

Department of Molecular and Cellular Biology  
**Graduate Seminar MCB\*6500**



Friday, March 17, 2017 in SSC 1511 @ 12:45 p.m.

*presented by:*

## **Kathleen Delfosse**

### **A Dissection of the Early Events Leading to the Formation of Plastid Extensions**

All plastids extend and retract thin tubules known as stromules. However, the reason and mechanism for stromule formation remains unknown. An assessment of the diverse conditions known to induce the formation of stromules suggests that sugar may be a possible commonality between them. Sugar acts in many ways in plant cells. It first drives glycolysis to create energy but when in excess it also feeds into the starch and lipid synthesis pathways. Therefore it is possible that storage molecules such as starch and lipids play a role in plastid pleomorphy. Whereas starch buildup inside the plastid might increase internal pressure leading to protrusions, the accumulation of lipids in the plastid envelope could allow for it to become more pliable. My proposal is built on the hypothesis that alterations in subcellular sugar levels lead to plastid pleomorphy through their effect on starch and lipid contents. Sugar levels of wild type and mutant *Arabidopsis thaliana* will be quantified under different conditions. Transgenic lines expressing plastid targeted fluorescent proteins will be used to determine the stromule frequency using confocal laser scanning fluorescence microscopy, and drawing possible correlations between subcellular sugar levels and stromules. A possible role for starch in stromule formation will be investigated using mutants such as *pgm1*, *adg1*, *be2be3* and *sex1*. Additionally, lipid profiles of plants displaying a high stromule frequency will be determined using mass spectrometry in order to seek possible connections between plastid lipids and plastid pleomorphy. This research will lead to important insights on plastid pleomorphy.