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5th Annual  
**Graduate Student  
Research Symposium**

**March 15, 2018**

Charles J. Dougherty Ballroom  
Power Center, Duquesne University

Artwork by Brittney Lybarger

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The 5<sup>th</sup> Annual

# GRADUATE STUDENT Research Symposium

March 15, 2018

Charles J Dougherty Ballroom

Duquesne University



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## ACKNOWLEDGEMENTS

The organizers would like to **thank** all of the ***faculty mentors*** for their service and support of our graduate scholars.

**THANK YOU** to the Bayer School of Natural & Environmental Sciences for their donation of the corkboards.

**We would like to thank the following organizations and individuals for their generous time and support of this event:**

Bayer School of Natural & Environmental Sciences  
Center for African Studies  
Center for the Catholic Faith & Culture  
Center for Healthcare Ethics  
Center for Spiritan Studies  
Gumberg Library  
Enrollment Management Group  
McAnulty College and Graduate School of Liberal Arts  
School of Nursing  
Office of the Provost  
Office of Research, Christine Pollock & Mary McConnell-Krepps  
Phi Kappa Phi, National Honors Society  
Rangos School of Health Sciences

# SCHEDULE

Wednesday, March 14, 2018	
9:30 a.m. to 2:00 p.m.	Participant Set up
2:00 p.m. to 4:00 p.m.	Reception for Students & Judges

Thursday, March 15, 2018	
8:30 a.m. to 9:00 a.m.	Welcome
9:00 a.m. to 10:00 a.m.	Oral Presentation Session 1 Concurrent Sessions – Section A & Section B <b>Poster Session is closed at this time</b>
10:00 a.m. to 11:00 a.m.	Open Poster Session – Power Center Section C & Shepperson Suite Guests are invited to peruse projects, & engage with students
11:00 a.m. to 12:00 p.m.	Oral Presentation Session 2 Concurrent Sessions – Section A & Section B <b>Poster Session is closed at this time</b>
12:00 p.m. to 1:00 p.m.	Open Poster Session – Power Center Section C and Shepperson Suite Guests are invited to peruse projects, & engage with students Boxed lunches provided for participants
1:00 p.m. to 2:00 p.m.	Oral Presentation Session 3 Concurrent Sessions – Section A & Section B Poster Session is closed at this time
2:00 p.m. to 3:00 p.m.	Open Poster Session- Power Center Section C and Shepperson Suite Guests are invited to peruse projects, & engage with students
3:00 p.m.	Awards and Closing Remarks

# ORAL PRESENTATIONS – SESSION 1

SECTION A		SECTION B	
<b>9:00</b>	<p><b>Lindsay Carroll</b> Physical Therapy Rangos School of Health Sciences Faculty Advisor: Benjamin Kivlan, Ph.D., PT, SCS, OCS Abstract: 78 <i>Chronic Ankle Instability and Hip Muscle Function: a Systematic Review</i></p>	<b>9:00</b>	<p><b>Wanzhu Zhao</b> Pharmaceutics School of Pharmacy and the Graduate School of Pharmaceutical Sciences Faculty Advisor: Devika Soundara Manickam, Ph.D Abstract: 104 <i>Gene Delivery to the BBB for Ischemic Stroke Therapy</i></p>
<b>9:15</b>	<p><b>Deepika Rao</b> Pharmacy Administration School of Pharmacy and the Graduate School of Pharmaceutical Sciences Faculty Advisor: Vincent Giannetti, Ph.D. Abstract: 97 <i>Community Pharmacist and Substance Use Disorder: Attitudes, Knowledge and Practices: A Systematic Literature Review</i></p>		<p><b>Fahmida Hossain</b> Center for Healthcare Ethics McAnulty College and Graduate School of Liberal Arts Faculty Advisor: Gerard Magill, Ph.D. Abstract: 90 <i>Narrative Authority: Patient-Physician Relationship as a Partnership</i></p>
<b>9:30</b>	<p><b>Josef DiPietrantonio</b> Mathematics and Computer Science McAnulty College and Graduate School of Liberal Arts Faculty Advisor: Rachael Miller Neilan, Ph.D. Abstract: 82 <i>A Computational Model of Team-based Dynamics in the Workplace</i></p>	<b>9:30</b>	<p><b>Kandarp Dave</b> Graduate School of Pharmaceutical Sciences School of Pharmacy and the Graduate School of Pharmaceutical Sciences Faculty Advisor: Devika Manickam, Ph.D Abstract: 80 <i>Nanoparticle-mediated BDNF siRNA delivery for Chronic Pain Therapy</i></p>
<b>9:45</b>	<p><b>Jasia Baig</b> Center for Healthcare Ethics McAnulty College and Graduate School of Liberal Arts Faculty Advisor: Henk ten Have, M.D., Ph.D. Abstract: 76 <i>Balancing Individual and Society: Advancing Cross-Cultural Responsiveness in Clinical Practice</i></p>	<b>9:45</b>	<p><b>Kallie Crawford</b> Forensic Science &amp; Law Bayer School of Natural and Environmental Sciences Faculty Advisor: Lyndsie Ferrara, M.S. Abstract: 79 <i>Understanding the Sexual Assault Kit Backlog in Pennsylvania</i></p>

# ORAL PRESENTATIONS – SESSION 2

## SECTION A

## SECTION B

<p><b>11:00</b></p>	<p><b>Cassidy Schultheis</b> Forensic Science and Law Bayer School of Natural and Environmental Sciences Faculty Advisor: Stephanie Wetzel, Ph.D. Abstract: 107 <i>Determination of Gunshot Residue Settling Velocity</i></p>	<p><b>11:00</b></p>	<p><b>Jayne Jenkins</b> Psychology McAnulty College and Graduate School of Liberal Arts Faculty Advisor: Elizabeth Fein, Ph.D. Abstract: 111 <i>Exiting White Supremacy: Understanding Activist Interventions</i></p>
<p><b>11:15</b></p>	<p><b>Yoelit Lipinsky</b> Center for Healthcare Ethics McAnulty College and Graduate School of Liberal Arts Faculty Advisor: Joris Gielen, Ph.D. Abstract: 112 <i>Bending or Breaking? Towards a Determination of Undue Hardship in Mental Health and Reproductive Care among Hasidic (Ultra-Orthodox) Jews.</i></p>	<p><b>11:15</b></p>	<p><b>Natalie Tupta</b> Law School of Law Faculty Advisor: Ella Kwisnek, J.D., M.S.Ed Abstract: 108 <i>Reconsidering the Immutability of "Race": An Examination of the Disconnect Between "Race" in Title VII Jurisprudence and Social Science Literature</i></p>
<p><b>11:30</b></p>	<p><b>Amy Tiberi and Cydney Quinn</b> Department of Counseling, Psychology, and Special Education School of Education Faculty Advisor: Tammy Hughes, Ph.D. Abstract: 100 <i>Barriers to Accessing Healthcare and Educational Services for Children with Autism Spectrum Disorders</i></p>	<p><b>11:30</b></p>	<p><b>Jason Payne</b> Nursing School of Nursing Faculty Advisor: Melanie Turk, Ph.D., RN Abstract: 96 <i>Experiences of Overweight and Obese Adults with Weight Management Technology</i></p>
<p><b>11:45</b></p>	<p><b>Dina Siniora</b> Center for Healthcare Ethics McAnulty College and Graduate School of Liberal Arts Faculty Advisor: Henk ten Have, MD, Ph.D. Abstract: 110 <i>Abstract: Research Integrity Challenges in Developing Countries</i></p>	<p><b>11:45</b></p>	<p><b>Meghann Slatosky</b> Physician Assistant Studies Rangos School of Health Sciences Faculty Advisor: Kristin D'Acunto, MPA, PA-C Abstract: 98 <i>Capgras Syndrome: The Delusion of Imposters</i></p>



# ORAL PRESENTATIONS – SESSION 3

## SECTION A

## SECTION B

<p><b>1:00</b></p>	<p><b>Karen Alexander</b>            Graduate            School of Nursing            Faculty Advisor: Rebecca Kronk, PhD, MSN, CRNP            Abstract: 75  <i>The effect of a mindfulness intervention on the depression symptoms of mothers in treatment for an opioid use disorder</i></p>	<p><b>1:00</b></p>	<p><b>Alyssa Mehlhorn</b>            Physician Assistant Studies            Rangos School of Health Sciences            Faculty Advisor: Kristin D'Acunto, MPA, PA-C            Abstract: 92  <i>Exploring Fertility Options with a Unicornuate Uterus</i></p>
<p><b>1:15</b></p>	<p><b>Siddiq Ahmed</b>            Psychology, Counseling and Special Education            School of Education            Faculty Advisor: Kinsey Wright, Clinical Instructor            Abstract: 105  <i>The Effectiveness of a Peer-Mediated Intervention on Writing Skills in Students With Autism Spectrum Disorder and Student with a Learning Difficulty in Inclusive Classroom</i></p>	<p><b>1:15</b></p>	<p><b>Andrea Rague</b>            Medicinal Chemistry            School of Pharmacy and the Graduate School of Pharmaceutical Sciences            Faculty Advisor: Kevin Tidgewell, Ph.D.            Abstract: 109  <i>Isolation of veraguamides from cyanobacteria of the genus Oscillatoria</i></p>
<p><b>1:30</b></p>	<p><b>Beth Tremblay</b>            Nursing            School of Nursing            Faculty Advisor: Melanie Turk, Ph.D., RN            Abstract: 101  <i>A Qualitative Mini-Study of young adults who use electronic nicotine delivery systems (ENDS)</i></p>	<p><b>1:30</b></p>	<p><b>Julia Marn</b>            Physician Assistant            Rangos School of Health Sciences            Faculty Advisor: Fr. Bill Christy, C.S.Sp.            Abstract: 93  <i>Pediatric Oncology in Tanzania: A study of current epidemiology, diagnostics, treatments, outcomes, and barriers to care in the Kilimanjaro Region</i></p>
<p><b>1:45</b></p>	<p><b>Christyn Davidson and Gianna Amplo</b>            Speech-Language Pathology            Rangos School of Health Sciences            Faculty Advisor: Sarah Wallace, Ph.D            Abstract: 81  <i>Narrative Comprehension by People with Aphasia given Single versus Multiple Modality Presentation</i></p>	<p><b>1:45</b></p>	<p><b>Collin Kessler</b>            Biological Sciences            Bayer School of Natural and Environmental Sciences            Faculty Advisor: Wook Kim, Ph. D.            Abstract: 106  <i>Identification of Genetic Elements that Regulate a Cyclic di-GMP Mediated Multicellular Trait in Pseudomonas fluorescens</i></p>

## SPECIAL AWARDS

### **BAYER SCHOOL FOR NATURAL AND ENVIRONMENTAL SCIENCES**

#### **Award for Graduate Research-Excellence in Graduate Research:**

**Two awards, \$300 each**

Students whose projects fall within the realm of the basic sciences are considered for this award. Projects are evaluated based upon organization, creativity, clarity, and technical content.

