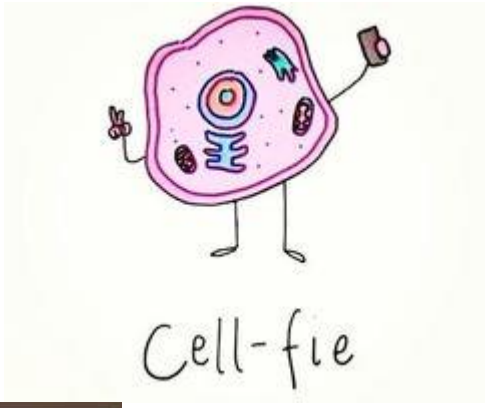
Welcome to BIOL 225: Form and Function of Organisms



- Objective for this lecture:
  - Thoroughly outline structure and content of this course
  - Go over the format of the midterms

Course information

- Instructor: Holly Caravan

  Email: holly.caravan@concordia.ca

  Office: SP 375.35

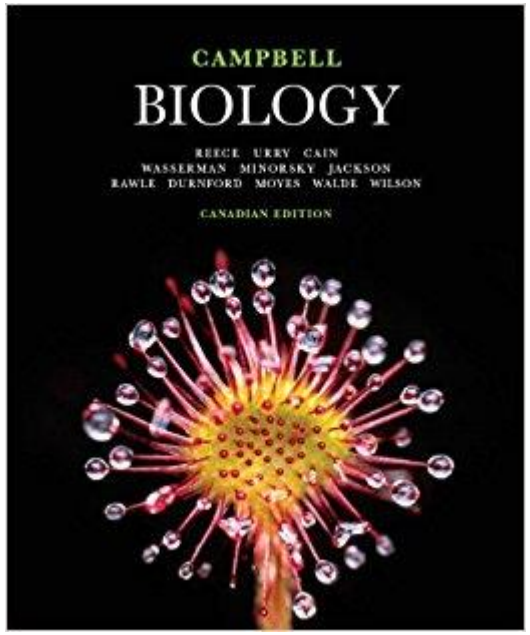
  Office hours: Wednesdays 13:00 – 14:00

- TA: Daniela Stanga

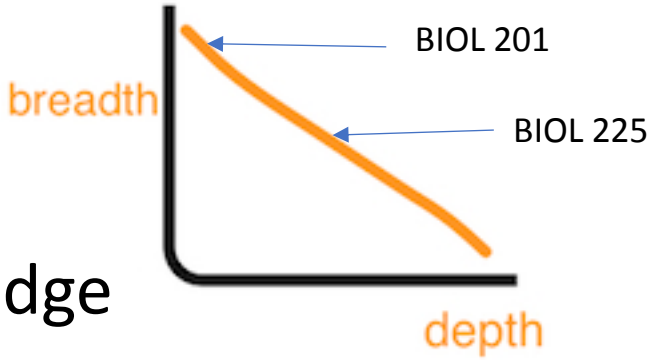
  Contact on Moodle

Resources:

- CAMPBELL BIOLOGY, 1ST CANADIAN EDITION
- Moodle



About this course

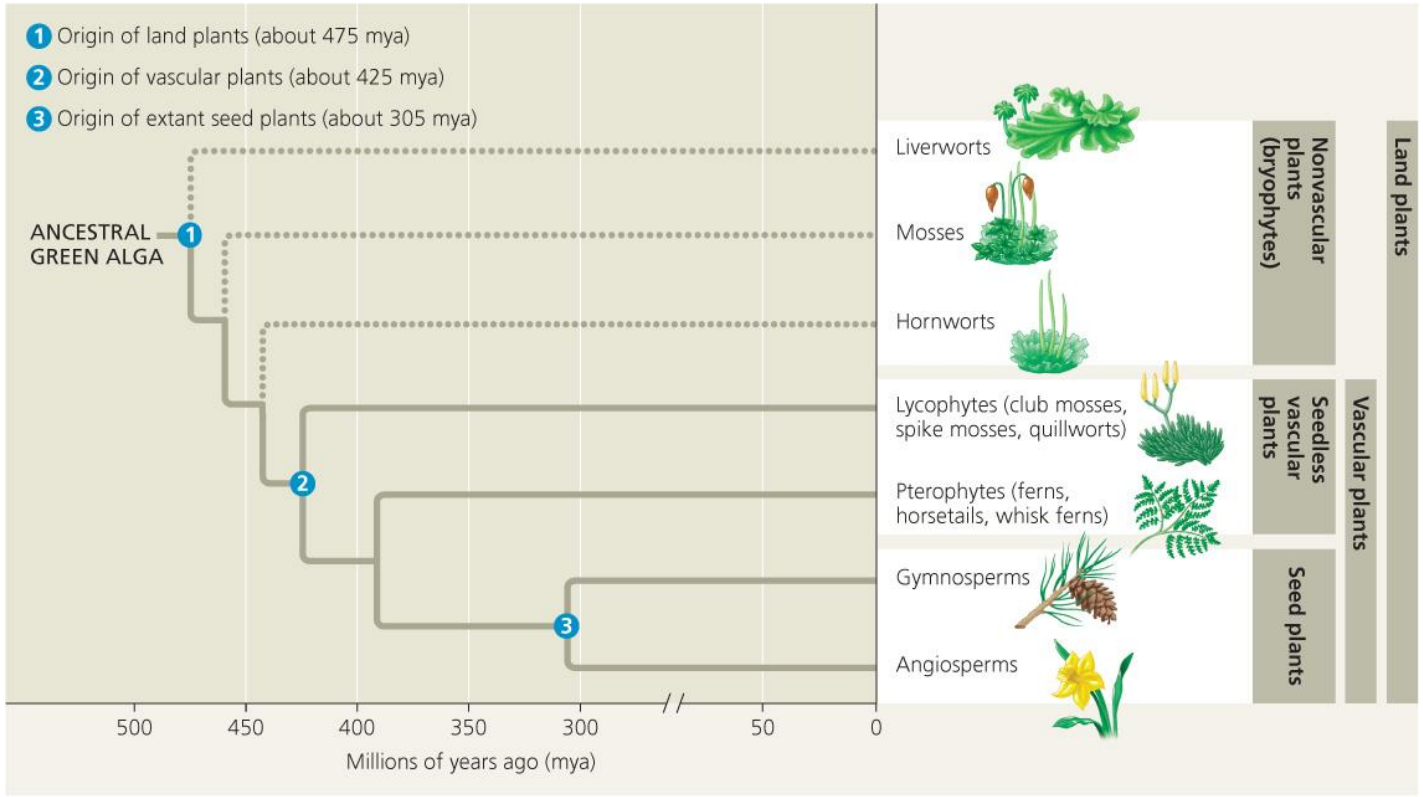


- A core biology course
- Designed to establish strong foundational knowledge
  - Basic architecture of organisms
  - How they acquire resources to survive and reproduce

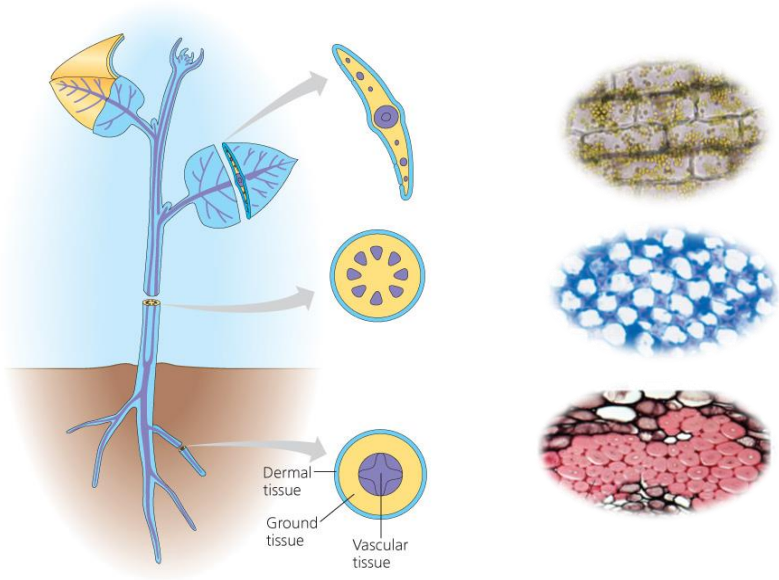
- Course is based on Units 6 & 7 from Campbell Biology textbook.
  - Unit 6: Plant Form and Function – 5 Chapters
  - Unit 7: Animal Form and Function – 11 Chapters

