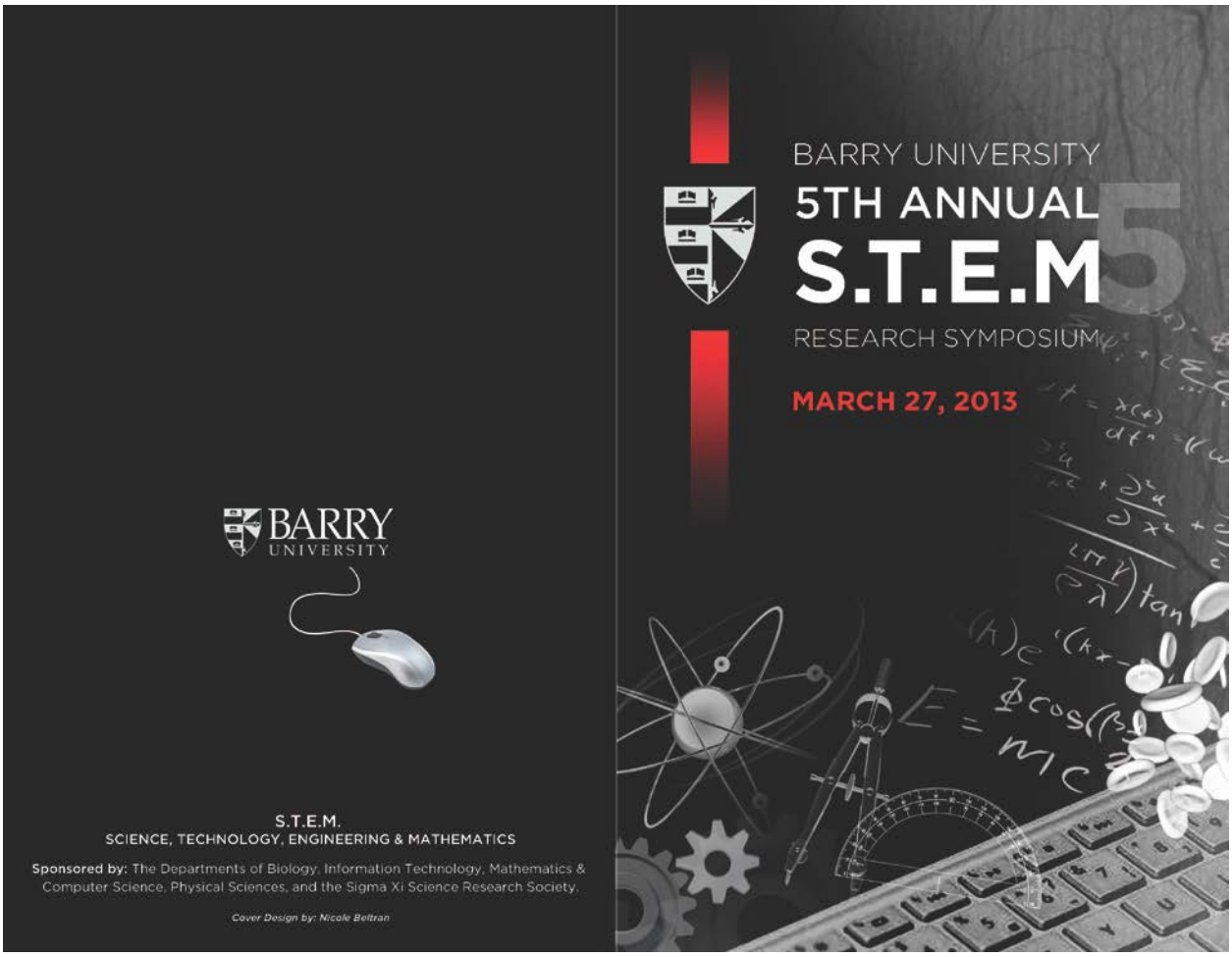
BARRY
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S.T.E.M.
SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS
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BARRY UNIVERSITY
5TH ANNUAL
S.T.E.M
RESEARCH SYMPOSIUM
MARCH 27, 2013

5th Annual S.T.E.M. Research Symposium

This research symposium aimed at engaging the Barry community in learning about and share in the excitement of ongoing discoveries and research within the S.T.E.M. disciplines (Science, Technology, Engineering, and Math). Undergraduate students will present posters related to their past and current research in biology, chemistry, computer science, information technology, mathematics, psychology, and physics.

DAY

Wednesday, March 27, 2013

TIME

9:00 AM - Noon

PLACE

Andreas 111 and 112

Barry University, Miami Shores, FL

Organized by Members of Barry University's STEM Committee:

Chakib Chraibi PhD, Khaled Deeb PhD, Christoph Hengartner PhD, Peter Lin PhD, and Zuzana Zajickova PhD.

We gratefully acknowledge these sponsors from Barry University:

Department of Biology; Department of Math and Computer Sciences; Department of Physical Sciences; College of Adult & Continuing Education; Sigma Xi, Barry Chapter.

We gratefully acknowledge these corporate and private sponsors:

Turner Construction Company, John Smith, and Carolina Biological Supply Company.

Special thanks to:

Dr. Flona Redway, Director of MARC/RISE programs, Ms. Michelle Aznarez, and Ms. Audra Bartram for assisting with the Symposium.

BARRY UNIVERSITY - COLLEGE OF ARTS & SCIENCES

Department of Biology

1. Protecting the end: genetic interactions of telomere binding proteins in yeast.

Wesam Azaizeh, Lauren Sanchez, Sue-Ann Flores, Jovans Lorquet, Maxime Jean, Christoph Hengartner and Leticia R. Vega (Department of Biology Barry University, Miami Shores, FL)

Telomeres are the physical ends of linear eukaryotic chromosomes that protect DNA ends from degradation and from aberrant end-to-end fusion with other chromosomes. Telomeres consist of stretches of repeated C/G-rich double stranded DNA and end with 3' single stranded G-rich overhangs. The enzyme telomerase and accessory proteins such as Ku and Cdc13p maintain telomeres and facilitate telomerase function. In the budding yeast, *S. cerevisiae*, Cdc13p is an essential telosome protein that binds to the single-stranded G-tails to prevent their degradation. Cdc13p also functions to recruit the telomerase enzyme to telomeric ends. The *cdc13-1* allele is a temperature sensitive allele of *CDC13* that is defective in capping the ends of telomeres and results in lethality at temperatures above 30°C. Another yeast telosome component is the heterodimeric complex composed of Ku70 and Ku80. Ku plays multiple roles in DNA metabolism including: non-homologous end joining, recombination, and protection of telomeres from degradation. Yeast cells lacking Cdc13p or the Ku complex have uncapped telomeres and exhibit longer single-stranded G-tails. Ku has been shown to facilitate chromosome end protection by recruiting telomerase. This study examines the effects of mutations in yKU80 on cdc13-1 strains. Using a genetic library of yku80 mutations generated by A. Bertuch's laboratory, we have introduced 125 mutant yku80 alleles into the cdc13-1 background by plasmid shuffle and determined the effects on viability and telomere end protection of the various yku80 mutant alleles in cdc13-1 strains. We found that 30 out of 125 yku80 alleles tested increased the temperature sensitive phenotype of *cdc13-1* strains, suggesting a telomeric end protection role for these mutant yku80 alleles. We are currently characterizing the telomere phenotypes of double mutant strains.

Supported by NIH NIGMS MARC Grant T34 GM008021-28, Barry University.