### **CENTER FOR AFRICAN STUDIES**

#### **Award for Graduate Student Research in African Studies: \$400**

This award is intended to encourage and reward graduate research in African Studies and related areas that engage Duquesne's ongoing commitment to Africa. Evaluations are based upon visual presentation, organization, creativity, and clarity.

#### **Award for Graduate Student Research in Global Health: \$400**

This award is intended to encourage and reward graduate research in Global Studies. Evaluations are based upon visual presentation, organization, creativity, and clarity.

### **CENTER FOR CATHOLIC FAITH & CULTURE**

#### **CENTER FOR SPIRITAN STUDIES**

#### **Common Good Research Award: \$500**

The Centers recognize and reward research from any discipline that aligns with Duquesne's Catholic, Spiritan mission, particularly our commitments to: the dignity and equality of all persons, working with vulnerable populations for systemic change, and preserving justice, peace, and integrity of creation.

### **CENTER FOR HEALTHCARE ETHICS**

#### **Award for Graduate Research in Ethics: \$250**

This award aims to promote the interest of students for issues in healthcare ethics within contemporary society and culture. It also intends to encourage graduate research in the area of healthcare ethics. The HCE prize is for the presentation that best highlights ethical issues in healthcare and ethical dimensions of developments in science and technology for human health and wellbeing.

### **GUMBERG LIBRARY**

#### **Award for Graduate Research: \$300**

The Gumberg Library Award for Graduate Research recognizes excellence in application of research methods that demonstrate substantial use of library resources. Outstanding projects in any field of study that incorporate significant use of library expertise, resources, collections, and/or services are eligible.

**MCANULTY COLLEGE AND GRADUATE SCHOOL OF LIBERAL ARTS**

**Outstanding Poster or Presentation: \$250**

The aim of this award is to recognize excellence in the liberal arts. Projects will be evaluated based upon organization, clarity, and content.

**PHI KAPPA PHI, NATIONAL HONORS SOCIETY**

**Outstanding Research Award: \$500**

Research projects from all disciplines are eligible for these awards. The awards serve to recognize outstanding scholarship across all disciplines in the university. They will be given to a student or students who demonstrate exceptional scholarship through either poster or oral presentation.

**OFFICE OF THE PROVOST**

**Provost's Award for Outstanding Scholarship: \$250**

**Honorable Mention: Two awards, \$125 each**

Students from all disciplines who are participating in the GSRS are eligible for these awards. A committee of administrators and faculty will judge posters and oral presentations based on intellectual merits and demonstration that the research presented meets the standards for its field.

**RANGOS SCHOOL OF HEALTH SCIENCES**

**Award for Graduate Research: \$250**

Students who are in the school of Health Sciences are eligible for this award.

**SCHOOL OF NURSING**

**Award for Graduate Research: \$250**

Students from the School of Nursing are considered for this award.

# ABSTRACTS

\*Indicates oral presenter & poster

\*\*Indicated oral presenter only

## **1 A Case of Isolated Hypomagnesemia as an Etiology of Reversible Psychosis**

Shelby Wasil

Physician Assistant | Rangos School of Health Sciences

Faculty Advisor: Kristin D'Acunto, MPA, PA-C

Clinicians rarely consider magnesium homeostasis as a necessary element of patient care. However, magnesium is a crucial cofactor for important cellular operations, including the functioning of neurons. Severe reductions in magnesium within the body can cause altered mental status. This is the case of a 61-year-old patient who was hospitalized in a mental health unit for rapid cognitive decline. The patient was previously able to function independently, but her mental status had significantly deteriorated over the four weeks leading up to hospitalization. Blood work revealed that her altered mental status was caused by low serum magnesium, or hypomagnesemia. By treating the patient with oral magnesium replacements, she returned to her baseline mental functioning within three weeks without any residual behavioral problems. Hypomagnesemia is more common than health care teams are aware, but rarely does it require inpatient psychiatric evaluation. This case teaches clinicians that magnesium is a crucial component of a healthy mental state. Failure to recognize hypomagnesemia could result in misdiagnosis, possibly committing a patient to a life in a hospital when, in actuality, their condition is curable.

## **2 A Lab-Based System to Study the Microbial Impacts on Passive Remediation Systems for AMD**

Michelle Valkanas

Other Authors: Nancy Trun, Ph.D.

Biological Sciences | Bayer School of Natural and Environmental Sciences

Faculty Advisor: Nancy Trun, Ph.D.

Abandoned mine drainage (AMD) affects over 3,000 miles of streams in Pennsylvania and 300,000 miles in the United States. Passive remediation systems are commonly used to treat AMD and efficiently remove contamination through the increase of pH (if necessary), aeration, settling ponds, and wetlands. Passive systems depend primarily on geochemical reactions. Microbial communities are naturally formed in these systems and vary, depending on the pH and the type of contaminants present. To study causal relationships of observations we have made in situ on contaminant levels and microbial communities, we have developed a lab-based system to study the impacts of bacteria on AMD contaminants. Slurries were collected from several ponds in two different passive remediation systems, both treating alkaline mine drainage. Bacterial communities were isolated and grown in the lab-based system to determine the impact microbial communities have on sterilized AMD. There was resolubilization of iron by bacteria from both systems, showing the potential for microbial communities to affect soluble contaminant levels. Starting with bacteria from the passive systems, enrichment cultures were grown in different media through 5 transfers and incubated in the lab-based system (after 3rd and 5th transfers). The enrichment cultures identified bacterial communities that could resolubilize

iron and, to a lesser extent, manganese. We are currently identifying the bacteria and metabolic reactions in the enrichment cultures responsible for the observed effects. This will lead to a better understanding of the bacteria that have a direct impact on AMD.

### **3 A Pediatric Presentation of a Partial Interstitial Chromosome 18q Deletion**

Maggie Marcus

Physician Assistant | Rangos School of Health Sciences

Faculty Advisor: Kristin D'Acunto, MPA, PA-C

Chromosome 18 deletion disorders are found in approximately 1 out of 40,000 births, occurring as a deletion of 18p, 18q, or ring (18) abnormalities. Hemizygoty may vary in accordance with gene region and size of the area involved. The possibility of such vast deviations in genotype creates difficulty in collecting associated phenotypic data as well as diagnosing these conditions. We present the case of a seven year old male whom we encountered in the emergency department with a diagnosis of chromosome 18q interstitial deletion involving regions 18q21.1 and 18q21.33. After a premature birth at 31.5 weeks via C section amongst various pregnancy complications, he displayed plagiocephaly, dysmorphic features, developmental delays, short stature, cryptorchidism, myopic astigmatism, and bilateral clinodactyly of the 5th digits within the first year of life. Gastrostomy tube placement was indicated due to aversion to PO intake and subsequent failure to thrive. He was later diagnosed with bilateral glaucoma, as well as persistent gross developmental, verbal and motor delays. This case illustrates the uniqueness of chromosome deletion disorders and attempts to find correlations between affected gene regions and phenotypic features.

### **4 An anti-viral immune response is associated with increased neural stem/progenitor cell proliferation and neurogenesis in the adult brain**

Manisha Chandwani, Kristen N. Fantetti, Lauren A. O'Donnell, Ph.D.

Pharmacology | School of Pharmacy and the Graduate School of Pharmaceutical Sciences

Faculty Advisor: Lauren O'Donnell, Ph.D.

Viral infections in the central nervous system (CNS) alter neural stem/progenitor cell (NSPC) activity and survival via direct infection by the virus or potentially through the effects of the anti-viral immune response. Our previous work demonstrated that neonatal NSPCs were protected by the anti-viral cytokine, interferon gamma ( $IFN\hat{\gamma}^3$ ), during a CNS infection, although the neonates ultimately succumbed to the infection. Here, we examined the response of adult NSPCs during CNS infection, where the anti-viral immune response controls the virus and the mice survive. In order to test the response of adult NSPCs in vivo, we utilized the NSE-CD46+ transgenic mouse model. This line expresses human CD46, a measles virus (MV) receptor, under the control of the neuron specific enolase promoter. Thus, only CNS neurons are infected by MV, sparing the NSPCs from viral infection. We infected adult mice at postnatal day 60 and analyzed the hippocampus by flow cytometry at 7, 21, and 60 days post-infection (dpi). In MV-infected adults, there was no change in nestin+ NSPCs at 7 and 21 dpi, but there was an increase in nestin+ cells at 60 dpi. A similar pattern was observed in immature neurons stained for doublecortin. In contrast, glial precursor cells (A2B5+) were unchanged by infection. In adult mice lacking  $IFN\hat{\gamma}^3$  (CD46+/ $IFN\hat{\gamma}^3$ -KO), there was an increase in NSPCs at 21 and 60 dpi, and an increase in the immature neuron population at 21 dpi only. This increase in NSPCs and immature neurons at 21 dpi might be attributed to a higher neuronal dropout in the CD46+/ $IFN\hat{\gamma}^3$ -KO infected mice compared to the CD46+ infected mice. Current studies aim to understand age-dependent differences in  $IFN\hat{\gamma}^3$  signaling in NSPCs.

These studies highlight the importance of anti-viral immune responses on adult NSPCs, and may link the control of NSPC proliferation and neurogenesis to specific anti-viral cytokines.

### **5 An Atypical Presentation of Gynecomastia in a Male**

Anna Zenkova

Department of Physician Assistant Studies | Rangos School of Health Sciences

Faculty Advisor: Kristin D'Acunto, MPA, PA-C

Gynecomastia is a common condition among men over 50 years old. The typical finding of gynecomastia is compressible, sub-areolar glandular tissue. Atypical presentations include unilateral, irregular, immobile tissue growth with nipple inversion and skin dimpling. This case discusses a 53-year-old white male presenting atypically as described on right breast. The patient had an ultrasound performed on both breasts which showed hypoechoic, irregular densities with malignant characteristics. Due to limitations of resources available in the facility, a biopsy of only the right breast tissue to rule out malignancy was performed and revealed fibroadipose tissue consistent with gynecomastia. Reasons for this presentation are most likely due to structural similarities of benign gynecomastia and malignant breast tissue. Although certain findings such as tissue mobility with regular borders bilaterally help differentiate benign gynecomastia from a neoplasm on physical exam, some of them may be misleading, and biopsy is required to make a final diagnosis. If border irregularity or a hard mass is present on palpation, a biopsy must be performed to rule out potential breast neoplasm in a patient.