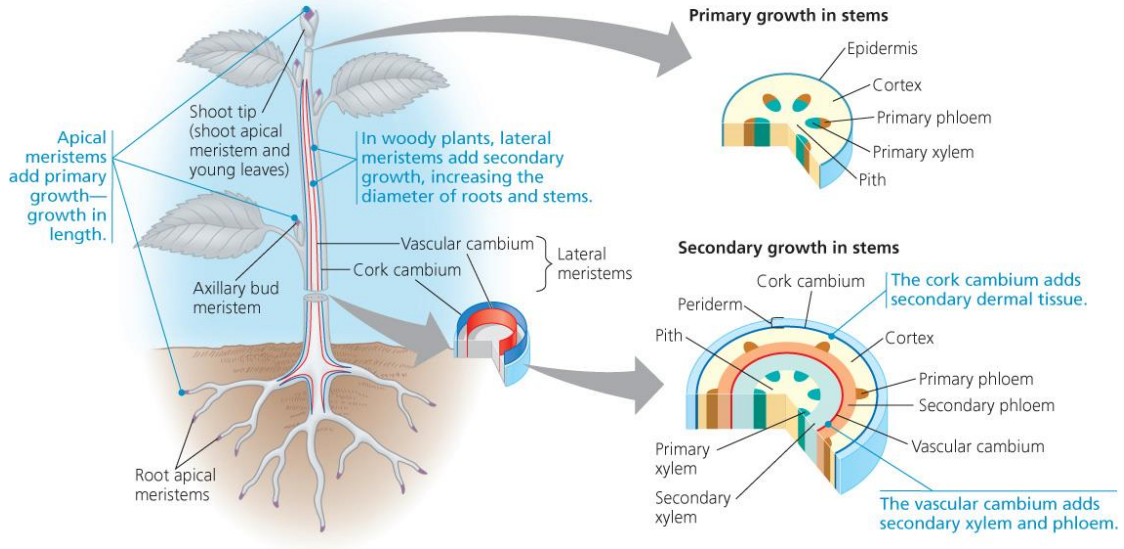
About this course

- Friday, September 8: Review of plant kingdom

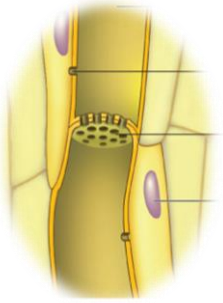


▲ **Figure 29.7** **Highlights of plant evolution.** The phylogeny shown here illustrates a leading hypothesis about the relationships between plant groups. The dotted lines indicate groups whose evolutionary relationships continue to be debated.