2. Asymmetry is not an honest indicator of immune function in male house crickets, *Acheta domesticus*.

D.C. Baker, S.A. Bowe, R.E. Brito, M.D. Drayton, J.C. Dunnom, K.K. Edwards, M.A. Flynn, S.R. Foster, B.L. Keener, T.M. Malinowski, K.L. Malinowski, K.S.W. Mccarty, T.K. Mcclenen, D.G. Novo, J.M. Ricketts, P. Rodriguez, S. Bazazzadeh and M.P. Robinson. (Department of Biology, Barry University, Miami Shores, FL)

Mate choice by females is a common phenomenon with multiple possible explanations. One strongly supported idea is that females choose males for "good genes." That is, a choosy female's genes will be present in her offspring along with better than average genes provided by her mate. Her mate's genes result in a better than expected fitness for her offspring, and the choosy female benefits indirectly when her genes are passed onto a greater number of grandchildren than if she had mated at random. Two important questions, however, are which genes or traits a choosy female selects and how she measures male quality are. We examined the relationship between three measures of immune function and fluctuating asymmetry (FA) in male house crickets, *Acheta domesticus*. Immune function is a probable source of heritable quality as offspring should inherit stronger immune systems when their fathers have stronger immune systems. FA is a measure of small fluctuations in symmetry that should indicate the ability of an individual to develop properly in the face of environmental stressors. FA should be an indicator of good genes but unlike immune function might be more easily observed by females directly. We found a positive relationship between one measure of immune function (i.e., hemocyte count) and

symmetry. These results indicate that if FA is an indicator of male quality, it is a poor indicator of immune functions and probably cannot be used by females to judge the quality of immune function in potential mates.

Supported by the NIH-NIGMS MARC: T34GM008021 award and the NIH-NIGMS MBRS RISE: R25 GM059244 award, Barry University.

3. A developmental analysis of the glycoprotein Ependymin.

Angelika Batres, Chris-Ann Xavier, Elizabeth Nguyen, Gabriela Toro, and Stephanie Bingham (Department of Biology Barry University, Miami Shores, FL)

ABSTRACT NOT AVAILABLE ONLINE

Supported by: Department of Biology, Barry University; Barry University Minigrant; Department of Energy Grant DE-FG02-06CH11438.

4. Investigation of DNA methylation in response to ethanol exposure.

Alec Davila[1], D. Ruffin, A. Lyn-Cook, L. Mudd, S. Bingham (Department of Biology, Barry University, Miami Shores, FL; [2]Department of Biochemistry and Molecular Biology, University of Florida, Gainesville, FL)

ABSTRACT NOT AVAILABLE ONLINE

Supported by: NIH MARC Grant T34 GM008021, Barry University; Department of Biology, Barry University; Research mini-grant, Barry University, Department of Energy Grant DE-FG02-06CH11438.

5. Metabolic differences in long chain fatty acid metabolism of the right and left ventricle after extracorporeal membrane oxygenation in the immature pig.

Alec C. Davila[1], Tyler Bradley[2], Masaki Kajimoto[2], Dolena R. Ledee[2], Michael A. Portman[2,3] ([1]Biology Department, Barry University, Miami Shores, FL; [2]Center of Developmental Therapeutics, Seattle Children's Research Institute, Seattle, WA; [3]Division of Cardiology, Seattle Children's Hospital, Seattle, WA)

Extracorporeal membrane oxygenation (ECMO) is frequently used in children with cardiopulmonary failure. EMCO plays the role of the heart and lungs. Deoxygenated blood from the right atrium flows into the ECMO machine. Once oxygenated, the blood is pumped into the aorta to be transported throughout the body. Appropriate energy metabolic modulation is an important factor for the recovery of contractile function. Previous studies suggest ECMO promotes fatty-acid (FA) metabolism. The current study aims to evaluate metabolic changes between the right ventricle (RV) and left ventricle (LV) in immature swine having undergone ECMO. Immature pigs (27-36 days) were subjected to unloading, by veno-arterial ECMO (ECMO, n=3), of the RV and LV; and were compared with pigs with normal circulation (control,

n=3) to identify ventricular metabolic changes. ECMO was carried out for 8 hours at 80-100 ml/kg/min flow rate. Metabolic analyses, by nuclear magnetic resonance (NMR), demonstrated ECMO nearly doubled long-chain FA oxidation and similarly reduced lactate oxidation in both ventricles. Immunoblotting demonstrated that phosphorylation of AMPKα, regulators of one of the key pathways of FA oxidation, was significantly downregulated in RV when compared to LV in ECMO subjects. In addition, the expression of CD 36, an FA myocardial transporter, was upregulated in the LV following ECMO, but unchanged in the RV. The ventricular unloading induced by ECMO promoted metabolic shifts in both ventricles; however, the degree of alteration and proteins altered were different between RV and LV. RV exhibits reduced metabolic plasticity in response to stress.

*Supported by: NIH-NIGMS MARC U*STAR Grant, T34 GM008021-29, Barry University and NIH National Heart, Lung, and Blood Institute (NHLBI) 5R25HL103180, University of Washington.*

6. Identification of 2nd site suppressor mutations in the HIV-1 capsid.

Precious de Verteuil[1], Ernest Yufenyuy[2], Christopher Aiken[2] ([1]Department of Biology, Barry University, Miami Shores, FL; [2]Department of Pharmacology, Vanderbilt University, Nashville, TN)

The human immunodeficiency virus (HIV-1) is the causative agent of the acquired immune deficiency syndrome (AIDS). HIV-1 is a retrovirus; it has an RNA genome and a reverse transcriptase enzyme that converts viral RNA into DNA. The HIV virus attacks CD4-T cells of the body's immune system. It recognizes the CD4 receptor and either of its coreceptors CXCR4 or CCR5. Once the viral envelope fuses with the cellular membrane of the host cell, the viral core is released into the cytoplasm where it undergoes a process known as uncoating. This is the disassembly of the capsid. Although this step in the life cycle is poorly understood, previous experiments with HIV-1 mutants have shown that hyperstable and unstable capsid mutants show impairment in infectivity, making the capsid a possible target for the treatment of AIDS. In the present study, we used a classical genetics approach to study HIV-1 mutants in culture for an extended period of time to isolate second-site revertants. We used enzyme linked immunosorbent assay (ELISA) and reverse transcriptase (RT) assays to measure the accumulation of capsid protein in the supernatant. No viral growth was measured for any mutants after 27 days of cells culture; hence no second-site revertant was isolated. Our results suggest that these mutations result in a drastic decrease in viral fitness. Future experiments with a more permissive cell line, or an increased amount of virus may allow for the isolation of pseudorevertants.

Supported by the NIGMS MARC T34 GM008021, Barry University and NIH Grant R01 Al076121, Vanderbilt University.

7. The wound healing process of adult *Danio rerio* wildtype zebrafish.

Precious de Verteuil, Victoria Hoelscher, and Brenda Schoffstall (Department of Biology, Barry University, Miami Shores, FL)

Danio rerio zebrafish are widely used as a scientific research model organism. Although they are not as closely related to humans as a mammalian model, they share many key physiological and genetic characteristics with humans. Zebrafish have been documented for their intrinsic ability to efficiently and completely regenerate fins, tails, and heart tissue. Thus far, no literature documents or characterizes the wound healing process of skeletal muscle and surrounding tissues in adult zebrafish. Our overall hypothesis is that zebrafish will efficiently and completely recover from a penetrating burn wound via pathways involving tissue regeneration. The first goal of this research project was to establish methodologies for zebrafish as a new wound healing research model. To accomplish this, we have

standardized methods for wounding zebrafish, creating a penetrating burn wound specifically located just below the dorsal fin. We have also begun to document the healing process. Our results thus far suggest that the wound takes about 25 days to fully heal, with no apparent permanent scar formation. We have begun to isolate samples of wounded tissue at different stages of the wound healing process using cyotechniques. Our immediate aims are to use these samples in a series of immunohistochemical stains to document the wound healing process at the tissue and cellular level. Future studies will incorporate identification of genetic pathways involved in stimulation of the regenerative healing process in zebrafish flesh wounds. Our results may eventually translate into applications for treating severe human flesh wounds, such as those sustained in combat injuries.

Supported by NIH MARC Grant T34 GM008021-29, Barry University.