### **6 A Rare and Advanced Case of Temporomandibular Joint Osteoarthritis**

Jillian Meaney

Physician Assistant | Rangos School of Health Sciences

Faculty Advisor: Kristin D'Acunto, MPA, PA-C

Osteoarthritis (OA) of the temporomandibular joint (TMJ) is a degenerative disease of the jaw joint that is often unilateral and affects the articular cartilage, subchondral bone, and synovial membrane, causing bony changes and remodeling leading to pain and/or dysfunction of the jaw joint. TMJ disorders affect approximately 15-12% of the general population, however severe cases are quite rare. In cases with severe degeneration, however, a total joint reconstruction with alloplastic prosthesis is the only option for return to both form and function of the jaw. We present a case of a 48-year old female who was found to have severe and late stage temporomandibular joint osteoarthritis (TMJ OA) on MRI. MRI revealed extensive macerated degeneration of her left TMJ including damage to the surrounding synovial joint and soft tissues. As a result of the extensive degeneration, the Oral and Maxillofacial specialists determined she would require a total left jaw alloplastic prosthesis with surgical reconstruction to restore form and function to the jaw joint.

### **7 Analysis of Metallic Components of GSR from Various Types of Ammunition and Firearms Utilizing an SEM-EDX**

Jenna Campbell

Forensic Science & Law Master's Program | Bayer School of Natural and Environmental Sciences

Faculty Advisor: Michael Van Stipdonk, Ph.D.

Gunshot residue (GSR) is a chemical reaction that occurs when a firearm is discharged, which emits a cloud of gases from the barrel of the gun. It consists of both the burned and unburned primer and gunpowder components, which can be organic and inorganic in nature. The inorganic components are

in the primer, which consists of lead, barium, and antimony. These elements are considered heavy metals. Additionally, they are the three key elements found in the primer that characterize whether or not it is GSR. This study aimed to develop a method to differentiate among the inorganic components found in different types of ammunition used in a variety of firearms. A 20 Gauge Pardner SBI Shotgun, a .30-06 Ruger M77 Rifle, a .22 Ruger Super Single Six Revolver, and a 9 mm Beretta 92 FS Pistol were fired five times for each of the four caliber and ammunition types. The ammunition consisted of 20 gauge, .30-06, .22, and 9mm calibers each for Federal Premium, Hornady, Remington, and Winchester ammunition. The right and left hands were tested for GSR by using aluminum stubs with a sticky carbon adhesive plating. The hands were stubbed starting with the dominant hand's trigger finger, moving down towards the thumb. Control stubs were also analyzed. One of the control stubs was used on a clean hand and the other control stub was solely the sticky carbon adhesive. The metallic components on each stub were optimally visualized and identified on the Scanning Electron Microscope coupled with an Electron Dispersive X-Ray Spectrometer (SEM-EDX). The results were examined by comparing these quantities and identities across each ammunition type. A comprehensive database will be produced so that the forensic science community can benefit by enabling them to compare and contrast their own GSR results.

### **8 Allergic Contact Dermatitis to Topical Antibiotic Ointment**

Nathaniel Bucci

Physician Assistant Studies | Rangos School of Health Sciences

Faculty Advisor: Brenda Swanson-Biearman, DNP, MPH, RN

Topical antibiotic medications are commonly used to prevent infections and promote proper wound healing. Allergic contact dermatitis is an uncommon, although well-documented, side effect of topical antibiotic use. The prevalence of these hypersensitivity reactions is largely unknown and vary from geographic region based on customs, socioeconomic status, and occupational exposures. Even among topical antibiotics, mupirocin (Bactroban), is considered safe and well-tolerated, with hypersensitivity reactions rarely occurring. We present a case of a 22-year old female with a less than one-centimeter papule on an erythematous base, located on the right upper border of her lip, after being treated for a facial abscess with mupirocin ointment. The lesion was nontender without an abscess, induration, or signs of purulent drainage. In comparison with other case studies of allergic contact dermatitis due to topical antibiotics, our patient had a similar history and physical examination. The patient was instructed to discontinue use of mupirocin, but was lost to follow-up prior to patch testing.

### **9 An Atypical Presentation of Infectious Mononucleosis**

Taylor Trypus

Physician Assistant Studies | Rangos School of Health Sciences

Faculty Advisor: Kristin D'Acunto, MPA, PA-C

Epstein-Barr virus (EBV) is a herpes virus that is most frequently transmitted via salivary exchange and can remain in humans for life by colonizing memory B cells. Approximately 50% of patients with a primary EBV infection present as typical infectious mononucleosis, with the classic triad of symptoms of fever, pharyngitis, and lymphadenopathy. In less than 5% of cases, primary infectious mononucleosis presents with laboratory values indicating cholestatic hepatitis in the absence of other typical symptomatology. We present a case of a 30-year old white female with no significant past medical history who presented with complaints of non-specific epigastric pain, intermittent fevers, chills, and

dark urine one day after arriving home from a three week trip to Europe. The results of her laboratory studies revealed marked bilirubinuria and elevated total bilirubin, aspartate aminotransferase, alanine aminotransferase, and alkaline phosphatase, indicating cholestatic hepatitis. These laboratory results, in addition to her recent travel and absence of classic infectious mononucleosis symptomatology, made the top differential diagnosis hepatitis A. Subsequently, a hepatitis panel was ordered, however the results were negative and further work-up revealed atypical lymphocytosis. Due to this finding, a Monospot was ordered. The results were positive, leading to the final diagnosis of infectious mononucleosis.

## **10 Application of Linear Modeling to Complex Nanoemulsions**

Eric Lambert

Pharmaceutics | School of Pharmacy and the Graduate School of Pharmaceutical Sciences

Faculty Advisor: Jelena Janjic, Ph.D.

Perfluorocarbons (PFCs) formulated as oil-in-water (O/W) nanoemulsions (NEs) have demonstrated enormous potential as diagnostic and therapeutic agents in the nanomedicine field. Clinical success, which is a major challenge (Satalkar, Elger et al. 2016), requires nanomedicine platforms to exhibit acceptable shelf-life and consistent quality attributes. One strategy for obtaining consistent and acceptable quality is to build critical properties into the product during the development stage (Duncan and Gaspar 2011). Depending on the pathology of the condition and the intended use of the therapy, nanoemulsion composition can differ substantially, which manifests in inter-formulation variability in colloidal properties, making each formulation suited for limited purposes. Nanoparticle shelf-life and in vivo performance are universal and are sensitive to droplet size and size distribution of the formulation (Desai 2012). Therefore, it is critical to fully understand their dependence on composition. Our complex triphasic nanoemulsions, formulated as parenteral PFC/O/W, have previously been developed to allow therapeutic and diagnostic functions to occur simultaneously (Patel, Patrick et al. 2013). Here, we have applied multiple linear regression strategies to a similar set of unique formulations. The models aim to contribute to understanding of individual component contributions of complex nanoemulsions, thereby providing a link between composition and performance/attributes. Four PFC and hydrocarbon oils exhibiting diverse structural properties as well as one solubilizer and a HC-PFC conjugate were selected as model excipients. NE size and size distribution models were fit and validated with new samples. This innovative characterization marks a first-of-its-kind approach to formulating and characterizing complex PFC NEs. It is expected that similar efforts focusing on early stages of development of predictive modeling will be applied to various products to aid in procuring consistent and reliable formulations.

## **11 An Unusual Case of Diabetic Ketoacidosis**

Kristen Struzzieri

Physician Assistant | Rangos School of Health Sciences

Faculty Advisor: Kristin D'Acunto, MPA, PA-C

Diabetic ketoacidosis consists of the triad of hyperglycemia ( $>250$  mg/dL), a pH of  $<7.3$ , and a bicarbonate level of  $<18$  mEq/L; however, there have been few cases reported of diabetic ketoacidosis without hyperglycemia. This is called euglycemic diabetic ketoacidosis, or EDKA. The criteria for EDKA is that of diabetic ketoacidosis, with the exception of blood glucose levels  $<200$  mg/dL. The case discussed involves a 62 year old Caucasian male with only significant past medical history of recurring urinary tract infections. He presented to the emergency department in severe uncompensated



metabolic acidosis. When traditional methods of acidosis correction failed, atypical causes of acidosis needed to be considered. After a beta-hydroxybutyrate acid level was checked, the diagnosis of EDKA was made. This case supports the need for high clinical suspicion of EDKA when examining a patient in metabolic acidosis. It also highlights some of the risk factors associated with EDKA, such as co-infection. Beta-hydroxybutyrate levels which identified EDKA in this patient have previously been utilized to monitor DKA treatment's success, but here we examine the possibility of its role as an essential diagnostic.

### **12 Assessing the efficacy of novel melatonin-tamoxifen hybrid ligands on breast cancer**

Mahmud Hasan, Thomas D. Wright, Mohamed A. Marzouk, Benton P. Miller, Darius P. Zlotos, Jane E. Cavanaugh, Ph.D. and Paula A. Witt-Enderby, Ph.D.

Pharmacology | School of Pharmacy and the Graduate School of Pharmaceutical Sciences  
Faculty Advisor: Paula Witt-Enderby, Ph.D.

Background: Melatonin/tamoxifen hybrid ligands (HLs) linked together by 2, 4, 5, 9 or 15 carbons were developed to enhance the anti-cancer actions of tamoxifen but to also lessen the adverse effects of tamoxifen. Tamoxifen is known to increase the risk of uterine cancer, disrupt sleep and induce resistance in ER+ breast cancer (BC) when used chronically. The anti-cancer actions (cell proliferation, cell migration, melatonin, and estrogen receptor binding affinities) of 5 HLs (C2, C4, C5, C9, C15) differing only in the number of carbons linking the 2 drugs were tested in 5 phenotypically diverse BC cell lines—MCF-7 (ER+/PR+), tamoxifen-resistant (TamR) MCF-7, MMC (HER2+), and triple negatives (MDA-MB-231 and BT-549).

Results: All HLs (C2, C4, C5, C9, C15) bound to the human MT1 melatonin receptor (MT1R) and the C5 HL displayed the highest binding affinity equal to that of melatonin—all others displayed lower binding affinity. With respect to binding to human estrogen receptors (ERs), only the C4 and C5 HLs bound to ERs equal to that of tamoxifen or 4-OH-tamoxifen. No concentration-dependent inhibition of [125I]-estradiol/[3H]-estradiol binding occurred for C2, C9, and C15 HLs. When tested for inhibition of BC cell proliferation and migration, both C4 and C5 HLs were the most potent and efficacious compared to the other HLs (C2, C9, C15). The C4 and C5 HLs were also more potent and efficacious when compared against co-administration of melatonin and tamoxifen or 4-OH-tamoxifen but unlinked. The C4 and C5 HLs were also potent against TamR BC cells with respect to inhibiting cell proliferation and migration.