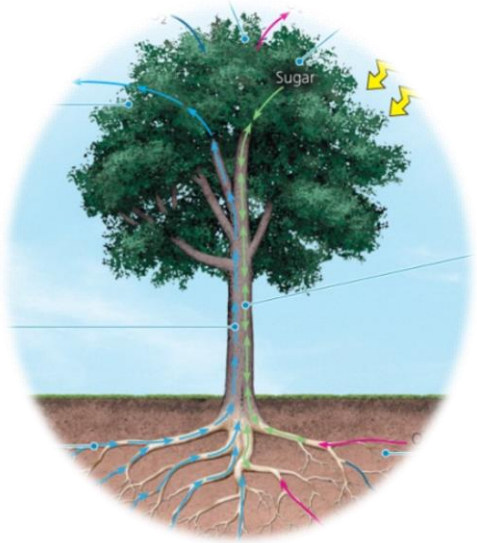


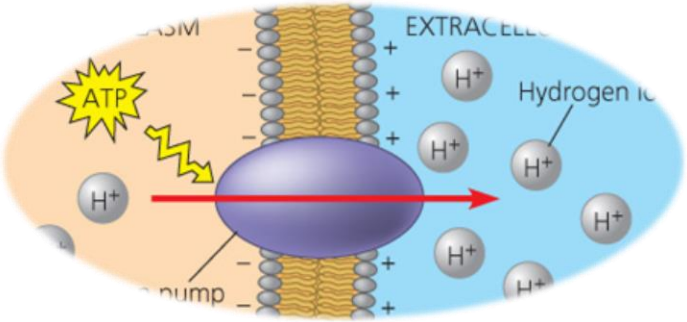


▲ **Figure 35.11** **An overview of primary and secondary growth.**

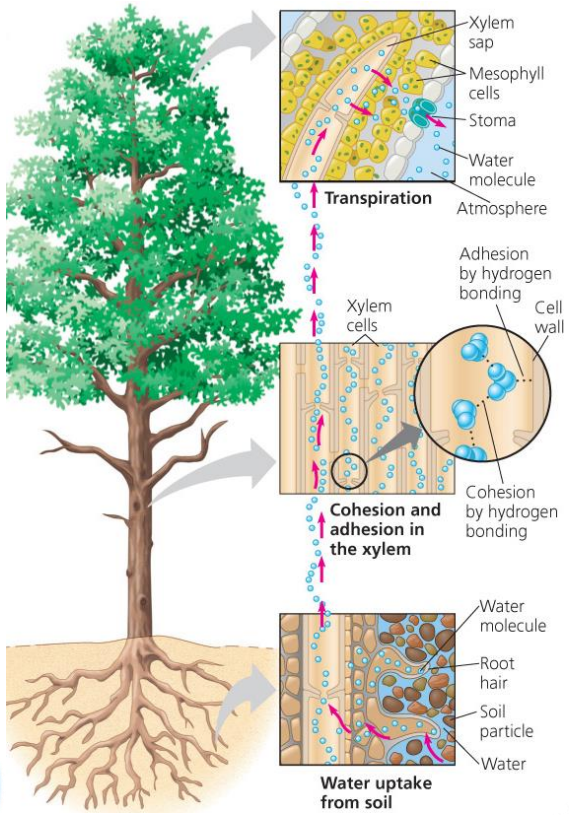


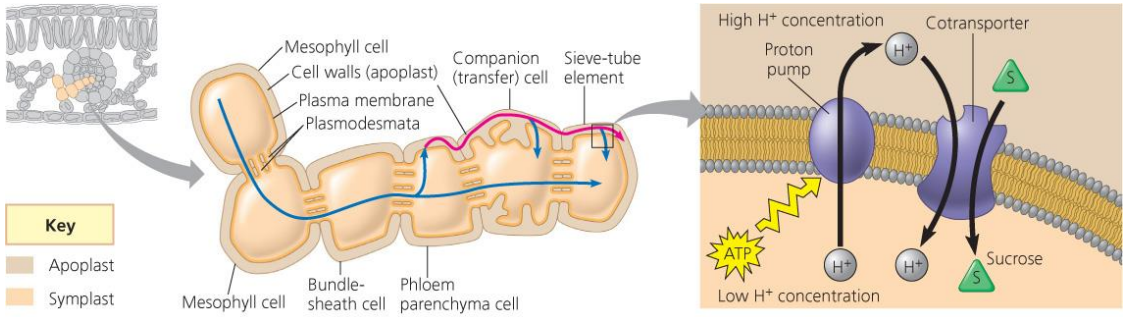
- Simplicity = resilience
- Asexual reproduction
- Above vs. below ground parts
- How plant development is affected by the environment

