

Introduction to the flowering plants, Shoot System  
Sept. 1, 2009 PMB 102/IB101

Contrast plant and animal cell

- Similarities
  - “eating”
  - movement
  - excretion
- Unique differences
  - Sexual Life Cycle
    - Alternation of Generations
  - animals: non rigid membrane, naked protoplast, no fixed shape
  - plants: rigid cell wall
    - plant cells do not migrate
      - leads to unique embryogenesis differing from animals
  - Plants consist of a few basic units which are repeated
    - Nodes, Internodes, Leaves, Buds
    - Variations → diversity in shape/size/form
    - Most plant development is therefore post embryonic
  - Do plants have a “nervous system”?
    - accrues outside plasma membrane
    - specialized functions
      - serves as barrier
      - modifies and interprets extracellular signals
      - typically 0.1 mm thick
      - composed mostly of water (90%)
      - approx. 1/3 of dry mass is cellulose
      - lignin incrusts wall
      - consider roles for lignin
- Notion of apoplast vs symplast
- apoplast...extraprotoplasmic, includes cell wall, intercellular spaces
- symplast...everything bounded by and including plasmalemma;
  - interconnected via plasmodesmata.
- notion of transfer between apoplast and symplast

The shoot system

- repetition of four basic parts; internode, node, axillary bud, leaf
- apical meristem and indeterminate growth
- axillary buds and branching
- Focus on shoot apical meristem
  - Tunica/corpus
  - periclinal divisions=new walls formed parallel to surface
  - L1, L2, L3 layers
  - clonal analysis

Leaf initiation

- how many (founder) cells in the meristem contribute to forming a leaf?
- endogenous controls for leaf arrangement and patterns
- leaf shape, controls