Conclusions: These findings suggest that conjugated (linked) melatonin-tamoxifen HLs linked by 4 or 5 carbons may be novel anti-cancer drugs against BC but more importantly tamoxifen resistant or triple negative BCs.

### **13 Appendiceal Mucinous Adenocarcinoma: An Abnormal Presentation of Perforated Appendicitis**

Drew Miller

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Faculty Advisor: Kristin D'Acunto, MPA, PA-C

This report summarizes the case of a 63-year-old white female referred to general surgery for an appendectomy. The post-operative diagnosis was acute appendicitis with a developing abscess cavity and a perforation. The appendicular pathology report demonstrated an incidental finding of mucinous adenocarcinoma with concomitant transmural appendicitis and tissue necrosis.

Appendiceal mucinous adenocarcinoma is a rare neoplasm typically presenting as an incidental finding secondary to appendicitis. It characteristically produces pseudomyxoma peritonei of the abdominal cavity, which was not observed in this patient. Instead, a forming abscess cavity within the appendix was found. This abscess was post-operatively determined to be a collection of mucin produced by the adenocarcinoma. The appendiceal perforation was attributed to tissue necrosis related to the adenocarcinoma.

This case illustrates an incidental finding of appendiceal mucinous adenocarcinoma complicated by an atypical presentation and advocates for histologic examination of all appendectomy specimens. Without the histopathology report of a specimen, there is risk for undetected appendiceal cancers to opportunely proliferate and metastasize. This report provides insight for medical providers into the rarity of appendiceal neoplasms and an atypical presentation of mucinous adenocarcinoma.

#### **14 Autism Training for Probation Officers**

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School Psychology | School of Education  
Faculty Advisor: Tammy Hughes, Ph.D.

Although there is no clear link between disabilities and crime, individuals with disabilities are involved in the criminal justice system at a higher rate than those without disabilities. Specifically, individuals with autism spectrum disorders (ASD) are anticipated to have up to seven times more contact with law enforcement over the course of their lifetime than their peers and as many as 60% of adjudicated youth in some facilities meet the criteria for ASD. Understanding ASD in the context of the justice system is important because the motivation for criminal activity is typically different for individuals with ASD as compared to other offenders. In addition, ASD traits may often be misunderstood by professionals in the juvenile justice setting. In order to help juvenile justice professionals better understand how traits of autism can mimic criminal attributes, it is necessary to help these professionals, including probation officers, more fully understand the social, emotional, behavioral, and cognitive features of ASD.

#### **15 Atypical Presentation of Vasospastic Angina in a 45-year old Female**

Katlyn Rop  
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Vasospastic angina (VSA) is a condition characterized by transient coronary artery spasm. Most frequently seen in females, VSA is typically asymptomatic, and therefore remains undetected. When symptoms occur, VSA presents as chest pain at rest during night or early morning, rarely associated with activity. Classic diagnostic findings include transient ST segment depressions or elevations on EKG, normal cardiac markers and negative cardiac stress testing. Spasms during angiography can aid in diagnosis, however normal coronary arteries will be visualized between attacks. Deviation from the typical clinical picture of VSA can delay diagnosis and treatment, leading to complications, such as myocardial infarction, atrioventricular block, and arrhythmias. Therefore, prompt recognition and treatment are crucial for successful management. We present a case of a 45-year-old female with non-radiating, substernal chest pain induced by activity. Diagnostic findings included a new left bundle branch block, elevated troponin T levels and a positive stress test. Coronary angiography revealed

normal coronary arteries. A clinical diagnosis of VSA was made based on presentation, EKG findings, the lack of angiographic evidence of stenosis, and based on responsiveness to treatment.

### **16 Behavioral characterization of cyclophosphamide-induced cystitis**

Heather Allen

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Faculty Advisor: Benedict Kolber, Ph.D.

Chronic bladder pain, often diagnosed as interstitial cystitis, is one of the most common visceral pain conditions in the United States, affecting between 5 and 10 million Americans. Interstitial cystitis patients experience increased frequency and urgency of urination and intense, burning pain during bladder filling and voiding. Additionally, bladder pain patients also frequently suffer from affective comorbidities, such as anxiety and depression. The cause of and mechanisms driving interstitial cystitis are unknown, and as a result diagnoses and treatments are poor and ineffective. Cyclophosphamide is a chemotherapeutic drug whose metabolite, acrolein, causes bladder inflammation and produces a bladder pain-like phenotype in both human patients and mice. Cyclophosphamide-induced cystitis is an established model of bladder pain in the literature, but there is no standardized treatment paradigm and the behavioral characterization of this model is lacking. Here, we used a series of repeated, low-dose cyclophosphamide injections to induce cystitis and study the behavioral effects of the treatment. We performed a variety of behavioral assays to explore the effects of cyclophosphamide-induced cystitis on abdominal mechanical hypersensitivity, anxiety-like, and depression-like behavior. Behaviors were assayed in cyclophosphamide-treated mice as well as saline-treated control mice at various time points following the completion of treatment. We hypothesized that mice treated with cyclophosphamide would display behavioral differences in mechanical sensitivity, anxiety-, and depression-like behaviors compared to mice treated with a saline control.

### **17 C.B.D.: Putting the "Fun" in the Funeral Business**

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Faculty Advisor: Alima Bucciantini, Ph.D.

This project reviews how society's changing views about death, dying, and the grieving process perfectly framed the emerging professionalism of the embalming industry and the funeral business in general. Modern embalming could not have taken root in American society without implicit and explicit forms of support from across the larger cultural landscape throughout the mid-to-late 19th century. The practical need for cadaver preservation in travel after the American Civil War framed by the sentiment fostered by Queen Victoria's promotion of extreme mourning practices led to a revival of the study and practice of preserving the dead.

As medical institutions grew in stature, technological advances revolutionized treatment, and health care became accessible to more and more people, a new perspective on death began to take hold on the United States: Life must be sustained at all costs, with death viewed as a devastating defeat. Getting the embalming job done, however, changed dramatically by the time Western culture craved the growth of such a morbid industry, as arterial embalming became the predominant method of getting any sort of substance circulated throughout the corpse. The production of such substances was not standardized, as each embalmer had their preferences using arsenic-based recipes, and the tools of the trade were

not uniform either, as most were imported or custom-made. This presentation will focus on the standardization and development of the embalming industry which stemmed from Carl Bruno Dolge, a German immigrant who not only developed modern formaldehyde-based embalming fluids, but had also established the first permanent school of embalming and patented a variety of tools of the trade still used today.

At the turn of the century, Carl found himself settled at the center of what historians have identified as a "mortality revolution." Specializing in embalming solutions and supplies, he changed the lives of those who daily dealt with the dead and promoted the professionalism of the emerging field of mortuary science.

### **18 Atypical Nodal Pattern in Primary Urethral Cancer**

Christopher Curran

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Faculty Advisor: Brenda Swanson-Biearman, DNP, MPH, RN

Primary urethral carcinoma (PUC) has been documented as less than 1% of all malignancies, making it one of the rarest genitourinary cancers. It typically manifests itself with common urinary complaints of obstruction, irritation, and hematuria. Some established risk factors include urethritis, radioactive seed implanting, recurrent urinary tract infections, and urethral diverticula. It is usually found on physical exam and followed up with cystourethroscopy with biopsy. Most tumours will have metastasis to the pelvic lymph nodes with distant metastasis being rare. We present a case of a 71-year old white female who presented to the emergency department with gross hematuria over a one-month period where a 1 centimeter hard, non-mobile mass was found at the distal urethra. She then underwent a radical cystectomy with anterior pelvic exenteration, pelvic lymph node dissection, and an ileal conduit that was tolerated well without complication. On follow up, two months later, computed tomography of the abdomen and pelvis revealed a growing left inguinal lymph node that was then biopsied to show reoccurrence of squamous cell carcinoma. A bilateral inguinal lymph node dissection was then performed without complication.

### **19 Cardiac Manifestations as Presenting Symptoms of Hereditary Hemochromatosis**

Leah Snyder

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Faculty Advisor: Kristin D'Acunto, MPA, PA-C

This case involves a 49-year-old male with a past medical history of implantable cardioverter-defibrillator (ICD) placement due to history of recurrent ventricular tachycardia (VT), previous myocardial infarction (MI), hypothyroidism, depression, hypertension, and chronically elevated transaminases who presented to the hospital with dull substernal chest pain that began the night before. He rated it 6/10 on the pain scale. Cardiac workup was negative and GI was consulted. Ultrasound (US) and CT showed mild ascites, possibly indicating early cirrhosis. Workup for chronic liver disease was done outpatient. An increased iron level of 220mcg/dL and ferritin level over 1000ng/mL revealed hereditary hemochromatosis (HH) to be the primary etiology of his cardiac symptoms and elevated transaminases, which was confirmed by a homozygous c282y genotype on HFE gene analysis. This diagnosis was not determined previously and late stage complications developed. With the complication of cirrhosis, the patient now has an increased risk for more serious conditions including

hepatocellular carcinoma. Although cardiac involvement is common in HH, chest pain and VT are not typically the presenting symptoms of HH. Clinicians must have high suspicion of HH in order to diagnose early, facilitate successful outcomes with appropriate treatment, and prevent late stage complications associated with the disease.

## **20 Characterization of bidirectional Arx from Alkalilimnicola ehrlichii MLHE-1**

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Faculty Advisor: John Stolz, Ph.D.

Arsenic has been known as a notorious poison for years. Though toxic to many organisms, there are wide varieties of bacterial and archaeal strains that have developed resistance to arsenic and are able to utilize arsenic as an energy source for growth. Different enzymes have evolved for detoxification (ArsC) and respiration, including reduction (ArrAB) and oxidation (AioAB and ArxAB). Among the bacterial species, novel strain MLHE-1 of the Ectothiorhodospira, isolated from Mono Lake, CA, is unique in its arsenic metabolism. MLHE-1 lacks the classic arsenite oxidase AioAB, but possess another membrane enzyme ArxAB for arsenite oxidation. ArxA is novel due to its bidirectionality as it's able to function biochemically as both As(III) oxidase and As(V) reductase. The proposed study is to purify and fully characterize Arx from MLHE-1 and determine its efficacy for bioremediation strategies applied to arsenic contaminated environments.

