1) Simple tissues take their name from the cell type: e.g., parenchyma tissue, etc.
 - b. Complex tissues are composed of 2 or more cell types
 - (1) Complex tissues have a variety of names: e.g., xylem, phloem, etc

- III. Parenchyma
 - A. Most common cell type in herbaceous plants
 1. Involved in photosynthesis, storage & secretion
 2. Occurs as masses of parenchyma tissue in pith, cortex, leaf mesophyll & fruits
 3. Found in radial & vertical strands in wood of plants with 2^o growth
 - B. Characteristics
 1. 1^o cell wall only in vast majority of parenchyma cells
 2. Living at maturity
 3. Least differentiated cell type & retains meristematic ability
 - a. most able to redifferentiate
 - (1) form adventitious structure such as roots
 - (2) wound tissue
 - C. Specialized parenchyma cells
 1. Transfer cells
 - a. Cell wall has numerous ingrowths
 - b. Greatly increases surface area of plasma membrane
 - c. Involved with short distance transport of solute
 - (1) intense solute fluxes: uptake or secretion
 - d. Found with vascular tissue in small veins, nodes, reproductive & secretory/glandular tissues

IV. Collenchyma

- A. Commonly occurs as vertical strands or cylinders just under epidermis of young stems & leaf petioles (strings in celery) & bordering veins in dicots
- B. Characteristics
 - 1. 1^o cell wall only with uneven thickenings
 - a. walls are ~ soft & pliable
 - b. gives support to young elongating regions
 - 2. Cells usually elongate parallel to main axis of organ
 - 3. Living at maturity with some capacity to redifferentiate

V. Sclerenchyma

- A. Most diverse cell type; may occur as simple or complex tissue or dispersed cells
- B. Make up most of 1^o & 2^o xylem tissues & stony pits etc.
- C. Two basic types of sclerenchyma: fibers & sclereids
 - 1. Fibers are usually elongate and occur in strands
 - 2. Sclereids have various shapes & occur singly or in clumps (grit in pears) or in masses in seed coats, pits etc.
- D. Characteristics
 - 1. 1^o & 2^o cell walls on almost all sclerenchyma cells
 - 2. Most lack protoplast: i.e., dead at maturity