



URSA

Undergraduate, Research,
Scholarship and Arts.
Benedictine University

2014 Poster Session

March 26, 2014 ❖ 12:00-5:30 pm ❖ Krasa BC

Saherish Abbasi, Huihui Li

“The Preference and Performance of the species *Manduca sexta* on Tomato Plants Treated with Varying Amounts of Nitrogen and Phosphate”

Different ways of agricultural control, other than pesticides, are being researched in order to protect crops from pests. The following study examined the preference and performance of *Manduca sexta* (the tobacco hornworm) on different treatments of fertilized tomato plants. The preference test was run on different life stages of the moths, including two different instars of the caterpillars and adult female moths; similarly, performance experiments tested how fifth instar caterpillars were influenced by different treatments of leaves.

Faculty sponsor: Cheryl Heinz

Enela Aliaj

“Detection of Cisplatin-Modified DNA by Sequence Enabled Reassembly of β -Lactamase (SEER-Lac)”

In the past, most of the common ways to detect and sequence DNA have utilized the amplification of its single-stranded form. Though this method is extremely valuable, it lacks the ability to detect covalent modifications of the DNA since this information is not retained through the amplification process. However, previous work has shown that it is possible to detect DNA when it is in its native, double-stranded form through a system called SEER (SEquence Enabled Reassembly of proteins). The system consists of two DNA binding domains that are each connected to half of a reporter protein, such as beta-lactamase. Therefore, in the presence of the specific DNA sequence target, the signal-generating reporter protein will come together and produce a detectable signal. As a result, this method allows for the detection any target sequence in DNA when it is in its native, double stranded form, thus constituting a sensitive, sequence-specific biosensor for DNA.

Faculty sponsor: Scott Meyer

Enela Aliaj, Eman Sahloul

“A *Caenorhabditis elegans* model to study the role of ABC transporters in intestinal function”

In mammalian intestines, excess luminal bile acids have been shown to affect colonic epithelial cell growth and function as a secretory agent, resulting in fluid loss and dehydration. A role for cystic fibrosis transmembrane conductance regulation (CFTR), an apical Cl⁻ channel belonging to the ABC-transporter superfamily, has been suggested in bile-acid induced diarrhea. We are currently using PGP-3, PGP-1, and MRP-1, ABC transporter superfamily members that share identity to CFTR and are endogenously expressed in the intestine of the eukaryotic model organism *Caenorhabditis elegans* to study the effects of bile acids on worm growth, intestinal morphology and volume. This excellent model system will help identify the connection between ABC transporters and the effects of bile acids on the intestinal physiology of an intact organism.

Faculty sponsors: Tanya Crum and Jayashree Sarathy

Carolyn Boyer, Leesandra Contreras, Kristina Frampton, Katherine Juszczak, Zoya Malik, Colleen Mathew, Anna Savio, Danielle Zeisig

“Behavior Modification Strategies at Work: How to Curb Your Texting Habit While Driving”

This project explored how to use behavior modification techniques to teach specific strategies to drivers to control their texting and cell phone usage while driving. Students created either a flyer or a poster to visually display the self-control plan they created. These self-control projects were designed with the intention of being shared with Benedictine students as well as local high schools to promote safer driving habits.

Faculty sponsor: Dianne Moran

Daniel Cygal, Marihan Hegazy

“Methods to demonstrate the effect of bile acids in GFP-CFTR trisected HEK cells”

High levels of bile acids in the human intestine have been shown to act as a secretory agent and affect epithelial cell function resulting in ion secretion, fluid loss and diarrhea. To examine the role of calcium and the apical Cl⁻ channel cystic fibrosis transmembrane conductance regulation (CFTR) in bile acid action, we used wild type (HEK-293) and eGFP-CFTR transfected (HEK-CFTR) human embryonic kidney cells. In cells loaded with a membrane-permeable calcium sensitive dye fluo 4, we observe an increase in intracellular calcium in response to conjugated and unconjugated bile acids (0.5mM) and the calcium ionophore A23187 (positive control). We also see a small increase in Cl⁻ secretion in cells treated with the adenylate cyclase activator forskolin as detected by monitoring changes in the Cl⁻ sensitive fluoroprobe MQAE and we are currently studying the effect of bile acid on Cl⁻ secretion through detection of MQAE fluorescence and iodide efflux. Thus, HEK and CFTR transfected HEK cells are a viable model to study the effects of bile acids on epithelial cells.