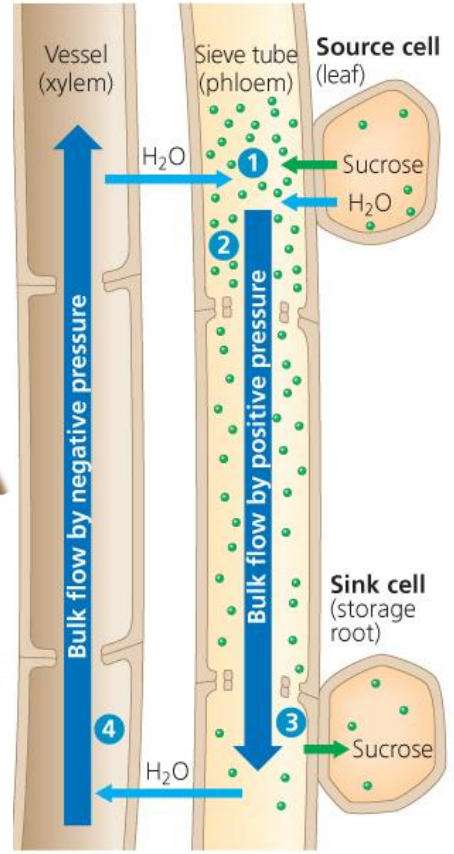


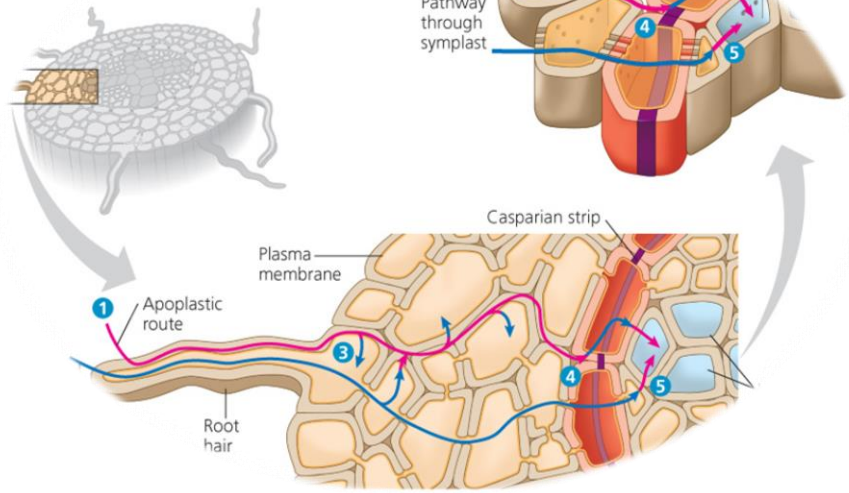


- Solar powered
- Move water against gravity

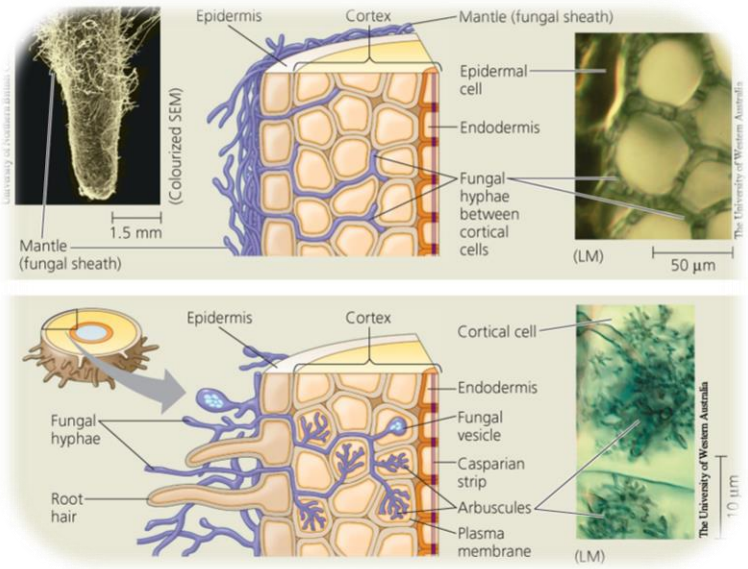