8. Utilizing dietary algal protein replacement in fish feed for rainbow trout (*Oncorhynchus mykiss*).

Julian Fiorentino (Department of Biology, Barry University, Miami Shores, FL)

Current forms of aquaculture feed use wild caught fishes that are processed into fish meal and fish oil to provide nutrition and protein for livestock. This system taxes the environment and could lead to the collapse of the important foraging fish that transfer planktonic energy to higher order animals. Another potential protein source for aquaculture feed is plant protein but it is not often used because plants produce inhibitory chemicals that affect digestibility. This experiment looked at the prospect of using algal protein as a protein and nutrition source for a species specific fish feed. Initially 150 Rainbow trout (*Oncorhynchus mykiss)* at an initial tank density of 4.5g l^{-1} were housed in a recirculating aquarium. They were fed an experimental diet consisting of differing concentrations of algal protein. The diets had an initial concentration of algal protein of which the remaining protein from fish meal. This formulation technique was used for a 10% algal protein diet, a 40% algal protein diet and a 70% algal protein diet. The fish were weighed weekly and fed daily for one month then fixed for future protein analysis. The 40% algal protein diet showed a growth rate higher than the control but using an ANCOVA to compare against the control there was no statistical difference. The 10% algal protein diet had a food conversion rate that was 9% better than the control and with a large standard deviation all conversion rates could be considered not statistically different. The preliminary results all show algal protein as a suitable replacement for the current protein sources.

9. Purification of crude extract from Great Boiling Spring that stimulates growth of *"Thermoflexus hugenholtzii"* of the phylum *Chloroflexi*.

Sue Ann Flores[1], Lorena Ramo[2], and Ernesto Abel-Santos[3] ([1]Barry University, Miami Shores, FL 33161; [2]California Lutheran University, Thousand Oaks, CA 91360; [3]University of Nevada-Las Vegas, Las Vegas, NV 89154)

"Thermoflexus hugenholtzii" is a novel, thermophilic bacterium that flourishes in Great Boiling Spring (GBS) near Gerlach, Nevada. Phylogenies inferred from 16S rRNA genes and predicted amino acid sequences of various conserved proteins indicate that the bacterium is a new class in the phylum *Chloroflexi*, which is a diverse group of bacteria that includes both photo- and chemoorganotrophs. "*T. hugenholtzii"* can be grown in synthetic medium but is greatly stimulated by water from GBS. To determine the compound(s) that stimulate growth, crude extracts from GBS water were made by reverse-phase chromatography. The crude extract was separated and visualized using thin layer chromatography. The crude extract consisted of three main components, which were separated and purified using silica column chromatography. One component partially stimulated "*T. hugenholtzii"* growth the best;

however, its effect was lower than the crude extract. Therefore, we hypothesize that other stimulants may not have been recovered from the silica column.

Supported by NIH-NIGMS RISE Grant R25 GM059244-12 Barry University; and NSF Grant DBI REU 1005223 University of Nevada-Las Vegas.

10. Analyzing the mutations in the TBX5 gene in a patient with Holt-Oram Syndrome.

Talia Guardia[1], Zaniar Ghazizadeh[2], Faranak Fattahi[2], and Shuibing Chen[2] ([1] Barry University, Miami Shores, FL; [2]Department of Surgery, Weill Medical College of Cornell University, New York, NY)

Holt-Oram Syndrome (HOS) is an autosomal dominant disorder that is caused by mutations in *TBX5*, which plays a role in a transcriptional regulatory cascade during forelimb and cardiogenesis. A characteristic of patients with HOS is at least one upper limb abnormality and 75% suffer from heart problems, most commonly atrial septal defect (ASD) and arrhythmias. *TBX5* spans 54.5 kb in chromosomal region 12q24.1 and consists of 9 exons. Most reported pathogenic mutations are in the DNA-binding T-box domain, which is highly conserved and encodes for important transcriptional factors. The aim of this study was to identify mutations within *TBX5* that may be responsible for causing the disease. A possible single-base pair substitution pathogenic mutation in *TBX5* was found in the HOS patient: C to T substitution as identified with primer set TBX5 10. Further validation of our results, through experimental replicates, is necessary to definitively identify specific mutations within *TBX5*. Furthermore, if the same mutations are present in the induced pluripotent stem (iPS) cell lines that were previously reprogrammed in the laboratory from HOS fibroblasts, we will be one step closer to not only validating the mutation, but also to the establishment of a disease model for HOS. Future directions include the differentiation of iPSCs into cardiomyocytes as a means to determine the role of *TBX5* in this differentiation process.

Supported by the Weill Cornell/Rockefeller/Sloan-Kettering Tri-Institutional MD-PhD Program.

11. Transforming Growth Factor-beta (TGF-β) inhibits growth of human myeloid leukemia cells and downregulates the expression of cdk inhibitor, p18.

Talia Guardia, Reshma Baddaloo, Alessandra Angelini, Tamara Guardia, and Tang Hu (Department of Biology, Barry University, Miami Shores, FL)

The cell cycle progression controlled by cyclin-dependent kinases (cdks) is counterbalanced by cdk inhibitors (CKIs), which include $p21^{WAF1/CIP1}$, $p27^{KIP1}$, $p57^{KIP2}$, $p15^{INK4B}$, $p16^{INK4A}$, $p18^{INK4C}$ and $p19^{INK4D}$. TGFβ has been reported to be a cell cycle inhibitor through upregulating the CKIs. We have previous reported that $p27^{KIP1}$plays both a positive and a negative role in TGF-β -mediated cell cycle control in human myeloid leukemia cells. In this study, we investigated whether $p18^{INK4C}$ plays any role in TGF-β-mediated cell cycle control in MV4-11 and TF-1 cells. TGF-β significantly suppressed proliferation of MV4-11 and TF-1 cells in culture and decreased the levels of multiple cdks (cdk1, cdk2, cdk4) and cyclins (cylin A and cyclin D3). Surprisingly, TGF-β also significantly inhibited the expression of $p18^{INK4C}$ detected by Western blot. The inhibitory effect of TGFβ on $p18^{INK4C}$ was time-dependent; the early inhibition occurred 3 hours upon TGFβ treatment and reached maximum of 70% at 72- hours. TGFβ-induced $p18^{INK4C}$ inhibition is also dose-dependent. Maximal inhibition was detected when 30ng/ml of TGFβ were added to the culture. Low concentration (5ng/ml or less) did not markedly affect the expression of $p18^{INK4C}$. Although TGFβ had no effect on the expression of cdk6, the association of $p18^{INK4C}$ with cdk6 was greatly downregulated measured by immunoprecipitation. Furthermore, the cells treated with TGFβ had a reduced level of p18-pRb complex. Our data have exposed a new role of

$p18^{INK4C}$ in TGFβ-mediated cell cycle control in human myeloid leukemia cells. Whether this role is caused by a possible $p18^{INK4C}$ gene mutation(s) and contributes to leoplasia of the cells is currently under investigation.

Supported by NIH-NIGMS MBRS RISE: R25 GM059244-12, Barry University.

12. Investigation of potential cardiomyocyte proliferation genes.

Nicole H. Lopez, Daniela Mendoza, and Brenda Schoffstall (Department of Biology, Barry University, Miami Shores, FL)

We have recently established *Danio rerio* (zebrafish) as a novel cardiac stress model to examine cardiomyocyte proliferation. Unlike humans, zebrafish have the capacity to regenerate heart tissue within a period of 30 days. Specific genetic programs may be involved in signaling heart cell division during regeneration; these signaling pathways may exist in humans, but are "turned off" or blocked. Using our non-invasive zebrafish cardiac stress model, we have screened for gene pathways that "turn on" cardiomyocyte proliferation. In this experiment, we investigated 7 genes that have been previously identified as participants in the zebrafish regenerative response: BMP4, GATA4, APOa1, PDGFA, IGF2, TGFβ1, and PCNA. With the use of real-time polymerase chain reaction (q-PCR), expression levels were compared between non-exercised (control) and exercised fish over a four-week period. Expression of PCNA peaked during week 2. Among the other genes tested, overall gene expression levels appear decreased in weeks 2 and 3 compared to week 1, but increased in week 4 compared to week 1. Based on the PCNA expression profiles, we have targeted the second week (~day 14) of exercise for future studies. This initial screen indicates, however, unexplained variations in expression of the other genes screened throughout the four-week period. Using these methods, we will continue to screen candidate genes in hopes of identifying a "switch" that activates the cardiomyocyte proliferation process in zebrafish hearts in response to cardiac overload stress. We hope to translate our findings into specific therapeutic molecular targets for the prevention of pathological cardiac hypertrophy in humans.