Faculty sponsors: Tanya Crum and Jayashree Sarathy

Kam Haifleigh

“Helping Out in the ELL Classroom at Meadow Glens Elementary School”

As a requirement for being an Arthur J Schmitt Future Leaders Scholar I had to go out and be a leader in the community by participating in a service project. My service project was helping out an English Language Learner (ELL) teacher at Meadow Glens Elementary School who had a lot of children in her class this year. For the project, I helped create materials that she could use in her classroom to help her students better understand how to speak English.

Faculty sponsor: Eric Goodwin

Spencer Havis, Cameron Pombert

“Effect of bile acids on cell death in non-intestinal cells”

In humans, cholic acid (CA) and chenodeoxycholic acid (CDCA), are primary bile acids that aid in fat digestion, 95 % of which are recycled in the terminal ileum with the remaining 5% entering the colon to be converted to secondary bile acids (deoxycholic acid DCA and taurodeoxycholic acid TDC) by the colonic bacteria. In pathophysiological states, such as Crohn’s disease, higher concentrations of bile acids accumulate in the colon to result in fluid loss and diarrhea. We used a non-intestinal cell line (human embryonic kidney cells; HEK293) to study the deleterious effects of bile acids and found that high levels of conjugated and unconjugated bile acids did not cause a dramatic increase in cell death/lysis as examined through flow cytometry analysis of propidium iodide and Annexin V labeled cells; most of the dead cells were apoptotic.

Faculty sponsors: Tanya Crum and Jayashree Sarathy

Marihan Hegazy

“Modification of protein-ligand interaction via in vitro selection”

DRASPY is a known cyclic peptide ligand of NeutrAvidin, which is a common biotin binding protein that is used in a variety of biotechnological applications. Because DRASPY has a higher affinity to its target in the cyclic form compared to

its linear form, in vitro selection by phage display will be performed to enhance the affinity of the linear peptide for NeutrAvidin. After selection, the structure of the isolated linear DRASPY peptide will then be analyzed to investigate the structure-function relationship of NeutrAvidin/DRASPY binding.

Faculty sponsor: Scott Meyer

Fatima Javed, Amel Tobaa

“Models for studying localization of the ABC transporter CFTR using green fluorescence protein”

The ATP-binding cassette (ABC) transporters are a large superfamily of proteins sharing a common function and ATP-binding domain, and include the mammalian Cl⁻ channel protein, Cystic fibrosis transmembrane conductance regulator (CFTR) and its *Caenorhabditis elegans* homolog, P-glycoprotein (PGP-3). To characterize the localization of the ABC transporters in eukaryotic systems, we used human embryonic kidney cells transfected with eGFP-tagged CFTR (HEK-CFTR) and *C. elegans* expressing a *pgp-3::gfp* promoter fusion (P_{pgp-3}::gfp). We are currently examining the GFP-expression patterns using immunofluorescence (Leica DMR fluorescence microscope attached to a Retiga 1300 CCD camera with Q-Imaging and ImageJ software) and preliminary data shows punctate expression of eGFP-CFTR in HEK cells and intestinal expression of a *pgp-3::gfp* promoter fusion in worms. Characterization of ABC transporter expression in these models is essential for future studies to determine their role in bile acid action.

