Welcome to the 13th Annual P.U.R.E. Symposium! *"Fall Session"*

Thursday Nov 30th, 2017, LSF 102 , Snacks 3:45, Talks begin at 4pm
This Semester's Presentations and Speakers:

4:00 – 4:15pm:

"Paradigm optimization for examining helping behavior in rats."

Student: Brayton Hart; Faculty Mentor: Dr. Shayna Wrighten.

Numerous experiments have been conducted on rats in order to observe if they help one another in stressful situations. Our lab has conducted experiments in order to design the best paradigm to be used to study helping behavior in rats. In our paradigms one rat was placed in a closed restrainer with a door that could be opened only from the outside and another rat in the arena that contained the restrainer. In our experiments, both the percentage of restrainer door openings and the latency to open the restrainer door were measured. We compared these results for a small restrainer containing water and a larger restrainer that did not contain water. Halfway through the experiment, the roles of the rats were reversed, the first restrained rat became the free rat and the first free rat became the restrained rat. We found that the individual door openings between the groups (small restrainer vs. large restrainer) and the latency to open the door were significantly different, with rats in the small restrainer condition opening the door more and faster than those in the large restrainer group. There was also a signifcant difference in door opening percetages between the rats initially given the opportunity to open the door and those given the second opportunity to open the door after the roles were switched, with the second helper rats opening the door more. These data show that in certain situations rats will help one another. Optimization of this paradigm opens the door for studying the mechanisms behind helping behavior in order to gain a better understanding of the neural underpinnings of helping.

4:15 – 4:30pm:

"Probiotics and the human microbiome: an analysis of the microbial composition of kefir."

Students: Jack Evans, Connor Graham, Coen Hasenkamp∗, Gasinee Phuprasertsak∗, Paulette Sarrazin (∗speakers); Faculty Mentor: Dr. Jennifer Lyles

The collection of microorganisms in the gastrointestinal tract, known as the gut microbiota, plays a critical role in overall health and wellbeing. Maintaining the appropriate balance of beneficial microbes in the gut has been shown to prevent and even treat certain disorders. One way to restore balance is by seeding the gut with probiotics, or beneficial microorganisms. Probiotics are commonly found in fermented foods and beverages, such as kefir—a fermented milk product. Prophylactic consumption of fermented products, like kefir, may contribute to increased health and disease prevention. However, the content of various types and brands of kefir may vary significantly. Therefore, specific species of yeast and bacteria were identified and quantified from various sources of kefir, including homemade kefir and various brands of commercial kefir. Isolates from homemade kefir sources were predominantly yeast (80%), while isolates from commercial kefir sources were predominantly bacteria (92%). However, both homemade and commercial sources of kefir possessed comparable species diversity regarding probiotic content – six unique species from homemade kefir and eight unique species from commercial kefir. Preliminary data suggest that the microbial composition of various sources and brands of kefir varies significantly. Further investigation is required to clearly demonstrate the relationship between the probiotic content of kefir and overall health benefits and disease prevention.

4:30 – 4:45pm:

"Preparation of plasmids to evaluate acid ceramidase over-expression on H295R adrenal carcinoma cells."

Student: Sierra Lind; Faculty Mentor: Dr. Lori Turner

Ceramide is a lipid signaling molecule that is converted by the enzyme acid ceramidase (AC). When under stress, the ceramide acts as an apoptosis (cell death) agent that "programs" cells to die. In cancer treatment, increased ceramide following radiation and some chemotherapy plays a role in cell death because of this apoptotic ability. However, in prostate cancer cells, the AC gets over-expressed and this leads to a dysfunctional ceramide pathway where ceramide is converted to sphingosine, and later sphingosine-1-phosphate, which is a potent lipid signaling molecule that causes the cancer cells to proliferate. Preliminary research has shown that AC is upregulated in adrenal carcinoma cells following stress. The goal of this research is to create two plasmids (pVITRO-AC-GFP and pVITRO-GFP) in order to test the effects of AC over-expression in H295R adrenal carcinoma cells.

4:45 – 5:00pm:

"Use of histo-pathology techniques to examine a tumor biopsy for cancer in a blood python."

Student: Tyler Wright; Faculty Mentor: Dr. Tamatha Barbeau

In a medical setting, when a physician or veterinarian examines a tumor (neoplastic growth), either a biopsy of the tumor or the entire tumor is removed and sent out to an independent laboratory for pathological analysis in order to determine if the tumor is harmless (benign) or cancerous (malignant). In this study, a tumor was removed from the mouth of a Blood Python (*Python brongersmai*) by a veterinarian, preserved in formalin, and was transported to Francis Marion University to perform a pathological analysis. The tumor was prepared for microscopy using standard histological techniques, and resulting slides were stained with hematoxylin and eosin to examine tissue morphology. Upon microscopic examination, we found that the tumor consisted of mucosal epithelial cells that exhibited anaplasia and pleomorphy, and contained numerous hyperchromatic nuclei. Furthermore, the center of the tumor seemed to consist of necrotic tissue lacking clear differentiation. Taken together, the cell morphology of the tumor indicates a malignant neoplasm of a moderate to severe dysplasia category.

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 (BIOL 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://people.fmarion.edu/tbarbeau/PURE_symposium.htm*. You can also contact Dr. Barbeau (tbarbeau@fmarion.edu), the coordinator of P.U.R.E., to answer any questions you might have and get you started on a research project!