Lecture 2: Elena

1. Many totipotent cells: all bound together, cells are cemented, thus coordination is super important! They must be able to build while other cells divide or expand
2. Two types of cell orientations:
   (a) Periclinal: parallel - never on the outer layers
   (b) Anticlinal: 90 deg angles to cell wall
3. Cell expansion is 95% of plant growth. Tuna can to a telephone pole
   (a) it requires cooperative processes among the cytoskeleton, vacuole, and the cell wall
4. Two types of growth
   (a) Diffuse - both directions
   (b) Tip Growth - like building an addition onto a house

Diffuse Growth

1. No orientation, pressure-driven growth
2. Isotropic
3. All depends on cell wall
   (a) If rigid, stands straight
   (b) If soft, cell expands
4. Cellulose: placed by specialize enzymes which controls how cellulose is laid down
   (a) This is another constraint on how the cell expands
   (b) Cell expansion will be limited in some directions but will predominantly expand in other directions

Meristems

1. Population of undifferentiated cells that give rise to different tissues
2. SAM vs RAM
3. Axillary Meristems: where the leaf meets the stem

4. Central Zone: area where the cells divide very slowly and remain undifferentiated
5. Peripheral Zone: rapid and incorporated into new organs (e.g. new leaves)
6. Rib Meristem: under cnetral zone and forms the vasculature (at least two layers!)
7. Outer layer of meristem is ONLY anitclinal to increase surface area, deeper layers can be periclinal which permits cell division to push things out
8. SAM: generates all of the above ground tissue

1. Modular organization
   (a) Phytomer: modular organization
2. Phyllotaxy: patter of leaf primordia and is consistent across species. Interconnected with branching

1. RAM: root axis
2. VERY organized. Most are anticlinal
3. Branching in roots: deep inside the root and push out from inside - very different pattern
4. Primary growth: as big as pinky tip
5. Secondary growth: for larger stems, can grow around things