*Supported by: NIH-NIGMS RISE R25 GM059244-12 and NIH-NIGMS MARC U*STAR Grant, T34 GM008021-29, Barry University.*

13. Effect of cigarette smoke on the number of ciliated cells in human tracheal epithelium.

Nicole H. Lopez[1], Monica Valencia[2], Benjamin Gerovac[2], and Nevis Fregien[2] ([1]Department of Biology, Barry University, Miami Shores, FL; [2]Department of Cell Biology and Pulmonary Research, University of Miami, FL)

Cilia are microtubule-based organelles located in the respiratory epithelium. These hair-like structures expel inhaled toxins and pathogens from our lungs by a process known as mucociliary clearance (MCC). MCC protects the lungs with the help of mucus which traps inhaled particles; motile cilia then sweep this pathogen-laden mucus out of the airway. It has been shown in animal studies that cigarette smoke exposure decreases ciliated cells in the airway and that this can inhibit MCC leading to respiratory disease. The current study was designed to quantify and compare ciliated cell populations in sections of human tracheal epithelium from non-smokers and smokers to determine if cigarette smoke results in a decrease in ciliated cell numbers in humans. This study was conducted by immunofluorescently staining tissue samples, which were dissected from 8 human donor lungs. A confocal microscope was then used to obtain micrographs of the samples; NIH Image J was used to quantify cilia length per cross section. This study revealed that 5 % more cilia were found in non-smoker lungs compared to smoker lungs. This result, although not statistically significant, is consistent with previous findings that exposure to cigarette

smoke decreases ciliated cells in animal models and may also have an effect in humans. While this finding does not provide evidence for a direct correlation between cigarette smoke and inhibited MCC as the mechanism for the observed loss of ciliated cells, by promoting cilia growth, we may be able to alleviate respiratory disease in individuals who smoke.

*Supported by: NIH-NIGMS RISE R25 GM059244-12 and NIH-NIGMS MARC U*STAR Grant, T34 GM008021-29, Barry University, and by CFR 46.102. [cid:B9704FA7-9EE1-4BF5-81E4-EAF92DEED8BE], University of Miami.*

14. Using ultraviolet photography to reveal UV-reflecting patterns in fishes.

Kevin. McCarty and Michael P. Robinson (Department of Biology, Barry University, Miami Shores, FL)

Ultraviolet (UV) radiation (200-400 nm) is located towards the short wavelength, high frequency end of the electromagnetic spectrum. Although ultraviolet radiation is not visible to the human eye some animals, including many coral reef fishes, use it as a potential source of communication. Two species of Pacific coral reef damselfishes (Pomacentridae) possess complex ultraviolet facial patterns. These ultraviolet facial colour patterns can be used for territorial aggression, identification, or other forms of communication. Damselfishes have evolved a range of social systems and color patterns in visible light. UV-reflectance has the potential also to vary with social system. To gain a better understanding of the variation in UV-reflectance, we followed a methodology described here for photographing these fishes. This is a modification of an earlier methodology developed by Siebeck (2004). The fishes were placed into a small, UV-transparent lexan aquarium, which enabled us to photograph the fishes without harming them. Using a SONY α SLT-A37 digital camera with a 30mm macro lens, we photographed both sides of the fish. Attached to the camera lens were two light filters from Oriel/Newport Corp. (FSQ-BG40 and FSQ-U340). These filers, when combined, allowed only ultraviolet radiation between 250 to 400 nm (with a peak near 360 nm) to pass through the filters to the camera sensor. One initial difficulty was that the ultraviolet radiation refracts differently than visible light when passing through the glass lens. This increased the focal distance requiring adjustments to the focus.

Supported by a Barry University Faculty Senate Mini-Grant.

15. A developmental analysis of Palmitoyl-Protein Thioesterase expression in the zebrafish embryo.

Marsha Mildor[1], Precious Ezeamam[1], Nella Delva[1], Vinoth Sittaramane[2], Stephen Ekker[3], Anand Chandrasekhar[2], and Stephanie Bingham[1] ([1]Department of Biology Barry University, Miami Shores, FL; [2]University of Missouri-Columbia, Columbia, MO; [3]Mayo Clinic, Rochester, MN)

ABSTRACT NOT AVAILABLE ONLINE

Supported by: MBRS RISE R25 GMO59244, Barry University; Department of Biology, Barry University; Department of Energy Grant DE-FG02-06CH11438, Barry University.

16. Classification of the normal gut microbiome of harvestmen (Order Opiliones, Class Arachnida).

Nicholas Morales, Jessica Ricketts, and Brenda Schoffstall (Department of Biology, Barry University, Miami Shores, FL)

Harvestmen (Order Opiliones, Class Arachnida) are spider-like arthropods commonly known as "*daddy long-legs*". These arachnids are closely related to "true spiders" (Order Araneae); however, harvestmen are scavengers who masticate and digest solid food. In contrast, true spiders externally pre-digest prey prior to consumption. To date, there has been no published classification of the normal digestive flora of Opiliones. Our overall hypothesis is that we will find greater diversity in normal digestive flora of harvestmen as compared to true spiders, and that the harvestmen gut microbiome will include typical enteric flora normally found in higher organisms. We have previously demonstrated a greater diversity in aerobic non-fastidious isolates from Opiliones (*Leiobunum* sp. and *Vonones ornata*) as compared to that of a representative Araneae (*Gasteracantha cancriformes*). Many of these harvestmen isolates were identified as common enteric bacteria. Here, we have refined dissection of the gut from adult harvestmen in efforts to more specifically target digestive flora, and are comparing these isolates to those acquired by our previous "whole body" culture method. Thus far, we have found aerobic non-fastidious isolates from 10 dissected *Leiobunum* guts to exhibit some different colony morphology, compared to isolates from 6 whole body cultures. Final identification of these comparative isolates are currently in progress using morphological, biochemical, and genetic (qPCR) methods. We hope to eventually introduce these organisms as a new invertebrate model for translational studies in microbiome gut research.

*Supported by the NIH-NIGMS RISE R25 GM059244-12 and NIH-NIGMS MARC U*STAR Grant, T34 GM008021-29 awarded to Barry University and by a 2012 ASCB-MAC Linkage Fellowship awarded to B. Schoffstall.*

17. Microbiome isolation from the gut of *Gasteracantha cancriformes*.

Jessica Ricketts, Nicholas Morales, and Brenda Schoffstall (Department of Biology, Barry University, Miami Shores, FL)

Harvestmen (Order Opiliones, Class Arachnida) arachnids are closely related to "true spiders" (Order Araneae). While harvestmen are scavengers who masticate and digest solid food, true spiders externally pre-digest prey prior to consumption. To date, there has been no published classification of the normal digestive flora of Opiliones. Our overall hypothesis is that we will find greater diversity in normal digestive flora of harvestmen in contrast to that of true spiders. To compare these microbiomes, we utilized *Gasteracantha cancriformes* ("spiny orb weaver") as our model representative true spider. We have begun to identify isolates from *G. cancriformes* obtained by two different methods. Here, we compare non-fastidious bacterial isolates from crushed whole *G. cancriformes* to those from dissected gut. We are currently refining protocols to determine the best method to study bacteria related to digestion. We assume that dissection of the gut would specifically target digestive flora, and demonstrate that there is noticeable difference in the isolates obtained from the two preparations. We present our current findings, comparing both aerobic and anaerobic isolates from these two aforementioned methods. Once complete, these data will be used to compare with isolates from Opiliones in order to investigate our overall hypothesis.

Supported by a 2012 ASCB MAC Linkage Fellowship awarded to Brenda Schoffstall.

