Department of Molecular and Cellular Biology

Graduate Seminar MCB*6500

Friday, April 7, 2017 in SSC 1511 @ 12:45 p.m.

presented by:

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Plant Polyprenols - Secondary Metabolites or Physiologically Important Superlipids?

Polyprenols are a class of hydrophobic polymers that are found in all kingdoms of life. In bacteria and animals, polyprenols have been well-characterized, yet little is known about what functional role these compounds serve in plants. In fact, these compounds have typically been dismissed as 'dispensable' or 'secondary' metabolites. However, their widespread occurrence throughout the plant kingdom suggests otherwise. *In vitro* studies with model membranes predict that polyprenols insert into lipid bilayers and adopt a chair-like conformation, which has a 'fluidizing' effect. Yet how these compounds behave in an *in vivo* environment is completely unknown. This is particularly relevant when considering that the majority of plant polyprenols are believed to accumulate in chloroplast membranes, which house the photosynthetic machinery of the plant and whose lipid composition and membrane microenvironment differ significantly from classic model membrane systems. The goal of this proposed research is to explore what effect altered polyprenol levels have on chloroplast membrane dynamics. *Arabidopsis thaliana* genetic lines exhibiting altered expression levels of a *cis*-prenyltransferase (AtCPT7) responsible for polyprenol synthesis will be examined. These lines will be deficient in polyprenols, or exhibiting hyperaccumulation of these compounds through RNAi-mediated knockdown or overexpression of AtCPT7, respectively. The effects on chloroplast membrane dynamics will be explored using two approaches: Fluorescence anisotropy with the lipophilic fluorophore, 1-6-diphenyl-1,3,5-hexatriene to monitor membrane fluidity, and differential scanning calorimetry to examine membrane phase transitions. These approaches will determine if polyprenols serve a functional role, or if these compounds are truly just 'secondary metabolites'.