

Primary Growth Processes

- Plant 1^o growth (growth in length) consists of two processes
- Cell division (Mitosis)
 - Produces 2 identical cells from a single cell
 - **ALL** cells except sex cells (sperm & eggs) are produced by mitosis
- Cell elongation
 - Results in growth in length at the root and shoot tips of the plant

Cell Division

- Mitosis is a *VERY* exact process
- Exact copy of each chromosome is made and then copies are separated
- Organelles are copied and separated
- Vacuoles breaks up into smaller vacuoles
- Cytoplasm is divided with a nucleus & half of organelles in each half
- Results in two identical cells
- Process provides ALL cells in a plant except sex cells
- Process takes place in regions called meristems

Cell Elongation

- 1^o wall thickening softens
- cell takes up water & *vacuoles enlarge*
- cell can get longer but not much wider
 - spiral fibrils allow only elongation
 - interwoven end walls constrain width changes
- 2^o thickening produced; cells can^{*}t elongate any more
- These are all changes in the 1^o wall
- If the cell will have a 2^o wall, it will be added later

Plant Primary Meristems

- Cell divisions that produce 1^o and 2^o growth take place in meristems
- Primary meristems are located near the apex (tip) of stems and roots
- Most divisions add cells to the long axis of the plant; a small number add to width of plant tips
- After cells are produced and elongate, they mature
- 1^ogrowth continues at stem & root apices as long as the plant is alive

Secondary Plant Meristems

- Plants that have woody or 2^o growth also have two 2^o meristems arranged as cylinders near the outer circumference of the stem
- One 2^o meristem produces wood; one produces bark
- 2^o growth is growth in width of the plant