## **21 Chronic Calculous Cholecystitis in a 19-Year Old Female**

Laura Toman

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Faculty Advisor: Kristen D'Acunto, MPA, PA-C

Gallstone disease is a common health problem estimated to impact 20 to 25 million Americans. In some cases, the cause of gallstones may be difficult to definitively determine. However, the disease is often linked to other conditions, including obesity and diabetes. Like these problems which are growing in number, health care professionals have reported a 20 percent increase in gallstone disease over the last three decades. Additionally, gallstones occur less frequently in the younger population. However, symptomatic gallstones and related hospitalizations have also risen in this age group. With complications that can occur and the increase in the mortality rate, it is important for patients to recognize the symptoms of the disease and evaluate treatment options as early as possible. We present a case of a 19-year old female that underwent an elective cholecystectomy to resolve her abdominal pain caused by gallstones. The patient was found to have significant fibrosis and scarring. Therefore, a cholangiogram which is used to locate the gallstones within the common bile duct, could not be performed. With these conditions, the likelihood of having residual gallbladder remnants after surgery increases and the patient is at risk of developing gallstones again later in life.

## **22 Coping in African Americans with Inflammatory Bowel Disease: An Integrative Review of the Literature**

Patricia Scott

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Given the chronic nature of inflammatory bowel disease, understanding the coping behaviors of individuals affected with the disease is important to influence health outcomes. Although minorities comprise a significant portion of individuals with the disease, little is known about the potential influence of one's culture, specifically among African

Americans, on coping with inflammatory bowel disease. This integrative literature review examined the past decade of research related to the coping behaviors of African Americans living with inflammatory bowel disease to identify opportunities for further research. Five studies were identified via database searches of PubMed, PsychInfo, CINAHL, and the Cochrane Library and limited to studies published in English, full-text, peer-reviewed, and adult samples that included African Americans. Findings lacked information specific to coping in African Americans. Results were categorized by coping and disease activity, acquisition of knowledge, and personal coping. An association between poor coping behaviors and active disease was reported. The disease frequently hindered academic pursuits of college students with increased knowledge about the disease associated with the use of better coping strategies. Personal coping behaviors were reported in stressful social situations, food choices, and religion. Results emphasized the need for future research to explore the influence of culture on the coping behaviors of African Americans with inflammatory bowel disease.

### **23 Cultural Influences to Collaboration between Special Education Teachers and Parents in Saudi Arabia**

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Faculty Advisor: Ann Huang, Ph.D.

Collaboration between special education teachers and parents is an important area that schools have to deal with. Effective collaboration is influenced by many factors such as cultural competency among school personnel. Many special education teachers lack cultural awareness and understanding of students diverse cultural backgrounds. Given the importance of effective collaboration among special education teachers and families of students with disabilities, it is necessary to explore cultural factors that may influence effective collaboration. This paper, explores cultural factors that influence effective collaboration between special education professionals and families of children with disabilities in Saudi Arabia.

### **24 Design, synthesis and antimalarial activity of narannjamide analogs**

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Nonribosomal peptides are a distinct class of marine cyanobacterial secondary metabolites with a wide array of biological activities, including but not limited to, anticancer, antifungal, antiparasitic and antimicrobial activities. Recently, we discovered an N-methylated pentapeptide, naranjamide, from a Panamanian cyanobacterium that displayed inhibition of growth of *Trypanosoma cruzi* (81.51%) and *Plasmodium falciparum* (79.6%). These two parasites are the causative agents of American

trypanosomiasis or Chagas disease and malaria respectively. A synthetic version of the natural product inhibited both *T. cruzi* and *P. falciparum* with IC50 values of 9.23  $\mu$ M and 2.79  $\mu$ M, respectively. In an attempt to discover structural features that determine the selectivity for Chagas and malaria parasites, we synthesized several analogs with variation in their chain lengths and methylation patterns. So far, we found that shortening the chain length and/or alteration of methylation pattern resulted in compounds with selectivity for *P. falciparum* and complete loss of activity for *T. cruzi*. Within the di-, tri- and pentapeptide series, nonmethylated analogs were more potent than permethylated analogs. On the contrary, the tetrapeptide series showed the opposite trend with the permethylated analog being the more potent compound. Improved potency was observed when the C terminal (S)-dolaphenine is adjacent to valine-isoleucine instead of valine-valine residues. Methylation of amide nitrogen results in conformationally restricted compounds and thus explains that in the di-, tri- and pentapeptide series, a certain structural flexibility is required to adopt the bioactive conformation. Whereas, in the tetrapeptide series, the rigid conformation is probably the more favored conformation for binding to the target. Currently, we are synthesizing analogs with glycine substitution to determine the important subunits for Naranjamide activity, as well as analogs with proline substitution to incorporate structural rigidity in molecules.

## **25 Determining Calcium Presence in Sow Rib Bones After Submersion in a Riverine Environment**

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The purpose of this research is to determine if calcium presence can help add precision and accuracy to time of death (TOD) analysis of bodies fully degraded within riverine environments. The goal is to show that the presence of calcium within sow rib bones varies when submerged in a river water environment for one week and one month. Previous research has delved into metals, glucocorticoids, and steroids effects on bones but not specifically effects on calcium amounts. Riverine environments prove to degrade bodies faster compared to other environments and thus are difficult for TOD analysis methods present today. Each of the following phases had four samples for each sample set. The preliminary phase involves showing that bones still have calcium presence after death. A scanning electron microscope energy dispersive x-ray spectroscopy (SEM-EDS) Hitachi S-3400N, Esprit 1.9.4 Quantax 400 Bruker was used to corroborate this evidence. The testing phase included samples being exposed to a riverine environment and natural exposure on a counter-top, to serve as a baseline/control. Time intervals were one week and one month for different sample sets. Each sample set was then analyzed using the same protocols in the preliminary phase to observe any qualitative differences. Results have shown that calcium presence, in general, does not change drastically after one week or one month submersion. However, iron and zinc presence has decreased when submerged. Further research should be conducted into creating a quantitative method for analysis of calcium and iron elements when submerged.

## **26 Differential gene expression of neuroinflammatory mediators following administration of macrophage targeted nanoparticles in peripheral neuropathy**

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Faculty Advisor: John Pollock, PhD

Neuroinflammation due to peripheral nerve injury (PNI) is thought to be a driver in the initiation and maintenance of chronic pain. It leads to the recruitment, infiltration, and activation of neuroimmune- and conventional immune-cells alike. Specifically axons, Schwann cells, macrophages, T lymphocytes, and endothelial cells in the periphery experience altered gene expression profiles upon injury. Chronic constriction injury (CCI) can be used in rats to emulate peripheral neuropathy via the ligation of four loose ligatures around the common sciatic nerve leading to increased pain behaviors<sup>1</sup>. Use of a theranostic nanoparticle has allowed our group to both visualize macrophage infiltration *in vivo*<sup>2</sup> as well as deliver an anti-inflammatory drug directly to the site of injury when picked up by circulating monocytes<sup>3</sup>. Changes in signaling patterns of these anti-inflammatory drug-laden macrophages has led to differential expression in cytokines and chemokines in the pain state versus those given drug-free nanoparticles in neuronal, glial, and immune cell markers. CCI rats given the anti-inflammatory drug-loaded nanoparticle show a significant decrease and nearly full recovery of pain behavior. By targeting underlying molecular pain mechanisms involved in neuroinflammation, our lab hopes to reveal the inflammatory milieu caused by all of the cells at the site of injury as well as changes in gene expression collectively contribute to pain and are therefore targets for therapy. (1Bennett and Xi, 1988; 2Vasudeva, PloS One, 2014; Patel Clin Immun, 2015)

## **27 Does Resveratrol Improve Muscle Morphology in Aging?**

Kailey M Omstead

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Resveratrol, an anti-oxidant found in common dietary sources such as grapes, wine and peanuts, shows promising effects as an anti-aging, anti-inflammatory and anti-cancer treatment. More specifically, in skeletal muscle, resveratrol can activate molecular pathways that slow tissue damage. Our current project investigates the efficacy of resveratrol acting as an anti-aging mechanism. Sarcopenia refers to the loss of muscle mass and function as a result of aging and in part is due to a decrease in Type II muscle fibers (fast-twitch). Interestingly, Type I muscle fibers (slow-twitch) stay relatively stable in size over a human lifespan. Based on these observations, we hypothesized that resveratrol can be used to decrease sarcopenia in a mouse model. Our goal was to measure the fast and slow-twitch muscle composition in a control group (n=17) versus resveratrol feeding groups (n=14, n=7). BL6 mice were fed normal or resveratrol enriched diets (pellet or mush form depending on treatment group, 120mg/kg of food) for 8 months. Frozen muscle samples were cryosectioned (10um) and immunostained using Type I and Type II Myosin Heavy Chain antibodies (DSHB). Histological analysis of muscle morphology will be visualized and quantified using fluorescent microscopy. Immunohistochemistry experiments are currently advancing in the lab and will provide us with a muscle fiber composition profile for the control and resveratrol treatment diet groups. Results from this study can be used to clarify the relationship



between Type I and Type II muscle fibers in relation to aging, and the effects a resveratrol enriched diet can have on reducing sarcopenia.

### **28 Dose-dependent effect of moderate intensity exercise on sensitivity to pain in humans**

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Increasing evidence implicates exercise as a viable adjuvant therapy for the treatment of nearly all forms of chronic pain. Knowledge of efficacious dosing respective to exercise type and pain condition is virtually absent in the literature. This leaves both clinicians and patients ignorant with regard to the best practice. The purpose of this study, was to determine the optimal dose of moderate intensity treadmill walking necessary to reduce acute pain in healthy human participants. After screening, participants were randomized into 1 of 4 groups: control (no exercise), low dose exercise (3x/wk), moderate dose exercise (5x/wk) and high dose exercise (10x/wk). Over a 7-day period, participants performed moderate intensity walking on a treadmill during assigned exercise days. Quantitative measures of pain were measured at baseline and post-exercise intervention via sensitivity thresholds to painful thermal stimulation and painful pressure stimulation. Participants also rated the intensity and unpleasantness of both thermal and pressure stimuli qualitatively. Significant results have been found in both the moderate and high dose exercise groups, with both groups demonstrating reduced sensitivity to pressure intensity and unpleasantness. The moderate dose group had the greatest reduction in ratings of pain, suggesting that our lowest dose of exercise was not enough to reduce pain and that the moderate dose of exercise may be a sufficient starting dose for exercise-based adjuvant pain therapy. Future studies include applying these results and techniques in the clinic.

