

## **Plan II Master's Defense**

**Date: Wednesday, July 23, 2014**

**Time: 2:00 p.m.**

**Location: SEC 2436**

**“Using *Drosophila melanogaster* as a model to study the biological effects of exposure to polyacrylic acid coated iron oxide nanoparticles”**

**Benjamin W. Henderson  
O'Donnell Lab  
University of Alabama**

**Abstract** -Biomedical applications of nanoparticle technology, such as targeted drug delivery and medical imaging, are rapidly expanding. Generally, the safety of nanoparticles is assessed by toxicity analysis of cultured cells. Such models, however, do not fully reflect potential interactions in living organisms. Therefore, detailed toxicological assessment of nanoparticles in whole organisms is needed for comprehensive evaluation of potential deleterious effects. We are utilizing *Drosophila melanogaster* to develop appropriate assays for immediate and long-term consequences of nanoparticle exposure. In the current study, we evaluated the effects of transient and low-dose treatment of negatively-charged, polyacrylic acid-coated iron oxide nanoparticles. *Drosophila* larvae were fed a range of concentrations for 24 hours and assessed for lethality, pupation success, and eclosion rate (the rate at which flies successfully made it to adulthood). Surviving adults were then assayed for reproductive defects. Additionally, hemocyte levels of treated larvae were quantified to determine whether or not nanoparticle exposure triggered activation of the innate immune response. We find that a specific range of low-concentration treatment to nanoparticles results in reproductive deficits as well as the induction of an immune response at higher concentrations. We anticipate that this complex, whole-organism model will provide researchers the capability of assessing the adverse effects of nanoparticle exposure.