18. A morpholino-based investigation of *Polycomb* gene function.

Kendymill Taveras, Susana Chan, Stephanie Bingham, Peter Lin, and Teresa Petrino (Department of Biology, Barry University, Miami Shores, FL)

Proteins encoded by the *Polycomb* (*Pc*) group genes are involved in gene regulation during development. Previously, we have identified and cloned zebrafish *Pc1*, *Pc2* and *Pc3*. Through in situ hybridization

analysis of a developmental series we determined that *Pc1* is expressed differentially. Initially (4-cell to 12-somite stage) it is expressed broadly. At later stages, the expression becomes progressively restricted. The fact that the expression was observed at the 4-cell stage indicates that the transcript is maternally derived and suggests that this gene may be critical in early development. To investigate the potential role, we are using a reverse genetics approach to disrupt Pc 1 expression and function. Reagents known as morpholinos prevent translation in a sequence-specific manner by binding mRNA and sterically hindering the translation initiation complex. Morpholinos were designed to target a region upstream of the translation initiation site of *Pc1*. The goal is to microinject zebrafish embryos at the 1 – 4-cell stage thereby disrupting *Pc1* translation. Zebrafish is an ideal model organism to carry out these studies in vertebrates because fertilization is external. Determination of *Pc* gene function will be an important step in understanding the role of these genes during embryonic development.

Supported by NIH-NIGMS MBRS RISE Grant: R25 GM059244-12; Barry University Minigrant (to TP and PL); Department of Energy Grant No.-DE-FG02-06CH11438.

19. The role of miRNA 17-92 OE on adult neurogenesis.

Marcela Toro[1], Tao Sun[2], Junghee Jin[2] ([1]Barry University, Miami Shores, FL; [2]Weill Cornell Medical College, New York, NY)

MicroRNAs (miRNAs) are small RNA post-transcriptional. miRNAs are transcribed from the non-coding regions of the DNA and are transported out of the nucleus into the cytoplasm where a DICER complex processes it into mature miRNA which functions to repress the process of protein translation. Previous studies have shown that miRNAs are either expressed in different developmental stages or in distinct cortical regions and are needed for adequate cellular processes such as adult neurogenesis. In this study, the importance of the miRNA 17-92 cluster is studied in order to look for a particular link between its function and normal cortical development. It is known that the process of neurogenesis, which is the growth of neural stem cells (NSCs), is limited to two specific areas of the brain the subventricular zone (SVZ) in the lateral ventricles and the subgranular zone (SGZ) of the dendate gyrus of the hippocampus. In order to analyze the role of the miRNA 17-92 cluster in the process of adult neurogenesis, eight mice expressed more ofthe miRNA 17-92 cluster, and five wild type mice where studied. Each of them was subjected to four behavioral tests and a dissection of the brain was performed during week ten. After the immunostaining procedure, it was found that the mice over expressing the miRNA 17-92 cluster displayed higher number neurogenesis. However, the exact mechanism of this increased neurogenesis is still under investigation. In the future, a culmination of this study can be used as a tool to map the mutations of coding genes and noncoding molecules, such as miRNAs, that result in human neurological disorders and mental illness.

Supported by Summer Traveler's Research Fellowship, Weill Cornell Medical College.

20. An investigation of the effects of embryonic ethanol exposure.

Tania Torres-Delgado, Marcela Toro, Sandra Richardson, and Stephanie Bingham (Department of Biology Barry University, Miami Shores, FL)

ABSTRACT NOT AVAILABLE ONLINE

Supported by: Department of Biology, Barry University; Faculty Incentive Grant, Barry University; Department of Energy Grant DE-FG02-06CH11438, Barry University.

Department of Mathematics and Computer Sciences

21. Computer Approximations of the Logistic Map.

Launie Bruno[1], Wesam Azaizeh[2], Aaron Mohammed[3], Sanja Zivanovic[1] ([1]Department of Mathematics and Computer Science, [2]Department of Biology, [3]Department of Physics, College of Arts and Sciences, Barry University, Miami Shores, FL)

In recent years, use of computers as a matter of rigorous proves in mathematics has increased significantly. Many real-life systems are presented as mathematical models which are not often analytically solvable, and thus numerical solutions are desired. However, since computers operate on finite sets (even inside any interval), any solution obtained via computers is only an approximation to the real system. For rigorous solutions, several general mathematical methods have been developed to describe approximations of real systems. In order to get an insight and compare computer approximations of a system with its true solution, we look into approximations of a specific real system when long term behavior is computed. We consider very famous model in population dynamics known as Logistic map, $f(x) = 4x(1 - x)$. This is a simple map to work with (one-dimensional quadratic map from interval [0, 1] to itself), but its dynamics is complicated enough to catch possible discrepancy.

*Supported by the NIH-NIGMS MARC U*STAR Grant, T34 GM008021-29, Barry University.*

22. An automated registration system (ARS).

Ryshawn Butler, Wadner Joseph, Alexis Yohe, and James Haralambides (Department of Mathematics and Computer Science, Barry University, Miami Shores, FL)

The system is designed to help students, faculty, and administrators engage in the class registration process in an efficient, streamlined, and method-driven approach. ARS offers recommended registration alternatives based on the academic history and schedule preferences of the student. Students and advisors may fine-tune parameters related to the total number of credits, load balance, and time management (course daily distribution). The system tests requirements including full-time status, maximum credits, scheduling conflicts, and course eligibility (by following prerequisite hierarchies) thus, minimizing administration overhead. The system repository maintains information related to courses as they are listed in the university catalog, student and advisor profiles, class records, and course offerings for upcoming semesters. Student transcripts are produced dynamically to reduce space requirements. In addition to the traditional organization of the transcript (chronological course listing), the system supports customized modular organization of the document. Listed categories include the major, minor, co-requisites, and general education requirements in agreement with information retrieved from the student profile. The latter structure offers a better insight to future student needs and helps produce balanced course schedules. The main contribution of the system is its capability to offer registration recommendations based on academic history, and student preferences. Course offerings are filtered and eliminated if they: a) do not meet prerequisite requirements, b) they do not belong in the academic plan for the specific individual, c) they have already been taken successfully. Students and advisors may customize results through a menu-driven approach that introduces elements of a balanced course load or schedule (courses are distributed 'evenly' among the aforementioned course categories or over the days of the week, respectively).

23. A three-dimensional function plotter using OpenGL.

Aarti Ragoonath, Charles Thompson, and James Haralambides (Department of Mathematics and Computer Science, Barry University, Miami Shores, FL)

We have implemented a program that produces three-dimensional plots for functions of the form $z = f(x, y)$. The prototype utilizes library routines of the OpenGL system. Users may enter functions of two variables x and y using arithmetic operators and trigonometric functions. Operators include: addition, subtraction, multiplication, division, and the unary minus. Functions include: sine, cosine, tangent, square root, and logarithm. The user-defined functional expression is evaluated by the system in multiple stages. Initially, it is checked for syntactic errors (incorrect sequence of operands, unbalanced parentheses, unknown operands, etc.) and is trimmed of extra white spaces. The expression is later parsed and a binary expression tree is constructed. A recursive pre-order traversal of the tree is used to evaluate the expression and yield a collection of three-dimensional points (x, y, z). OpenGl controls and library functions are employed to define the three-dimensional axis system, viewpoint, bounding volume, surface characteristics, and projection method for the drawing of computed points. The system uses orthographic projection, a variation of parallel projection to provide a better visual effect. Menu options allow for rotation about the X, Y, and Z axes as well as modification of the zoom factor. Functions may be drawn in "frame" mode, where lines are used to connect three-dimensional points, or 'fill' mode, where surface segments are filled quadrangles. An interesting feature of the program is its capability to illustrate rotation and scaling dynamically through motion. The user may adjust rotational and scaling parameters of the function plot as it moves through three-dimensional space. The motion speed is also dynamically adjusted and a frame per second rate is displayed to measure the efficiency of the algorithm.

24. A gender comparison of college-aged computer users' modulated-waveform recognition-rates as tacton parameters and of simple-waveform detection threshold.