Faculty sponsors: Tanya Crum and Jayashree Sarathy

Noor Khan

“Patients with Obstructive Sleep Apnea Display Increased Carotid Intima Media: A Meta-Analysis”

Obstructive sleep apnea (OSA) is associated with coronary artery disease. Intermittent hypoxia associated with OSA increases sympathetic activity and may cause systemic inflammation, which may contribute to atherosclerosis leading to an increase in the size of carotid intima media thickness (CIMT).

Faculty sponsor: Jayashree Sarathy

Syeda Khan, Kulsum Musani

“The Scientific and Psychological Effects of Tanning”

This study is based on a literature search on the scientific and psychological effects of tanning. This paper explores the science behind tanning, its relation to the incidence of skin cancer in America, and the psychological reasoning and effect of tanning.

Faculty sponsor: Jayashree Sarathy

Margaret Kline

“The Effects of Truvia on Fly Lifespan and Development”

My study focuses on the effects of Truvia on the lifespan and development of *Drosophila melanogaster*. Overall, the 100% Truvia and the sucrose control diet have survival curves that closely matched each other, with a similar mirroring of the 25% and 50% diets, while the 75% diet died off around day 20. The other half of my study focuses on the effects of Truvia on development of larvae with no significant changes seen thus far.

Faculty sponsor: LeeAnn Smith

Megan Malone, James Moffitt

“Step Up for Alcohol Awareness”

A multi-step awareness effort aimed at educating the campus as a whole on the importance of peer to peer responsibility. The program directs special attention at prevention of drinking and driving. This is done through a pledge, lanyards, and StepUp Program classes.

Sponsor: Joan Henehan

Zylfi Memedovski

“Effects of taurine on the life spans of mated and non-mated *Drosophila*”

Previous work in the lab demonstrated that males on taurine have increased life spans compared to males without supplemented taurine while life spans of females on taurine are decreased compared to the controls. Since these results were with mated flies, we wanted to investigate how non-mated females and males were affected by taurine supplementation to determine if the cost of reproduction is associated with the effects of taurine.

Faculty sponsor: LeeAnn Smith

Mariam Murphy

“The Views of University Students in Incorporating iPad Technology Throughout Courses”

The purpose of this study is to determine the views university students have about incorporating iPad technology in their courses. Through a randomly selected sample population, participants identified their experiences with using iPad technology for reading, writing, and studying purposes. A positive correlation was seen between students within a Humanities major and the willingness to use the technology in their courses.

Faculty sponsor: Alandra Weller-Clarke

Katherine Partyka, Mir Zulqarnain

“The Role of the Vocal Tract in Human Vowel Production”

The shape of the human tongue and vocal tract allows us to produce “quantal” vowels that enhance speech perception. Previous research shows that one of our closest extinct relatives, the Neanderthals, would have possessed a tongue and vocal tract more similar to that of a chimpanzee than to a modern human and that they would not have been capable of producing quantal vowels like [i] (the vowel of “see”), [a] (the vowel of “sod”), and [u] (the vowel of “sue”). One of the outstanding questions from the above research is how the acoustic properties of estimated Neanderthal vowel-like sounds compare to modern human vowels. Last summer, we recorded acoustic data for 16 vowels produced by 50 subjects and analyzed the acoustic data using the programs Praat and Akustyk. Several vowel tokens fall outside the previously-recorded range of human variation, providing a useful dataset with which to compare reconstructed Neanderthal vocalizations. We are currently working to increase our sample size to 200 participants in order to more adequately sample the range of vowel variation in modern humans. In addition, we are looking at the relationship between tongue and vocal tract size and shape and vowel production in subjects that fall outside of the previously-recorded range of variation in vowel production.

Faculty sponsor: Robert McCarthy

Harjot Sangha

“Humanizing the Homeless”

Using servant leadership, I am doing a project that focuses on humanizing the homeless. A group of volunteers and myself will be traveling to Chicago to take out homeless people for coffee or a meal. Prior to the event we will have fundraising events that will be used to purchase the gift cards that will be used.

Faculty sponsor: Eric Goodwin