

GENERAL BOTANY Lecture 15 - Cell Types & Tissues

I. Where do all the different types of cells come from (focus on stems)?

A. Meristems

1. Apical meristems (source of all other meristems and give rise to primary meristems)
 - a) Shoot tips and root tips
2. Primary meristems
 1. Protoderm - gives rise to dermal (epidermis) tissue (outermost cells)
 2. Ground meristem - gives rise to ground tissue (i.e., parenchyma, collenchyma, and sclerenchyma)
 3. Procambium - gives rise to vascular tissue (xylem & phloem)

XYLEM

PHLOEM

Procambium

Protoderm EPIDERMIS

Meristematic
Cells

Ground Meristem

PARENCHYMA

SCLERENCHYMA

COLLENCHYMA

Chlorenchyma (photosynthetic)

Storage (starch)

Aerenchyma (air)

Sclerified (support)

II. Tissue types and their cells (focus on stems)

A. Dermal (epidermis)

1. Usually a single superficial layer of cells - epidermal cells
2. Covers the primary tissues
3. Outer surface of cells contain cutin - a waxy substance impermeable to water
4. Can contain stomates - two guard cells plus a pore = stoma

B. Ground tissue (pith - middle & cortex - just beneath epidermis)

1. Parenchyma cells - most common
 - a) Have intercellular air spaces
 - b) Multiple types and functions (see above)
 - c) Found everywhere - very abundant in pith
2. Collenchyma cells
 - a) Have (unevenly) thickened cell walls (pectin & cellulose)
 - b) Support tissue
 - c) Found just to inside of epidermis
3. Sclerenchyma
 - a) Have lignified cells walls (they stain red) and may be pitted
 - b) Types
 - 1) Sclereids (stone cells) - irregular and branched - gritty in pears
 - 2) Fibers - elongated and pointed at ends
 - c) Strengthen tissue and prevent damage
 - d) Found associated with vascular bundles, in pith, and in cortex

C. Vascular tissue (xylem & phloem)

1. Phloem - usually to the outside of stem
 - a) Sieve tube members, companion cells, fibers, sclereids, parenchyma
 - b) Involved with nutrient transport
2. Xylem - usually to the inside of stem
 - a) Tracheids and vessel members
 - b) "Dead" - water transport