Ghofran M. Saad[1], Ana M Jimenez[1], and Ricardo Jimenez[2] ([1]Department of Biology; [2]Department of Mathematics & Computer Science, Barry University, Miami Shores, FL)

There is increasing research centering on vibrotactile devices that produce vibrotactile cues known as tactons. Tactons rely on cutaneous sensation as a haptic form of output that can be used as an additional modality in Human-Computer Interaction (HCI). Tactons and vibrotactile devices can have wide-ranging potential in HCI such as gaming, virtual reality, navigational aids, and mobile devices. Tacton parameters of stimuli with high recognition rates have been identified for a young population of computer users. However, there is limited research which compares recognition rates of tactons between genders. The literature indicates differences between genders in detection threshold of simple waveforms. Additionally there is research which correlates detection threshold levels with tacton recognition rates. However, there is limited research which directly correlates gender detection threshold and recognition rates. The present study is a gender comparison of 32 (17 male, 15 female) college-aged test subject's detection threshold of a sinusoidal waveform of 250 Hz and the recognition rates of modulated sinusoidal waveforms. There was no statistical difference between the two groups in detection threshold. However, the female group had significantly higher recognition rates of modulated sinusoidal waveforms. There was no correlation between detection threshold and recognition rates; therefore other factors besides mechanoreceptor sensitivity must account for the differences, including sample size. The study will continue to recruit additional test subjects to acquire a larger sample size, as well as examining other factors which may be contributing to the differences in recognition rate.

Department of Physical Sciences

25. Metal – organic assemblies of tetrasubstituted porphyrins.

Miriam Basden, Meghan Knol, and Tamara D. Hamilton (Department of Physical Sciences, Barry University, Miami Shores, FL)

Metal-organic frameworks (MOFs) are 3-D structures consisting of organic ligands and metal ions, able to encapsulate molecules and be hosts to chemical reactions. Porphyrins are large, naturally occurring, aromatic macrocycles perfect for the building of MOFs. This research seeks to synthesize metal – organic polyhedra (MOPs), in particular metal – organic cubes (MOCs) using substituted porphyrins as the faces of the cube. So far, 2- and 3- tetrapyridyl porphyrins have been synthesized and synthesis of tetrakis(2,3-dihydroxyphenyl)porphyrin and tetrakis(3,4-dihydroxyphenyl)porphyrin is underway. These tetrasubstituted porphyrins were chosen because of their ability to bind to a metal on the porphyrin exterior. Several attempts at self – assembly with metal salts have been made, and here we will present the X-ray crystal structure of one result. Although not an MOP, this structure is promising for the future isolation of porphyrin – containing MOPs.

26. Solid state synthesis of a series of tetra-substituted porphyrins.

Paula N. Mackin and Tamara D. Hamilton (Department of Physical Sciences, Barry University, Miami Shores, FL)

Solvent-free chemistry is becoming more important due to the industrial demand for waste reduction and cost efficiency. Porphyrins, macrocyclic rings, are traditionally synthesized using large amounts of solvent by way of an acid-catalyzed condensation between pyrrole and an aldehyde. The reaction mixture is then oxidized to produce the porphyrin. We are investigating a solvent-free approach involving grinding reactants with an acid catalyst in a ball-mill grinder, the Retsch MM300. To probe the general applicability of this approach, a series of substituted benzaldehydes were ground in the ball-mill grinder in the presence of pyrrole and p-toluene sulfonic acid. This was further oxidized with 2,3-dichloro-5,6-dicyano-1,4-benzoquinone. Each reaction was carried out three times and the resulting products were characterized using UV-Vis spectroscopy. This environmentally advantageous method was proven the most effective using unsubstituted benzaldehyde as a reactant towards production of tetraphenyl porphyrin in significant yields. All the aldehydes that were tried gave significant yields of the porphyrin in comparison to reported literature yields from the traditional method of synthesis.

27. Review of methods of detection and quantification of D-amino acids in animal and human tissues.

Travis Comnick and George Fisher (Department of Physical Sciences, Barry University, Miami Shores, FL)

Determining the role of amino acids in biological systems is important to better the understanding of the evolution of life. Two naturally occurring chiral forms of amino acids are the L- and D- enantiomers. The focus of this review is to investigate various separation methods for identification and quantification of trace amounts of D-amino acids in animal and human tissues. More specifically, attention will be towards analysis of D-aspartic acid (D-Asp) in tissues of vertebrates and invertebrates. Detection of D-Asp helps elucidate its biological roles and prediction of biochemical pathways. Primary ways of analysis of D-Asp using enzymes, high performance liquid chromatography (HPLC) and gas chromatography (GC) will be reviewed.

28. Quantification of D-aspartic acid in nervous tissue of *Rana pipiens* by HPLC.

Elliott Rodriguez, Travis Comnick, and George Fisher (Department of Physical Sciences, Barry University, Miami Shores, FL)

D-Aspartic acid (D-Asp) is an endogenous amino acid found in the nervous and endocrine systems of many vertebrates and invertebrates, including marine and terrestrial animals. Previous studies showed that D-Asp has physiological importance as a neurotransmitter and a hormone regulator. We have quantified D-Asp in various tissues of the grass frog *Rana pipiens.* D- and L-Asp from homogenized tissues were derivatized with *o*-phthaldialdehyde (OPA) and *N*-acetyl-L-cysteine (NAC) to form chiral diastereomers which were then separated by high performance liquid chromatography (HPLC) on a reversed phase C-18 column, eluted isocratically with sodium citrate-methanol (NaCit-MeOH) buffer, and fluorescence detection. D-Asp was found primarily in the frog nervous tissues: spinal cord (18 nmoles of D-Asp/g, 1.7% D-Asp), brain stem (17 nmoles/g, 2.1% D-Asp), brain (6 nmoles/g, 0.8% D-Asp), and sciatic nerves (6 nmoles/g, 2.4% D-Asp). No D-Asp was found in cardiac, skeletal, or smooth muscle tissues. These results demonstrate that D-Asp is present in the nervous system of frogs where it may play an important role as a neurotransmitter.

29. Greening the Diels-Alder reaction.

Sue Ann Flores[1], George Fisher[1], and Mark Erickson[2] ([1]Department of Physical Sciences, Barry University, Miami Shores, FL; [2]Department of Chemistry, Hartwick College, Oneonta, NY)

The objective of this project is to develop an environmentally friendly ("greener") approach to conducting Diels-Alder reactions. The Diels-Alder reaction is a [4+2] cycloaddition between a conjugated diene and dienophile such as an alkene or alkyne to form cyclohexenes and cyclohexadienes. Traditionally, hazardous and toxic reactants are used resulting in an outcome of hazardous products. In our experiments, we used 2-furfuryl alcohol (from renewable feedstock) as the diene and maleimide as the dienophile, forming exo and endo isomers of 3a,4,7,7a-tetrahydro-4-(hydroxymethyl)-4,7-epoxy-1H-isoindole-1,3(2H)-dione. These experiments were conducted on a microscale instead of a macroscale level, using water as a green solvent or solventless. Our results will be compared to those being carried out at Hartwick College in New York. When favorable results are found the experiment will be added to the organic chemistry laboratory curriculum.

30. Synthesis of 2-thiophene-N-tetrahydropyridium methyliodide salt of muscarinic m1 and m4 ligands for psychological treatment of Schizophrenia.

Rhony F. Jean and John Boulos (Department of Physical Sciences, Barry University, Miami Shores, FL)

The research aims at synthesis of muscarinic M1/M4 ligands for psychological treatment of Schizophrenia. Structural analogs of partial M4 agonist are synthesized with the purpose of increasing the selectivity and functionality for M1 and M4 muscarinic receptors. One ligand was synthesized by the reduction of 2-thiophenecarboxaldehyde with sodium borohydride to obtain 2-thiopenemethanol. The latter product was chlorinated with triphenylphosphine in carbon tetrachloride along with pyridine to yield 2-thiophene-N-pyridinyl chloride salt. The obtained salt was selectively reduced to 2-tiophene-N-tetrahydriopyrinyl base with sodium borohydride. The base was methylated with iodomethane to yield 2-thiophene-N-tetrahydropyridium methyliodide salt. Throughout the experiment, using nuclear magnetic resonance (NMR) as well Fourier transform infrared spectroscopy (FTIR), the structures and functional groups of the intermediates as well the salt were confirmed. This organic salt will be sent to Czech Academy of Science to be tested on muscarinic cell lines which have been induced with M1-M5 muscarinic receptors for binding affinity, functionality, and selectivity purposes.