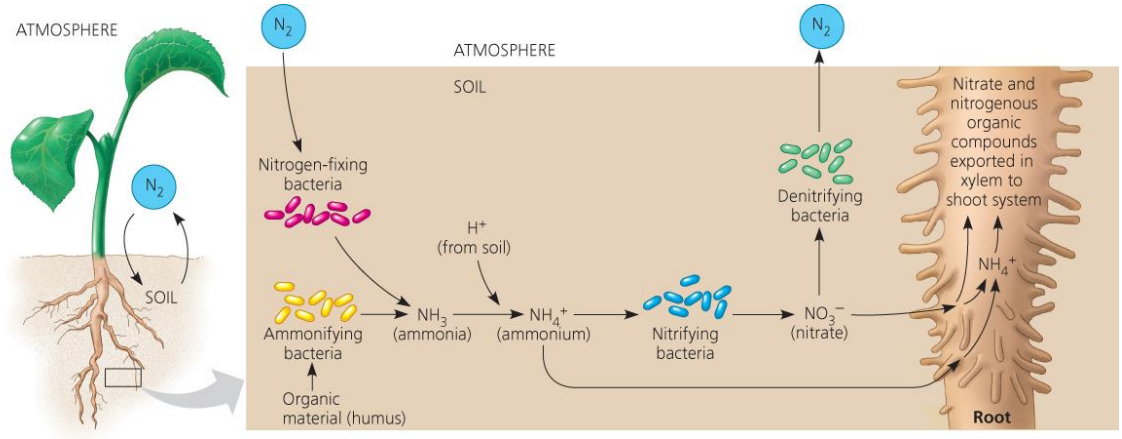


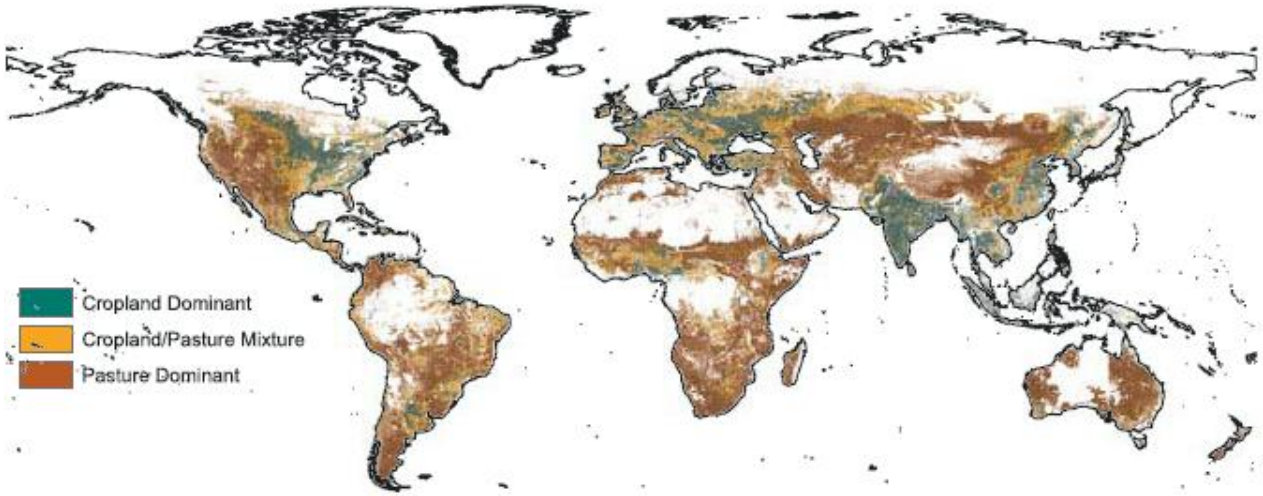




- Short distance vs. long distance transport of nutrients

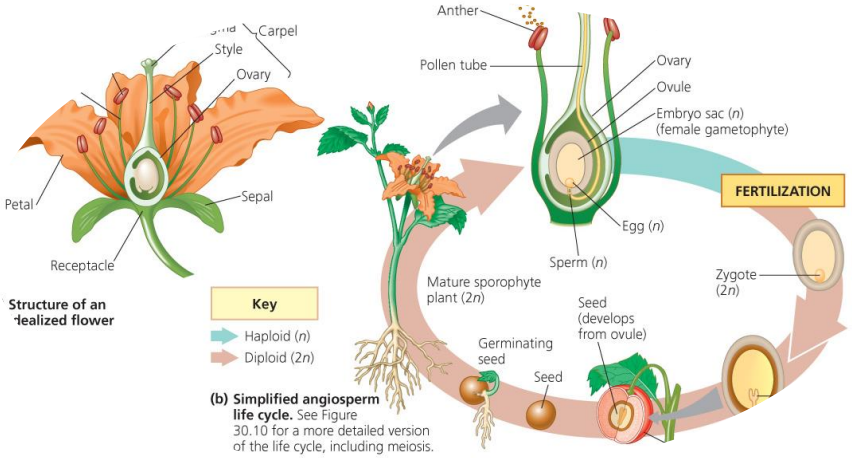




