BIOLOGY III

Section Moderator: Dr. John Niedzwiecki
Room: Beaman Hitch Science Building 207
Time: 8:00 – 9:00 PM

8:00 – 8:15
"Resolving Conflicts in Ambystomatid Salamander Phylogeny with Nuclear DNA"

Audrey S. Henson
Faculty advisor: John Niedzwiecki

Questions in evolutionary biology can be addressed and answered through phylogeny. Traditionally, phylogeny was determined through examination of morphological characteristics. However in some groups the morphological method is difficult to apply. This has been an issue facing the determination of Ambystomatid salamander phylogeny because of their reduced morphology. More recently, a molecular method using allozymes was applied to phylogenics. While these multiple techniques often produce similar results, there are major conflicts. In this research, the amplification, sequencing and cladistic analysis of nuclear DNA was an attempt to resolve the current conflict facing Ambystomatid phylogeny. While difficulty with PCR prohibited the sequencing and analysis of nDNA, a technique was established and functioning primers were determined for a number of Ambystomatid species. The successful PCR products were purified and are ready for complete analysis in the future.

8:15 – 8:30
"The Effects of 6-Hydroxydopamine, Sulpiride and SCH-23390 on locomotion in *Caenorhabditis Elegans*"

Robert Gibson
Faculty Advisor: Dr. Nick Ragsdale

Parkinson's disease is a highly debilitating disorder that greatly decreases the quality of life of those effected. As such, a potential cure is currently under much investigation. 6-hydroxydopamine (6-OHDA) is a well-known Parkinson-inducing neurotoxin. It competes with dopamine for reuptake into dopaminergic neurons via dopamine receptors. Once inside, enzymatic cleavage of 6-OHDA releases reactive oxygen species that damage and eventually destroy the neuron. This causes an overall decrease in the dopamine available to the afflicted organism, resulting in Parkinson's Disease. From previous research, this is believed to be caused by preferential binding of the D1-family dopamine receptors, which are excitatory. In this experiment, C. elegans were treated with a known antagonist (sulpiride) of the D2-family dopamine receptors, which are presumed inhibitory. In addition, 6-OHDA C. elegans underwent treatment with SCH23390. The first group (sulpiride treatment) showed a net increase in worm velocity comparable to that observed in 6-OHDA treated worms. The second treatment group (6-OHDA +

SCH23390) showed a return to normal movement velocity, i.e. SCH23390 protected against the detrimental effects of 6-OHDA. This evidence supports the current theoretical mechanism behind dopamine involvement in C. elegans locomotion.

8:30 – 8:45

"The Effect of Larval Size on the Antipredator Behavioral Response of the Streamside Salamander, *Ambystoma barbouri*"

Virginia K. Beazley
Faculty advisor: John Niedzwiecki

The willingness of an organism to tolerate a predation risk should be related to the potential rewards of that risk or the potential harm of inaction. It is hypothesized that a tradeoff may occur over the course of larval development of the streamside salamander, *Ambystoma barbouri*. Using *A. barbouri* and a fish species known as Green Sunfish, a predator/prey model was set up. It is known that *A. barbouri* have become quite sensitive to Green Sunfish chemical and this detection often elicits a definitive response from the larvae. Salamander larvae where measured and randomly assigned to Green Sunfish or control water treatments and behavior was monitored. Regression analysis was used to examine the results. Although strong evidence was found to support the notion that the salamanders could detect fish chemicals and would react accordingly, there was no correlation found between size and their anti-predator behavior. However, it is possible that this correlation would be evident between very young larvae and larvae nearing metamorphosis.

8:45 – 9:00

"Community Associated Methicillin-Resistant Staphylococcus Aureus: A Study of Virulence Factors"

Cyrus D. Eaton
Faculty Advisor: Dr. Nick Ragsdale

Staphylococcus aureus is found as both nosocomial (HA-MRSA) and Community Acquired (CA-MRSA) methicillin resistant strains. Methicilin-resistance is determined by the mec-type gene. While both CA-MRSA and HA-MRSA have these mec-type genes, CA-MRSA also carries a Panton Valentine Luekocidine gene, allows it to secrete a PVL toxin. *Caenorhabditis elegans* have also been found to show susceptibility to the bacteria *Staphylococcus aureus* as well as other gram positive and negative bacterium. Thus, these round worms serve as a model system to investigate virulence. The current study will investigate the efficacy of infections with and without different mec and PVL types. Specifically, a comparison between on mec type I and mec type III, as well as PVL positive and PVL negative, will be completed.