31. The impact of physics beyond the standard model on the blue loop phase of stellar evolution.

Aaron Mohammed, Michael Wise, and Maurizio Giannotti (Department of Physical Sciences, Barry University, Miami Shores, FL)

Massive stars go through a stage in their evolution (blue loop phase), when they contract and expand while their surface temperature changes from relatively cold (red) to hot (blue) and then decreases again. Since modern observational techniques allow measuring the relative number of red and blue stars accurately, this phase has extensively been studied experimentally. We showed, with a numerical study, that the evolution of the star during the blue loop phase is very sensitive to the microscopic physics inside the star and therefore can be effectively used as a laboratory to test some of the new models for microscopic physics. Here we discuss how a novel cooling mechanism could red-shift the position of the star in the Hertzsprung–Russell diagram and increase the relative number of red stars versus blue stars. We apply this result to axions, which are hypothetical particles whose existence is required for the correct description of the theory of the strong interactions, and show how this analysis provides new constraints on the axion coupling with photons. Finally, we discuss possible generalizations of this analysis to other physics beyond the standard model.

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32. Using dynamic light scattering, zeta potential measurements, and fluorescence spectroscopy to study the properties of graphene oxide.

Launie Bruno[1], Shanghao Li[2], and Roger Leblanc[2] ([1]Barry University, Miami Shores, FL 33161; [2]Physical Sciences Department, University of Miami, Coral Gables, FL 33124)

Graphene oxide (GO) is the oxidized form of graphene, a two-dimensional, one atom thick honeycomb shaped lattice of sp2, bonded carbon atoms. GO has reactive functionalities such as hydroxyl, epoxy and carboxylic acid groups, with potential applications in biomedical fields including cancer treatment, drug delivery, and biological imaging. A study of the size distribution and surface charge of GO in aqueous solution was carried out, using Dynamic Light Scattering (DLS), and zeta potential measurements to understand factors that influence its stability and ability to disperse in water. DLS determined the hydrodynamic size distribution of GO's radius to be approximately 100nm, close to the actual size. The surface charge was less negatively charged with solutions of higher concentrations. Fluorescence spectrum revealed a linear relationship. These results will provide greater insights into the physical and chemical characteristics of GO and the conditions under which it may be most effectively used in therapeutic applications.

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33. Thermal-grafting of a hybrid monolith with octadecyl methacrylate.

Deepa Gharbharan[1], Anna-Marie Weed[1], Frantisek Svec[2], and Zuzana Zajickova[1] ([1]Department of Physical Sciences, Barry University, Miami Shores, FL; [2]The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA)

A novel hybrid class of monoliths that contains dual organic and inorganic functionalities is emerging. This characteristic gives it great flexibility for surface modification. This research takes advantage of the exposed organic functional groups to thermally modify the surface thus increasing its hydrophobicity. The

parent monoliths that were chosen for modification were prepared via thermal polymerization of the starting monomer, 3-(trimethoxysilyl)propyl methacrylate (MPTMS), in the presence of the initiator azobisisobutyronitrile (AIBN). The ensuing thermal functionalization was performed utilizing toluene solutions varying in the percentage of octadecyl methacrylate (C18) used. The performance of the column prior to and after grafting was evaluated by its ability to separate a mixture of thiourea and benzene under isocratic conditions and by analyzing the retention factor. The retention of benzene on the grafted monolithic column improved with the increasing percentages of C18 up to 70%. After this point, the columns became impermeable. The polymerization time was also adjusted. It was observed that the retention factor for benzene improved with longer polymerization times. The ideal time chosen was 3 hours. The optimized column can now be used for efficient separations in reversed phase chromatography.

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34. Hydrophobization of pore surface via functionalization of organo-silica monolithic columns with photografted octadecyl methacrylate.

Anna-Marie Weed[1], Deepa Gharbharan[1], Frantisek Svec[2], and Zuzana Zajickova[1]([1]Department of Physical Sciences, Barry University, Miami Shores, FL; [2]The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA)

Monoliths represent an alternative to traditional particle packed columns that are currently used as separation media in high performance liquid chromatography. Monolithic columns feature low resistance to flow and enable fast analyses. In this study, 100 µm ID monolithic capillary columns prepared using thermal polymerization of 3-(trimethoxysilyl)propyl methacrylate are used as a support. The methacrylate functionalities of this parent hybrid monolith allowed modification of the pore surface by applying UV light initiated grafting polymerization of octadecyl methacrylate resulting in an increase in the hydrophobicity. Azobisisobutyronitrile and 2,2-dimethoxy-2-phenylacetophenone were used respectively as initiators for single-step photografting reaction. Irradiation time and concentration of monomer in the polymerization mixture was optimized to achieve surface coverage. The retention factor for benzene was used to monitor the changes in the surface hydrophobicity of the monolithic columns. Longer retention indicating better coverage of pore surface with poly(octadecyl methacrylate) chains resulted while using azobisisobutyronitrile as the photoinitiator.

Supported by the National Science Foundation CBET-1066113 award.

35. Photopolymerized and thermally-polymerized organo-silica monoliths for application in reversed-phase high performance liquid chromatography.

Anna-Marie Weed[1], Jill Dvornik[1], Jake Stefancin, Frantisek Svec[2], and Zuzana Zajickova[1]([1]Department of Physical Sciences, Barry University, Miami Shores, FL; [2]The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA)

Highly porous monolithic materials present an alternative to traditional particle packed columns that are currently used as separation media in high performance liquid chromatography. The advantage of this novel substitute is in achieving efficient separations in short periods of time under low back pressure. The monolith prepared in this study is a hybrid consisting of both organic and inorganic functionalities for separations of analytes with varying polarities. To create such media, a pre-treated fused silica capillary (20 cm x 100 µm ID) was charged with a solution consisting of 3-(trimethoxysilyl)propyl methacrylate (MPTMS), hydrochloric acid, toluene, and 2,2'-azobisisobutyronitrile (AIBN). The capillary was then

submitted to heat or light induced polymerization. In order to create the optimally porous structure, the amount of toluene in the polymerization mixture was studied. The properties of the optimized organo-silica monolith were evaluated by a series of tests using capillary liquid chromatography. The dual pore size distribution measured using inverse size exclusion chromatography showed the presence of through-pores as well as mesopores. The separation of alkylbenzenes demonstrated the ability of the column to operate in reversed-phase mode. Separation of polar analytes confirmed the presence of surface silanols. Additionally, the monolithic surface was found to be sterically selective to molecules of similar size but different planarity. These tests confirm the presence of dual functionalities in the hybrid monolith and its ability to operate in mixed mode high performance liquid chromatography.

Supported by the National Science Foundation CBET-1066113 award.

36. The effect of preparation conditions on the performance of organo-silica monoliths in liquid chromatography.

Gabriela Soto, Anna-Marie Weed, Deepa Gharbharan, and Zuzana Zajickova (Department of Physical Sciences, Barry University, Miami Shores, FL)

Monolithic columns are greatly permeable separation media utilized in high performance liquid chromatography (HPLC). These columns consist of a series of interconnected porogenic channels that allow for fast and efficient performance. In this present research, the effect of preparation conditions on the chromatographic performance of an organo-silica monolith is being investigated. Specifically, changes in polymerization time and catalyst concentration are related to column retention. Homogeneous solution containing starting monomer 3-(trimethoxysilyl)propyl methacrylate (MPTMS), an aqueous catalyst hydrochloric acid of altering concentration, a porogen toluene, and thermal initiator azobisisobutyronitrile (AIBN) was charged into capillary. The solution was then allowed to polymerize at 80˚C at different times ranging from 3 to 96 hours. Chromatographic performance of prepared monoliths was evaluated by measuring retention factor of benzene utilizing 50% aqueous acetonitrile as mobile phase. It has been observed that increasing concentration of hydrochloric acid from 0.15 to 0.6 mol/L resulted in insignificant changes in retention and ultimately lead to formation of impermeable monolith. Increase in polymerization time resulted in increased retention factor of benzene until constant value was reached after 48 hrs. Optimized monoliths show high potential for retention of hydrophobic compounds in reversed-phase liquid chromatography.

