3rd ANNUAL PURE SYMPOSIUM
(Program for Undergraduate Research)
April 15th, 2008 - LSF 102

Isolation of Lectin cDNA from Green Bean Pods. (3:45 - 4:00 pm)

Shaquanna Brockington
Faculty Mentor: Vernon Bauer

We wanted to isolate a lectin gene from the green bean. Our first step was to isolate RNA from the pod tissue of the green bean. We used an RT-PCR approach using primers that are specific for the jackbean lectin, concanavalin A, to try to amplify the homologous gene from the green bean. Once we had an amplification product, we cloned it into a plasmid vector called pCR 2.1-TOPO. This recombinant molecule was transformed into *E. coli*. We then isolated the plasmid from a bacterial culture and sent it off to have the green bean DNA sequenced.

An Investigation of Cadmium Effects on Mitochondria Isolated from Mouse Brain (4:00 - 4:15 pm)

Alyssa K. Polson
Faculty Mentors: Kirk Dineley and Latha Malaiyandi

Cadmium (Cd^{2+}) is a relatively abundant environmental contaminant. Accumulation of Cd^{2+} in nervous tissue causes neuropathy and while its cytotoxic effects are well-documented, it is unclear exactly how Cd^{2+} kills cells. One potential mechanism involves inhibition of cellular energy production. In this study, we used fluorescence microscopy to monitor the effects of Cd^{2+} on mitochondrial transmembrane potential in individual mitochondria isolated from mouse brain. Mitochondria were adhered to microscopy glass and loaded with rhodamine 123, a fluorescence indicator that collects in energized and respiring mitochondria with a robust transmembrane potential. We found that Cd^{2+} at relatively low concentrations quickly and irreversibly dissipated transmembrane potential. Cd^{2+} mitotoxicity was relatively potent and efficacious when compared to two other well-characterized mitotoxic metals, Ca^{2+} and Zn^{2+}. These results demonstrate that Cd^{2+} can substantially inhibit mitochondrial function, and provide important insight regarding the mechanism of Cd^{2+}-mediated neurotoxicity.

The Green Roof Project (4:15 - 4:30 pm)

Yeolonda Snipes, Shane Parker, Robert Branton, and Jessica Burroughs
Faculty Mentor: Lisa Pike

Green roofs help maintain constant building temperatures, decreasing energy costs. The plants in the green roof reduce global warming by absorbing carbon dioxide, and the soils absorb stormwater. The objectives of this project are to determine if green roofs lower temperatures on the surface of the roof and to determine what impacts green roofs have in lowering storm water runoff. Twenty-two green roof grids (two feet by two feet each) were placed on the roof of Leatherman Science Building. Nine temperature probes were placed under the green roof in varying positions to determine if being on the outside or inside areas of the green roof made any difference in the temperature reading. A rainfall monitor was placed on the green roof to collect the rainfall and some of the green roof grids were designed so that rainwater ran into a reservoir and was collected and measured. The preliminary data showed that the green roof temperatures were consistently lower than the highs of the control grids and higher than the lows of the control grids. The temperature readings on the edge of the green roof and in the middle of the green roof do not show differences. Rainfall data is still being processed, but it is clear that the green roof grids do absorb and retain some of the rainwater as well as slow the amount of rainwater exiting the roof after a rainfall event. This pilot study is ongoing.

Fluorescence Detection of MAO Activity in Mitochondria Isolated from Mouse Brain and Liver
(4:30 - 4:45 pm)

Philip J. Vernon
Faculty Mentors: Latha Malaiyandi and Kirk Dineley

Monoamine oxidase (MAO) enzymes degrade dopamine, serotonin, norepinephrine and other monoamine neurotransmitters, and are important targets in the management of depression and psychiatric disorders. The two major isoforms, MAO-A and MAO-B, are both associated with the outer mitochondrial membrane, but their distribution varies depending on tissue. Specifically, MAO-A is abundant in liver, MAO-B is found in blood platelets, while both are found in brain. In this study, we developed a plate reader-based, fluorescence assay to detect MAO activity in mitochondria isolated from mouse brain and liver. We used the indicator amplex red to monitor H_2O_2 production resulting from the oxidation of substrates, benzylamine and tyramine, and we tested MAO activity in the presence of various inhibitors. We have used these results to produce an efficient and simple means of assaying MAO activity in a high-throughput fashion.

Ecology of Diamondback Terrapins (4:45 - 5:00 pm)

Paige Weaver
Faculty Mentor: Peter King

Diamondback terrapins (*Malaclemys terrapin*) are found in estuaries and river mouths along the east coast from Maine and Florida and extend into the Gulf of Mexico along the coast to Texas. A population/diet study was done from May - July in 2006 and 2007 at the North Inlet - Winyah Bay National Estuarine Research Reserve near Georgetown, SC. Data on weight, carapace and plastron lengths were recorded on each terrapin caught, marked and released. Feces from 5 terrapins were collected and examined for food items. Various areas of the estuary were patrolled to determine aspects of terrapins behavior and habitat use.

The Department of Biology at FMU strongly encourages student participation in research activities. We offer many opportunities for undergraduates to assist in faculty research or develop their own independent research projects. Students can earn academic credit through Special Studies (BIO 497) and Honors Independent Study.

If you are interested in learning more about P.U.R.E. or available research opportunities, please visit our website at: *http://www.fmarion.edu/academic/Biology* and click on 'Research' link. You can also contact Dr. Barbeau (tbarbeau@fmarion.edu) or Dr. Pryor (gpryor@fmarion.edu), the coordinators of P.U.R.E. We can answer any questions you might have and get you started on a research project!