

Course focus

BIOO 460 Plant Metabolism - Andreas Fischer



In terms of metabolism, plants and some other groups of eukaryotes are much more 'capable' than animals. As plants are sessile, they need strategies to survive in their given environment; they do this both through metabolic and through developmental flexibility. The focus of this class is on those metabolic 'pathways' that allow plants to thrive, literally, on water, air, a few nutrients from the soil solution, and energy from sunlight.

A large emphasis is placed on the biophysics and biochemistry of the conversion of light energy to chemical energy, and use of that energy to acquire and reduce carbon (from CO₂), nitrogen (from nitrate and ammonium) and sulfur (mostly from sulfate) – the basic reactions through which carbohydrates, amino acids and nucleic acid building blocks (nucleotides) are 'made'. This means that, while the 20 amino acids and five nucleotides needed for protein and DNA/RNA synthesis are mentioned in most introductory biology classes, BIOO 460 will teach you the metabolic principles leading to their synthesis. Additional material covered includes an integrated overview of central carbohydrate metabolism (sucrose, starch and their interconversion), an introduction to plant lipid metabolism, and an overview of the major groups of plant 'secondary metabolites' (terpenoids, alkaloids and phenolic compounds), which are important for plant interaction with other organisms.

This is mostly a lecture-style class (with lecture notes and other important materials available through D2L), but every student will present one original research article, covering a recent development in our understanding of plant metabolism, to the class. Students taking this class need a basic understanding of plant biology and a good understanding of biochemical principles; BIOO 220 ('General Botany') and BCH 380 ('Biochemistry') are therefore prerequisites. This 3-credit class is taught every other spring semester (spring 2013, spring 2015), alternating with BIOO 437 ('Plant Development'; spring 2014, spring 2016).