### **29 Effects of chronic melatonin treatment and/or hormone therapy (HT) on bone microarchitecture and metabolic proteins in intact female mice**

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A novel melatonin HT was developed to provide women with a safe alternative for treating menopausal symptoms (e.g., hot flashes, night sweats and sleep disturbances) without increasing the risk of breast cancer. This therapy was developed out of concerns from the Women's Health Initiative (WHI) showing that current HT regimens like PremPro™ increased breast cancer risk and mortality. Further testing of melatonin HT demonstrated an anti-cancer action against HER2, ER/PR and triple negative breast cancer in vivo (HER2/neu) and in vitro (HER2, ER/PR, triple negative). In this study, we further studied and compared melatonin, HT and combination of melatonin and HT (melatonin HT) on bone density (BMD), bone quality and on osteogenic gene expression in a perimenopausal mouse model since women experience substantial bone loss during perimenopause. HT protects bone by inhibiting osteoclast activity and bone resorption while melatonin mainly works by stimulating osteoblasts to form bone. The effect and mechanisms underlying combination HT and melatonin (melatonin HT) on bone are not clear. The results of our study reveal that one-year nightly treatment with melatonin (15 mg/L drinking water) increased BMD, bone strength and expression of osteogenic markers (RUNX2, BMP-2, FRA-1, Type-1

collagen). Furthermore, melatonin regulated the expression patterns of the metabolic proteins, PPAR, IRB, GLUT4 and NFkB in a manner that is consistent with melatonin's bone-protective actions and positive effects on metabolism. HT alone (0.5 mg 17 $\beta$ -estradiol + 50 mg progesterone given in food) also increased BMD and bone strength similar to melatonin but did not change the expression of metabolic proteins. Combination of melatonin with HT was without effect on any parameter studied. These findings suggest that either melatonin alone or HT alone may be a better treatment option in perimenopausal women where levels of estrogen and progesterone are high. Melatonin may even be superior to HT due to its beneficial effects on metabolic parameters, which may be important in perimenopausal women who are also experiencing weight gain. These studies also suggest that combination melatonin and HT may be a better treatment option in postmenopausal women where levels of estrogen, progesterone and melatonin are low.

### **30 Evolutionary Rate Covariation Identifies New Endocytic Protein Cargo Regulated by Alpha-Arrestin's in *Saccharomyces cerevisiae***

David Macar

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Faculty Advisor: Allyson O'Donnell, Ph.D.

The dynamic homeostasis of membrane associated proteins at the plasma membrane is widely regulated by ubiquitination, which in response to extracellular signals results in these proteins trafficking through the endocytic pathway and eventually on to the vacuole for degradation. In the budding yeast *Saccharomyces cerevisiae* and mammalian cells, the specificity of ubiquitination can be regulated by alpha-arrestins, by recruitment of the E3 ubiquitin ligase Rsp5 to targeted integral membrane protein cargo. To prioritize the screening of integral membrane proteins for regulation by alpha-arrestins, we used a comparative genomic sequence analysis method known as Evolutionary Rate Covariation (ERC) to identify candidate genes whose evolutionary rates covary with the alpha-arrestins across 18 yeast species. Subsequent cellular localization and relative abundance of GFP-tagged candidate cargo proteins were compared between wild-type yeast and cells lacking alpha-arrestins. Mean fluorescent intensity was used to quantify the abundance and/or subcellular distribution of GFP-tagged proteins. Statistically significant changes in the abundance or distribution of our GFP-tagged proteins between wild-type cells and those lacking alpha-arrestins suggests a dependence on these protein trafficking adaptors, and makes these proteins good candidates as new alpha-arrestin-dependent cargos. Using this approach, we have quantitatively confirmed that 16 new integral membrane proteins are controlled by the alpha-arrestins, and an additional 20 proteins appear to be regulated based on qualitative analyses of the microscopy data, but we are currently completing the image quantification. In conclusion, the ERC approach is a powerful new tool that is able to define protein trafficking regulatory networks, which will undoubtedly be of interest to the cell biology community.

### **31 Examining the Effect of a Video-based Treatment on Inferencing Skills in an Adult with ASD: A Single Subject Design**

Jenna Reade

Other Authors: Katherine Belardi, Lori Marra, Heather Rusiewicz

Individuals with Autism Spectrum Disorder (ASD) have difficulty finding employment and maintaining social relationships. Inferencing is a social-communication skill that is important for professional and personal interactions. Inferencing is a challenge for individuals with ASD because it requires complex information processing. More specifically, it involves the integration of cognitive and linguistic information. There is a lack of research using complex stimuli to treat inferences. An ABA design was used to examine the effectiveness of a video-based intervention, Movie Time (Vagin, 2012), on improving the inferencing skills of one young adult with ASD. The participant answered factual and inferential questions about short Disney and Pixar video clips. Visual supports were used during the treatment phase to teach the participant about inferencing. Post-test results and visual analysis of the data suggest Movie Time had a positive impact on the inferencing skills in one adult with ASD. Social validity results provide additional support for the use of Movie Time with adults with ASD. The current study has the potential to inform clinicians about identifying and treating the inferencing skills in adults with ASD, with the ultimate goal of improving their participation in meaningful personal and professional interactions.

### **32 Examining the Effectiveness of an Intervention that Combined Repeated Reading and Positive Reinforcement on Reading Fluency in Elementary Students with ASD**

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The Department of Counseling, Psychology, and Special Education ... | School of Education  
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Many students with autism spectrum disorder (ASD) varies greatly in their reading proficiency, and reading fluency is the most skill that students with ASD may struggle with reading. Repeated reading is an intervention developed to improve the reading fluency for students with disabilities. This study aims to extend the research using the repeated reading intervention with three elementary school students with ASD to improve their reading fluency. The students will reread the instructional level passage for three times with a one minute break between each passage. The token economy will be used as a reward system to reinforce the students' reading improvement by providing them with 20 minutes iPad time whenever they finished their reading before 1 minute. An oral reading fluency (ORF) curriculum-based measurement (CBM) will be administered first to determine individual student's instructional reading level. Training sessions using explicit instruction procedure provided by the researcher will be implemented to ensure the accuracy of implementing the intervention. A multiple baseline across subjects' design will be used to demonstrate the effects of the intervention on an irreversible skill. The intervention will be introduced sequentially to all three participants, and their reading performances will be measured concurrently and graphed accordingly.

### **33 Examining the special education professional development needs of Saudi Arabia Schoolteachers**

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Faculty Advisor: Morgan Chitiyo, Ph.D.

This research explored the special education professional development needs of more than 800 Saudi educators. The research provides insight into current special education challenges and specific needs

necessary to advance special and inclusive education in Saudi Arabia, from practicing teachers' perspectives.

### **34 Killing the Filipino, Saving the Man: A Comparative Study on Americanization through Education as a Form of Imperialism in the Philippines and Native America**

Jamie Coleman

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Faculty Advisor: Andrew Simpson, Ph.D

The establishment of education in the American model was one of the various ways in which Imperial America demonstrated its superiority. These schools were established in multiple parts of its territories, including The Philippines and Native America. The United States' purpose for establishing these schools was to pacify and assimilate colonized subjects into American culture. Education was deemed by policy makers, who wanted to avoid backlash, as a benevolent way to subdue the indigenous peoples. This paper argues that these policies, such as the installment of English as an instruction language, the process of character training to showcase American values, and the adulation of industrial education as regulation to inferior positions, were not as altruistic as the United States believed. Through these policies and the experiences of both the students and the teachers of the American Indian and Filipino schools, similarities between these schools can be identified. By examining education policies in Native America and the Philippines the effects of American imperialism can be realized. Looking at these similarities, as well as recognizing the differences, adds to a new narrative on imperialistic America through transnational and comparative studies.

### **35 Exposure to low, ecologically relevant levels of an organophosphorous pesticide causes changes in stress levels and brain structures in a vertebrate model.**

Sara McClelland

Other Authors: Sarah Woodley

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The insecticide chlorpyrifos (CPF) negatively affects neurodevelopment at high exposure doses. Less is known about exposure to lower, putatively safe levels, often found in wetlands due to agricultural runoff. Furthermore, humans can be exposed to low concentrations of chlorpyrifos by consuming produce that contains pesticide residues. This study aimed to better understand the neurological effects of exposure to relatively low concentrations of CPF. We exposed a vertebrate model, the Northern Leopard Frog (*Lithobates pipiens*), to 0, 1, or 10 ppb CPF during development in a controlled laboratory study. We measured levels of the stress hormone corticosterone and body and brain shape. Exposure to chlorpyrifos resulted in increased levels of corticosterone, as well as changes in brain mass and alterations in brain shape. Specifically, tadpoles that were exposed to CPF during development had wider and longer telencephala and longer olfactory bulbs. This study provides evidence that exposure to low, ecologically relevant doses of organophosphorous pesticides increases stress levels and has neurological effects in vertebrates.

### **36 Focal Onset Myoclonic Seizures in the Setting of Quetiapine Overdose**

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Generalized tonic-clonic seizures in the setting of drug overdose are not uncommon as this is the product of central nervous system toxicity, the consequence of overdose. Focal seizures rarely occur in this situation as the toxicity is generally widespread. While large amounts of any substance, such as over the counter or prescription medications, illegal drugs, alcohol, and some herbal supplements can cause toxicity, some substances require lesser amounts to reach this point; this correlates with a lower seizure threshold. It is believed that second-generation or atypical antipsychotics, such as quetiapine (Seroquel) are among these drugs, with a lower seizure threshold in the setting of overdose than their first-generation counterparts. We present a case of a 52-year-old woman who experienced focal onset myoclonic seizures in the form of intermittent episodes of tongue myoclonus, which over several hours progressed to generalized tonic-clonic seizure after consuming a toxic amount of Seroquel.

### **37 Gallstone Ileus: A Rare cause of Mechanical Small Bowel Obstruction in an Elderly Patient**

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Gallstone ileus is an uncommon form of small bowel obstruction most frequently observed in elderly females with a history of gallbladder pathology. Gallstone ileus is typically the result of the formation of a cholecysto-enteric fistula that forms between the gallbladder and a portion of the small intestine, most often the duodenum. The fistula that forms facilitates the passage of any contents of the gallbladder directly into the small intestine, including gallstones. Gallstones travel through the small intestine, and larger stones usually become trapped at the ileocecal junction and result in small bowel obstruction. These patients typically present with the characteristic signs and symptoms of a small bowel obstruction such as abdominal pain, bloating, constipation, nausea, and vomiting. Patients who are unable to pass the stone on their own usually require surgical intervention; however, there is currently no consensus on the standard management. We present the case of a 74-year old female with no medical history of gallbladder pathology, who presented with worsening abdominal pain, nausea, and vomiting. CT scan revealed a gallstone ileus. A laparoscopic enterolithotomy was performed and the gallbladder and fistula remained intact. The patient recovered uneventfully and was discharged on post op day 3.