Supported by the National Science Foundation CBET-1066113 award

Department of Psychology

37. Young adult grandchildren point of view of personality change in their grandparents.

Maria C. Martinez and David Feldman (Psychology Department, Barry University, Miami Shores, Fl)

The purpose of this literature review is to examine the changes (physical, mental, and social) associated with transitioning into old adulthood. Previous research has shown that these changes not only affect the elders but the people that surround them as well, mostly family and friends. Family dynamics, emotions and relationships from the families and caregivers will also be studied. This research will be conducted to examine the perception of personality change in elders; 65 years old and older, from the point of view of young adult (18-23 years) grandchildren and how this affects the elderly relationship with the family. This research would test the idea that Hispanic and African American college students will have more interaction with their grandparents than other ethnicities. Data will be collected using a demographics questionnaire to identify the ethnicity of the grandchildren. A survey not yet developed will be used to

examine the personality changes in the elders from their grandchildren perspective. Data will be analyzed using descriptive statistics via SPSS.

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38. Diversity of executive functions: shifting, updating, and inhibition.

Andrea Tirado[1], Lily Sun[2] and Wilma Koutstaal[2] ([1]Psychology Department, Barry University, Miami Shores, Fl; [2]Psychology Department, University of Minnesota, Minneapolis, MN)

Research suggests that executive function (EF) is composed of multiple separable control processes that share some underlying commonality. The current research examined the extent to which EF is a unitary or diverse set of components. Based on previous studies, we hypothesized that, first, measures of shifting, updating, and inhibition would be positively correlated (within-process correlations) and, second, that inhibition would show relatively stronger across-process correlations. Two tasks per EF component were administered to 14 participants individually over an hour-long session. A positive moderate correlation was found among shifting, updating and inhibition, supporting hypothesis one. A stronger correlation was found among shifting and updating, supporting our second hypothesis. Our results are in line with previous research, suggesting that updating and shifting are independent components of EF that share some commonality.

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42. Diversity of executive functions: shifting, updating, and inhibition.

Khalid K. El-Amin and Guillermo Wated (Psychology Department, Barry University, Miami Shores, FL)

Research suggests that perceptions of distributive, procedural and interactional justice influence counterproductive work behavior (Aquino, 1999). Distributive justice is defined as fairness of distributions or allocations (Colquitt et. al, 2001). Procedural justice is the fairness of procedures used to determine outcomes of distributions or allocations (Colquitt et. al, 2001). Interactional justice is the fairness in beliefs on the sincerity, respectfulness, and consistency of persons in authority (Bies & Moag, 1986). The research focuses on examining the relationship between perceptions of justice and counterproductive behaviors in academic settings, specifically academic dishonesty. In general, academic misconduct encompasses multiple forms including *test cheating, plagiarism, and inappropriate collaboration* (Kisamore, 2007). The term "justice" is used to connote "righteousness" (Colquitt et. al, 2001). In academic settings, justice refers to students' perceptions of fair treatment from faculty and administrators. It is proposed that students' perception of procedural, interactional and distributive justice will be associated with greater engagement in academic dishonesty. Participants were college aged members of a private catholic university in the southeast region. Results suggest that all forms of injustice are negatively correlated with academic deviance. A regression analysis was conducted suggesting that interactional justice held the most weight on academic deviance. Students may be less likely to engage in academic dishonesty if they feel their instructors are sincere and respectful. This finding is consistent with the postulates of equity theory (Adams, 1965). According to equity theory, individuals seek fairness in their dealings with others (Adams, 1965). The results of the present suggest that instructors may want to manage students' perceptions of respect and kindness. Methods for managing students' perceptions are discussed. Some limitations to this study include the specific population of the sample, mono-method bias, and correlational non-experimental design. Further research possibilities such as longitudinal studies are discussed.

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BARRY UNIVERSITY - COLLEGE OF HEALTH SCIENCES

39. The relationship between wealth and the availability of ARV for the prevention of mother-to-child transmission in HIV-positive pregnant women.

C. Frau[1], P. Crespo[1], Y. Toro[1], L. Varghese[1], A. Vila[1], B. Anderson[1], N. Arguedas[1], N. Arango[1], D. Figueroa[1], S. Ackbarali[1], J. Montague[2] ([1]Allied Health Professions Program, College of Health Sciences; [2]Department of Biology, College of Arts and Sciences, Barry University, Miami Shores, FL).

The use of antiretroviral therapy (ART) has been proven effective in prevention of mother-to-child transmission (PMTCT) of HIV, but many nations face challenges in providing antiretroviral drugs (ARV) to HIV-positive pregnant women. It was hypothesized that poorer countries would be less successful than wealthier countries in meeting the need for ARV (%) among this population. Data were collected from the World Health Organization and World Bank. The results indicate that there is a large variation among countries of similar per capita GDP or per capita health expenditure and the percentage of ARV need met among HIV-positive pregnant women for PMTCT. This does not support our hypothesis and suggests that other factors besides national wealth and health expenditure affect a country's ability to meet the need for ARV in PMTCT.

40. Evaluation of bacterial viability using fluorescence.

Gerhild Packert, Sumera Ackbarali (Allied Health Professions Program, College of Health Sciences, Barry University, Miami Shores, FL).

The LIVE/DEAD *Bac*Light Bacterial Viability stain (Molecular Probes, Grand Island, New York) is composed of two fluorescent nucleic acid stains, SYTO® 9 and propium iodide, which stain live bacteria fluorescent green and dead bacteria fluorescent red respectively. SYTO® 9 is capable of penetrating the membranes of both live and dead bacteria, while propium iodide penetrates only damaged bacterial membranes and reduces the SYTO® 9 fluorescence. The purpose of this study was to detect live and dead bacteria in synthetic skin that was wounded and infected with *Staphylococcus aureus*. The specimen of infected skin was mounted on cork and frozen in 2-methyl butane (isopentane) cooled to -78.5°C with dry ice. A thin slice of the frozen tissue was removed from the region of the wound and embedded on end on another piece of cork for cryosectioning (10 µm thick). The sections were stained in the dark for 15 minutes with a 1:1 mixture of propium iodide and SYTO® 9, rinsed briefly in PBS and diH_2O, and coverslipped using an aqueous mounting medium. Normal, non-infected skin was used as a control. The slides were then examined using a confocal microscope. The results of this study will be further discussed.

ST. THOMAS UNIVERSITY

School of Science, Technology, and Engineering Management

41. Characterization of a novel primary neuronal culture from adult zebrafish brainstem.

Isaac Chacon[1], Francelethia Shabazz[1], Jossias Genao[1], Arjena Valls[1], Katarina Vajn[2], Martin Oudega[2], Alexis Tapanes-Castillo[1] and Jeffery Plunkett[1] ([1]School of Science, Technology, and Engineering Management, St. Thomas University, Miami Gardens, FL; [2]Departments of Physical Medicine &

Rehabilitation, Neurobiology, and Center for Neuroscience, University of Pittsburgh, University of Pittsburgh School of Medicine, Pittsburgh, PA)

The ability of the adult zebrafish (*Danio rerio*) to regenerate specific tracts within its central nervous system (CNS) after injury has been well-documented. Our lab developed a novel primary adult brainstem neuronal culture technique to better understand the molecular and cellular biology underlying this phenomenon. Characterization of the cultures, which can be maintained over 14 days under serum-containing or serum-starved conditions, revealed a heterotypic population of cells, consisting primarily of neuronal cells, with sub-populations of glial and putative stem/progenitor cells at various stages of differentiation. We are currently utilizing our culture to investigate axonal responses to growth inhibitory chondroitin sulfate proteoglycans (CSPGs), which are expressed within the zebrafish CNS pre and post injury. We have particularly focused on the CNS expressed CSPG neurocan. Our lab has performed cultures utilizing CSPGs, as well as purified Myc-tagged full-length zebrafish neurocan b (Myc-NcanB) protein, as substrates. Based on *in vivo* data, which demonstrates that brainstem neurons have different regenerative capacities, we hypothesized that our culture would contain different neuronal populations that would respond distinctively to CSPGs or Myc-NcanB presented under controlled culture conditions. Our results supported this hypothesis revealing different populations of brainstem neurons with regard to their response to CSPGs or Myc-NcanB *in vitro*. Taken together, our results suggest that the ability or disability to grow across and beyond a CSPG-rich area is intrinsic to the neuron and likely involves unique sets of axon growth-related genes.

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