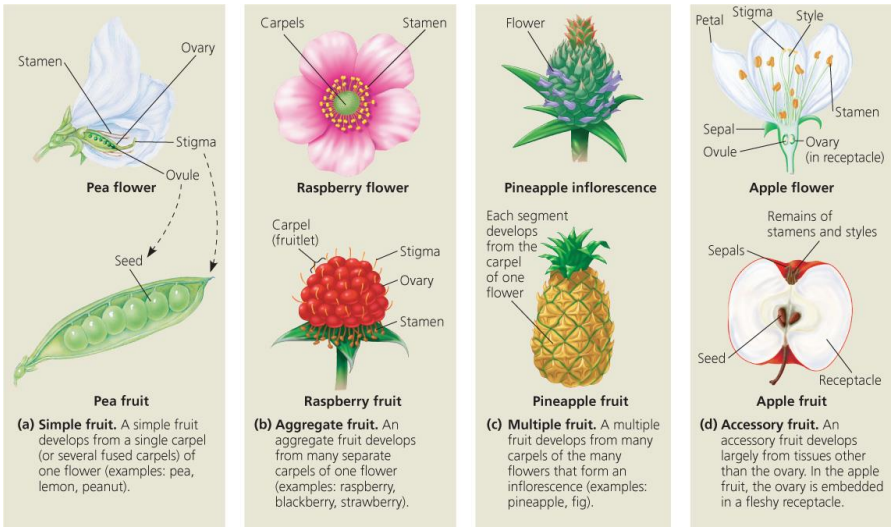


- Mutualistic associations with microbes
- Agriculture

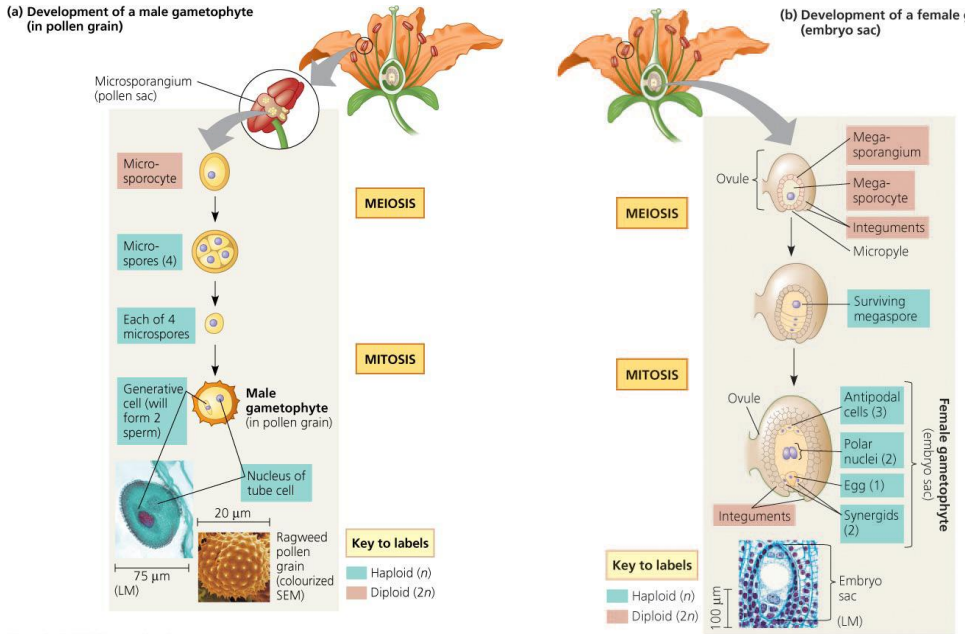
27 September Angiosperm reproduction and biotechnology CH.38