### **38 Managing Heart Failure with Preserved Ejection Fraction: The Hidden Half of Heart Failure**

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Heart failure with preserved ejection fraction (HFpEF) is a diagnosis of exclusion based on typical signs and symptoms of heart failure (HF) and an ejection fraction (EF)  $\leq 50\%$ . HFpEF is responsible for half of all HF cases and will be the most common form of HF within the next 5 years. Despite the increasing prevalence of HFpEF, the prognosis is not improving and the pathophysiology is not fully understood. There is a lack of large evidence-based trials supporting the optimal treatment of HFpEF. This is due, in

part, to heterogeneous phenotypes and complex underlying mechanisms of HFpEF. We present a case of an 80-year-old female with HFpEF who presented to the hospital in acute decompensated HF. This case will discuss the pathophysiology and treatment of HFpEF, as well as the essential need for further research into this prevalent disorder.

### **39 Novel Pharmacophores to Aid in Rational Drug Design for Dopamine D3 Receptor-Related CNS Disorders**

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Faculty Advisor: Kevin Tidgewell, Ph.D.

Dysregulation of the dopaminergic pathways in the central nervous system (CNS) plays a key role in several neurological disorders. Dopamine D3 receptors have been recognized as important targets in Parkinson's disease, schizophrenia, and addiction disorders. Despite being studied for nearly three decades, there is still more to discover about the receptor functionality and therapeutic ability. These issues have been difficult to address, due to high similarity of the D3 receptor to the D2 receptor, which D3 ligands can recognize and bind to. New selective ligands are necessary to continue to learn about the D3 receptor, and to hopefully provide therapy to its related disorders.

One method for rational drug design is the use of pharmacophores, which can help to construct the desired features of a molecule in 3D space. There is currently only one published pharmacophore for D3. The lack of pharmacophoric models hinders the development of new treatments for the disorders affected by dopaminergic dysfunction.

Herein, several new pharmacophores have been developed based on recently discovered D3 ligands with novel scaffolds, to aid in design of new D3 ligands. Molecules were included from studies that conducted at least one functional assay to determine functional activity of the ligand at the D3 receptor. Molecules were aligned using a flexible alignment feature using MOE software, and characteristics of the molecules analyzed to develop the pharmacophores. These new pharmacophores will aid in design of new ligands for the D3 receptor.

### **40 Gastric Perforation Following Cocaine Abuse**

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Faculty Advisor: Kristin D'Acunto, MPA, PA-C

Although an old drug, cocaine remains to be abused by many. In 2014 there was an estimated 1.5 million cocaine users over the age of 12. While the cardiac complications of cocaine abuse are well recognized by clinicians, cocaine induced gastrointestinal ischemia and perforation are less commonly encountered. Here we evaluate a 52-year-old female patient brought to the emergency department for an overdose after snorting heroin and cocaine. Following revival, she immediately complained of severe, epigastric abdominal pain. Her physical exam was positive for epigastric tenderness and generalized guarding and a CT scan revealed a pneumoperitoneum. An emergency exploratory laparotomy exposed a gastric perforation along the posterior wall requiring surgical management via partial gastrectomy. The purpose of this case report is to identify the relationship between cocaine's vasoconstrictive properties and gastric perforations in hopes to gain a heightened awareness for quicker resolution. This case demonstrates the challenge of promptly diagnosing gastric perforations in drug abusers due to their

complicated clinical presentation. Left undiagnosed, gastric perforations can rapidly lead to sepsis and death. Due to this relationship and the potential for complications, gastric perforations should always be considered in patients presenting with abdominal pain who are known to abuse cocaine.

#### **41 Life, Liberty, and the Pursuit of Authentic History**

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The National Park Services excluded portions of the historical narrative of Independence National Historical Park causing the authenticity of the National Park to dwindle. In order to understand which authentic events are excluded from the narrative at Independence National Historical Park, an exploration of two case studies, Independence Hall and the Presidents House should assist in the conclusion of which narratives are commonly omitted from this National Park.

#### **42 Identifying Amphetamine Induced Pulmonary Arterial Hypertension in an Incarcerated Patient**

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Pulmonary arterial hypertension (PAH) is a rare and progressive disease that often leads to right sided heart failure and death. A 49-year-old white male with a history of long term methamphetamine abuse and cardiomyopathy presented to the heart failure clinic from prison with a three-week history of dyspnea on exertion. Right heart catheterization revealed PAH secondary to long term methamphetamine use. Macitentan an endothelin receptor antagonist, 10mg by mouth daily, and tadalafil a vasodilator, 20mg daily were prescribed with pulmonologist follow-up. The patient's symptoms of dyspnea on exertion and orthopnea improved, and he was able to resume his previous level of activity. However, due to the late stage of disease the prognosis remains poor. PAH associated with stimulants is becoming increasingly well recognized as a subgroup with amphetamine and methamphetamine users having a 3-fold increased risk of developing PAH. Stimulants such as methamphetamine subvert normal cellular repair to increase DNA damage associated with vascular disease such as PAH by subverting the adaptive responses to oxidative stress. Prison populations have an increased prevalence of prior long term stimulant use than the general population. Therefore, health professionals working in corrections facilities should have a high index of suspicion for PAH in the work up of associated symptoms such as right sided heart failure.

#### **43 Nuclear Executives: The Presidency at the intersection of politics and popular culture during the Cold War**

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In 1981, John Hinckley Jr. attempted to assassinate then-President Ronald Reagan. In the aftermath of this act of violence, Hinckley claimed that his actions were not motivated by politics, but inspired by the popular film Taxi Driver. This unusual assertion exemplifies a direct connection between politics and popular culture; the executive and the people.

This paper will argue that presidential policy directly affected, and was affected by, popular culture. It will also argue that films are amongst the best tools for understanding the ongoing relationship between the Executive office and American citizenry. Using a mixture of primary-source opinion polls and film analysis, this paper will show that presidential policies from Harry Truman to the early years of George H.W. Bush affected the cultural response and reception of executive authority in popular culture. More importantly, it will explain that the cultural dialectic between the citizenry and the executive office helped shape modern conceptions of executive authority. This project intervenes in the field at a time when Cold War cultural history is increasingly written by cultural studies scholars whose invaluable work has nonetheless emphasized theoretical analyses over actual events. The goal of this paper, therefore, is to reclaim the discussion of American Cold War culture for academic history.

#### **44 Impact of Shone Complex on Development in a 2-year-Old**

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Shone Complex is a rare left-sided heart congenital defect and like other congenital heart disease, it is associated with delays in childhood development. This case focuses on a 2-year old child with Shone Complex and her delayed development and growth after an aorta reconstruction in the first week of life. She has displayed multiple delays in both language and gross motor skills. Early intervention services were enacted slowly to address her delays. Many children, like the patient in this case, are not receiving adequate surveillance for developmental delays from the health care providers they interact with. This case expresses the need for continuity of care after life-saving intervention, like heart reconstruction, to monitor for the impact beyond the initial resuscitation period. A greater emphasis is needed for primary care providers to have an active role in monitoring for early signs of developmental delays in congenital heart disease patients to improve long-term health outcomes. Solutions such as repeated testing with Bayley-III Scales of Infant Development and Language Development Surveys are inexpensive and practical solutions. Further, increasing awareness of Shone Complex can help practitioners monitor for physical sequela during exams at well child visits.

#### **45 Pushing Boundaries: A conversation for counselors.**

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The American Counseling Association has a specific section in their code of ethics that is strictly related to boundaries. The code of ethics looks at the over extension of physical boundaries and dual relationships that could potentially harm the client. There has been research on boundaries of the mind that are suggested as different personality traits in both the client and the counselor (Hartmann, 1991; Johnston & Farber, 1996; Rosenkrantz & Morrison, 1992). Boundaries are made to be able to separate internal feelings from outside reality for counselors and clients (Johnston & Farber, 1996). Counselors that score higher with anaclitic depressive issues tend to view clients in a negative manner (Rosenkrantz & Morrison, 1992). Hartman (1991) suggests that individuals have thin or thick boundaries. He reports that individuals with thin boundaries are more open, trusting, and vulnerable. Individuals with thick boundaries tend to be solid thinkers, well organized, and rigid. The purpose of this research is to explore the works psychological boundaries in counselors and clients. The theoretical framework of this



research will be grounded in Hartmann's thin and thick boundaries of personality. By exploring his work, connections and gaps can be found to help clinicians with their own boundaries, as well their clients. This preliminary research will help with further research of psychological boundaries in the counseling field. Further research would also be explored in group counseling and clinical supervision.

#### **46 Peripheral Nerve and DRG Expression of MCP-1 Following Administration of Anti-Inflammatory Drug-Loaded Nanoemulsion in a Rat CCI Model.**

Muzamil Saleem

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Biological Sciences | Bayer School of Natural and Environmental Sciences  
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Macrophages, the most abundant leukocyte of the innate immune system, play an extensive and dynamic role in pathological processes, including chronic pain which is an inadequately managed condition in the clinic. Monocyte chemoattractant protein 1 (MCP1), also called CCL2, is a small ligand "a chemokine" which recruits monocytes and macrophages to the sites of inflammation produced by either tissue injury or infection. We seek to better understand the neuroinflammation involved in the chronic constriction injury (CCI) rat model of neuropathic pain. The constriction, as well as the chronic gut suture used to ligate the sciatic nerve causes inflammation. We have previously reported the targeting and imaging of this inflammation with a dual labeled perfluorocarbon (PFC) nanoemulsion (1). The labels are a Near Infrared (NIR) fluorescent dye and <sup>19</sup>F fluorine, which can be imaged in vivo and ex vivo. This serves as a tool to label circulating monocytes that accumulate as macrophages at the site of injury. This has been confirmed by histological studies (1). An anti-inflammatory drug has been incorporated into the nanoemulsion (2). This is injected on day eight post-surgery, when the animal has developed increased hypersensitive behavior, measured by calculating paw-withdrawal thresholds. Behavioral testing confirms a significant relief from hypersensitivity (3). Inflammation was assessed by imaging the NIR fluorescence in live animals and in post-mortem histological studies. In addition to a reduction in accumulated macrophages at the injury site and the dorsal root ganglia (DRG), drug-loaded nanoemulsion treatment resulted in a reduction in expression of MCP-1. Interestingly, the expression of MCP-1 at the DRG was reversed: an increased expression is observed in the cell bodies of the DRG in animals administered with drug-loaded nanoemulsion. 1. Vasudeva et al, PLOS One, 2014; 2. Patel et al, Clin. Imm, 2015. 3. Janjic, Vasudeva et al, J Neuroimmunol. 2018 (in press).