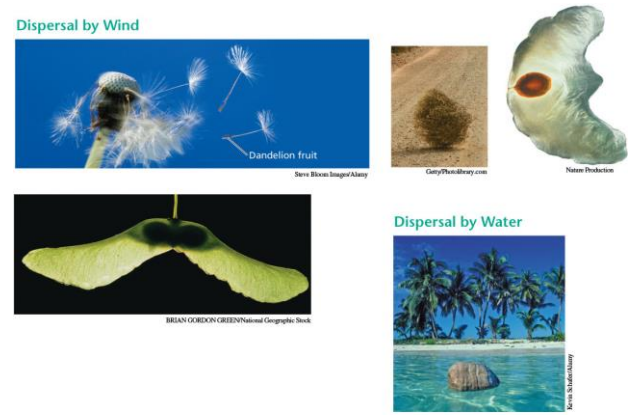


- Angiosperm life cycle

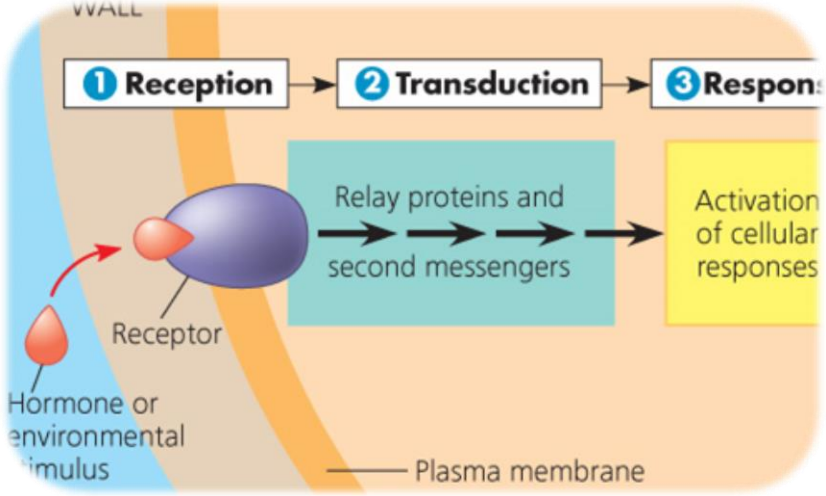


- Mutualistic association of plants with pollinators and seed dispersers





29 September & 4 October Plant responses to internal and external signals CH.39



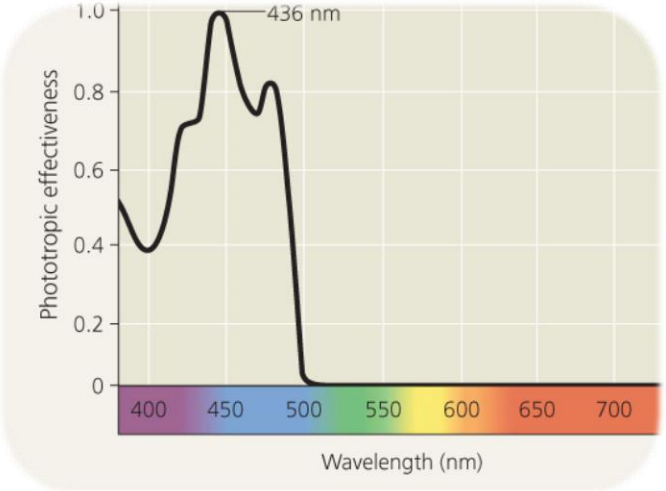


Table 39.1 Overview of Plant Hormones

Hormone	Where Produced or Found in Plant	Major Functions
Auxin (IAA)	Shoot apical meristems and young leaves are the primary sites of auxin synthesis. Root apical meristems also produce auxin, although the root depends on the shoot for much of its auxin. Developing seeds and fruits contain high levels of auxin, but it is unclear whether it is newly synthesized or transported from maternal tissues.	Stimulates stem elongation (low concentration only); promotes the formation of lateral and adventitious roots; regulates development of fruit; enhances apical dominance; functions in phototropism and gravitropism; promotes vascular differentiation; retards leaf abscission.
Cytokinins	These are synthesized primarily in roots and transported to other organs, although there are many minor sites of production as well.	Regulate cell division in shoots and roots; modify apical dominance and promote lateral bud growth; promote movement of nutrients into sink tissues; stimulate seed germination; delay leaf senescence.
Gibberellins	Meristems of apical buds and roots, young leaves, and developing seeds are the primary sites of production.	Stimulate stem elongation, pollen development, pollen tube growth, fruit growth, and seed development and germination; regulate sex determination and the transition from juvenile to adult phases.
Brassinosteroids	These compounds are present in all plant tissues, although different intermediates predominate in different organs. Internally produced brassinosteroids act near the site of synthesis.	Promote cell expansion and cell division in shoots; promote root growth at low concentrations; inhibit root growth at high concentrations; promote xylem differentiation and inhibit phloem differentiation; promote seed germination and pollen tube elongation.
Abscisic acid (ABA)	Almost all plant cells have the ability to synthesize abscisic acid, and its presence has been detected in every major organ and living tissue; may be transported in the phloem or xylem.	Inhibits growth; promotes stomatal closure during drought stress; promotes seed dormancy and inhibits early germination; promotes leaf senescence; promotes desiccation tolerance.
Strigolactones	These carotenoid-derived hormones and extracellular signals are produced in roots in response to low phosphate conditions or high auxin flow from the shoot.	Promote seed germination, control of apical dominance, and the attraction of mycorrhizal fungi to the root.
Ethylene	This gaseous hormone can be produced by most parts of the plant. It is produced in high concentrations during senescence, leaf abscission, and the ripening of some types of fruits. Synthesis is also stimulated by wounding and stress.	Promotes ripening of many types of fruit, leaf abscission, and the triple response in seedlings (inhibition of stem elongation, promotion of lateral expansion, and horizontal growth); enhances the rate of senescence; promotes root and root hair formation; promotes flowering in the pineapple family.

OCTOBER 6TH

- *** **Plant midterm 20%** ***
- **Types of questions on midterms and exam**: Multiple choice; fill in the blanks; match words and statements; true or false statements; labelling diagrams; short definitions; short answers.
- In the event of a missed midterm **with a valid medical reason, the final exam will count for 80%**. Special arrangements to write the missed midterm on an alternate date cannot be accommodated.

Table 40.1 Organ Systems in Mammals

Organ System	Main Components	Main Functions
Digestive	Mouth, pharynx, esophagus, stomach, intestines, liver, pancreas, anus	Food processing (ingestion, digestion, absorption, elimination)
Circulatory	Heart, blood vessels, blood	Internal distribution of materials
Respiratory	Lungs, trachea, other breathing tubes	Gas exchange (uptake of oxygen; disposal of carbon dioxide)
Immune and lymphatic	Bone marrow, lymph nodes, thymus, spleen, lymph vessels, white blood cells	Body defence (fighting infections and cancer)
Excretory	Kidneys, ureters, urinary bladder, urethra	Disposal of metabolic wastes; regulation of osmotic balance of blood
Endocrine	Pituitary, thyroid, pancreas, adrenal, and other hormone-secreting glands	Coordination of body activities (such as digestion and metabolism)
Reproductive	Ovaries or testes and associated organs	Reproduction
Nervous	Brain, spinal cord, nerves, sensory organs	Coordination of body activities; detection of stimuli and formulation of responses to them
Integumentary	Skin and its derivatives (such as hair, claws, skin glands)	Protection against mechanical injury, infection, dehydration; thermoregulation
Skeletal	Skeleton (bones, tendons, ligaments, cartilage)	Body support, protection of internal organs, movement
Muscular	Skeletal muscles	Locomotion and other movement

ASSESSMENTS

- Midterm 1 (October 6TH) 20%
- Midterm 2 (November 17TH) 20%
- Final Exam 60%

- **Final exam date:** It is your responsibility to be available for the entire examination period! The range of Final Exam Dates is available online a year in advance. Special arrangements for examinations that may conflict with travel or employment plans cannot be made.
- You must understand that it is your responsibility to be available during the entire exam period.
- For more information please go to: https://www.concordia.ca/students/exams.html