#### **47 Neurontin as an Adjunctive Treatment for Bipolar I Disorder**

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The mechanism of action and low side effect profile of Neurontin has led to its significant off-label usage, most significantly in the treatment psychiatric disorders. An example of this is in a 40 year old white female with a history of bipolar I disorder first diagnosed 3 years ago. This patient began treatment for their condition with the typical first line agents, however like many patients with bipolar disorder she was refractory to multiple medications due to the inability to obtain emotional stability and

unwanted side effects. For this reason, Neurontin 1800 mg/d was added to her current medication regimen which included a mood stabilizer and antidepressants. Over a two-month period the patient was observed. She admitted sufficient control of her condition and denied side effects.

Neurontin was initially produced to be a GABA mimetic but research has proven that it has a direct effect on calcium channel receptors and an indirect effect on specific GABA receptors, making its role in the treatment of bipolar disorder plausible. There is sufficient evidence that physicians have successfully treated their patients with Neurontin as an adjunctive treatment for bipolar disorder. Many case studies and systematic reviews have been produced, testing Neurontin's effect on bipolar patients, either claiming clinical success or negligent change in patient outcomes. Presently, Neurontin's off-label use is exclusively based on physician opinion and specific patient outcome.

#### **48 Salamander skin peptides inhibit growth of fungal pathogens linked to worldwide amphibian decline**

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Amphibian skin is unique among vertebrate classes, containing a large number of multicellular exocrine glands. The secretions of these glands include a repertoire of bioactive compounds including antimicrobial peptides (AMPs) which are important for protecting individuals from infectious disease such as chytridiomycosis. Chytridiomycosis is a lethal skin disease linked to worldwide amphibian decline and is caused by chytrid fungi, *Batrachochytrium dendrobatidis* (Bd) and *B. salamandrivorans* (Bsal). Susceptibility to chytrid fungi is species-specific and related to AMP bioactivity. AMP bioactivity against Bd has been measured for a number of amphibian taxa using in-vitro assays. Similar studies are lacking for the recently discovered chytrid fungus, Bsal. Therefore, our objective was to develop an in-vitro assay for assessing AMP bioactivity against Bsal. Because the zoospores of Bd and Bsal are ultrastructurally similar, we predicted that AMPs effective against Bd would also be effective against Bsal. We used solid phase extraction to purify AMPs from the skin secretions of a large aquatic salamander (*Amphiuma tridactylum*). AMP concentrations (500 to 15.6  $\mu\text{g mL}^{-1}$ ) were combined with the zoospores of Bd or Bsal in a 96-well plate and observed for fungal growth by measuring changes in optical density over a 15 day period. We found that AMPs inhibited growth of both Bd (minimum inhibitory concentration (MIC): 85.18  $\mu\text{g mL}^{-1}$ ) and Bsal (MIC: 147.5  $\mu\text{g mL}^{-1}$ ). Thus, AMPs that protect against Bd might also provide protection against Bsal.

#### **49 Infectious Mononucleosis: An Uncommon Cause of Acute Appendicitis**

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Acute appendicitis is a rare complication of infectious mononucleosis (IM) not commonly considered by clinicians. We present a case of a 14-year-old female who presented with fever and abdominal pain after clinical diagnosis of IM three days prior. While laboratory results and physical examination were not strong indicators of acute infection, ultrasound (US) showed splenomegaly with concomitant inflammation of the appendix. IM is a common illness affecting most individuals by their third decade of

life. While there are few reports in the literature, there is pathological and histological evidence of the Epstein-Barr virus (EBV) as a causative agent in the infection. Lymphocytic infiltration of the appendicular wall has been demonstrated in these patients. Typical symptoms of appendicitis include fever, anorexia, and abdominal pain. However, these findings may be absent in IM-induced appendicitis, which may present only with fever or symptoms related to IM. In asymptomatic patients, the diagnosis was made on incidental imaging findings. The clinical diagnosis may be delayed due to the low suspicion for IM-related appendicitis, as well as the variable and often occult presentation. Treatment may consist of traditional appendectomy, or a conservative approach of watchful waiting may be implemented in asymptomatic individuals.

## **50 Select alpha-arrestins control surface abundance of the mammalian Kir2.1 potassium channel in a yeast model**

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Protein composition at the plasma membrane is tightly regulated, with rapid protein internalization and selective targeting to the cell surface in response to environmental changes. For example, ion channels are dynamically relocalized to or from the plasma membrane in response to physiological changes, allowing organisms to maintain osmotic and salt homeostasis. To identify new factors that regulate the selective trafficking of one ion channel, we used a yeast model for a mammalian potassium channel Kir2.1. Kir2.1 maintains potassium homeostasis in heart muscle cells and defects in Kir2.1 lead to human disease. By examining the ability of Kir2.1 to rescue the growth of yeast lacking endogenous potassium channels, we discovered that specific  $\hat{\pm}$ -arrestins regulate Kir2.1 localization. Specifically, we found that the Ldb19/Art1, Aly1/Art6, and Aly2/Art3  $\hat{\pm}$ -arrestin adaptor proteins promote Kir2.1 trafficking to the cell surface, increase Kir2.1 activity at the plasma membrane, and raise intracellular potassium levels. To better quantify the intracellular and cell surface populations of Kir2.1, we created fluorescence-activating protein (FAP) fusions and for the first time used this technique to quantify the cell surface residency of a membrane protein in yeast. We also identified two other Kir2.1 regulators, which are known effectors of  $\hat{\pm}$ -arrestins: In particular, both the Rsp5 ubiquitin ligase and that the protein phosphatase calcineurin facilitated the  $\hat{\pm}$ -arrestin-mediated trafficking of Kir2.1. Together, our findings implicate  $\hat{\pm}$ -arrestins in regulating an additional class of plasma membrane resident proteins and describe a new tool to dissect the trafficking itinerary of any membrane protein in yeast. We are currently using our yeast model system to define additional regulatory elements needed for  $\hat{\pm}$ -arrestin-mediated trafficking of Kir2.1 to the cell surface.

## **51 Infective Endocarditis: More Than Just a Pain in the Neck**

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Infective endocarditis (IE) is a rare, but critical infection involving the inner lining of the heart. When abnormal, damaged or prosthetic heart tissue is present, one becomes susceptible to bacterial seeding.

Bacteria capable of infecting the heart enter the blood stream by mechanisms as simple as brushing one's teeth. The challenge with IE is that demographics change and presentation varies greatly between patients. Yet, a delay in diagnosis contributes to the consistently high morbidity and mortality rates. A multi-disciplinary team approach to care is essential, but entails a high clinical suspicion and a thorough, but prompt workup. Therefore, knowing the risk factors, potential symptoms, and patient history is vital. We present a case of a 55-year-old man with history of IE, coarctation of the aorta and cardiac meshwork who went misdiagnosed for three months because his chief complaint was intractable neck pain. The patient was initially treated with doxycycline for clinical suspicion of Lyme's disease, but the neck pain never resolved. At subsequent visits, he was told it was a musculoskeletal problem and sent to physical therapy. With further evaluation and inquiry into the patient's history, we suspected IE, which was confirmed by positive blood cultures and Duke criteria. The patient was treated with IV vancomycin and ceftriaxone for 6 weeks and prescribed life-long oral suppressive therapy with 500mg amoxicillin twice a day. His case demonstrates the greater need for awareness of variability of presentations in this potentially critical condition.

## **52 School-Based Recommendations for Refugees**

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School psychologists in sanctuary cities are facing new challenges regarding how to best serve their refugee students and their families. While teachers and school staff can make huge gains with a child at school, this progress can be entirely lost if there is not family support at home. For this reason, home-school partnerships are immensely important. They improve outcomes for students in many areas (Soutullo, Smith-Bonahue, Sanders-Smith, & Navia, 2016). Immigrant parents bring their own challenges to this process, especially due to language and cultural barriers (Soutullo, et al, 2016; Espstein & Salinas, 2004). Refugees, like immigrants, also face these barriers to collaborative home-school relationships. However, they have additional needs as well. Refugee children experience trauma not only in their home country, but in their travels to their country of refuge and when integrating into their new culture. Children with trauma experiences are much more likely to experience psychological distress which can impair both social and academic functioning. Schools are often the only place that refugee children have access to appropriate mental health care due to health care disparities that often exist for immigrant families, as well as varying views on the necessity and stigmas surrounding mental health care. Furthermore, prejudice and discrimination may be especially common among Muslim refugees as their faith is one many Americans equate with terrorism (McBrien, 2005). Various recommendations for best practices for serving refugee populations in schools will be addressed.

## **53 Screening of the ScUbl yeast deletion library for modifiers of Aly1- or Aly2-mediated resistance to rapamycin in an undergraduate lab course**

Ray Bowman

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Cells respond to cues in their extracellular environment by selectively redistributing proteins. This reorganization is imperative for cell survival and is regulated, in part, by alpha-arrestins. How then is

α-arrestin-mediated trafficking controlled? We know that modification by ubiquitination plays a role in modifying α-arrestin function. To help us identify specific α-arrestin regulators, we generated and utilized a unique yeast gene deletion library called the *Saccharomyces cerevisiae* Ubiquitin Interactome (ScUbl) library. ScUbl contains all the non-essential genes annotated as important for ubiquitination and ubiquitin interaction. We used this library as part of the BIOL 371w Cell & Molecular Biology laboratory course to screen for gene deletions that altered the growth phenotypes associated with over-expression of α-arrestins. Specifically, the undergraduates transformed the ScUbl library with plasmids over-expressing α-arrestins Aly1 and Aly2 and then assessed these transformants for gene deletions that either increased or decreased cells sensitivity to rapamycin, an inhibitor of TORC1 function that mimics nitrogen starvation. Three replicate screens of the ScUbl library were evaluated for changes in rapamycin sensitivity when over-expressing Aly1 or Aly2 identified 45 and 39 hits respectively as having  $>1$  or  $<-1$  Z-scores. Of these, 11 candidates are found in both the Aly1 and Aly2 screens. From this, Atg7 was chosen as a strong candidate and further assessed. We show that in *atg7<sup>Δ</sup>* cells, Aly1 and Aly2 electrophoretic-mobility is altered, and demonstrate that this is due to a change in phosphorylation status of the α-arrestins. These data suggest that α-arrestins are regulated by changes in the autophagy pathway and we are currently working to define that role.

#### **54 Quantifying the Amount of Latent Metal Deposited from Firearms onto Skin using the Scanning Electron Microscope**

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Faculty Advisor: Stephanie Wetzel, Ph.D

This research aims to quantify the amount of latent metal deposited on the skin when handling a firearm. The study is based on Locard's Principle of exchange which states that when two things come into contact, each will leave or transfer something to the other. The hypothesis for this study is that the greater the number of shots, the greater amount of metal should be deposited onto the trigger finger and surrounding area. The quantity of metal compared to the number of shots fired was assessed. Individuals used multiple firearms to fire a varying number of shots. Samples were collected from the trigger finger and surrounding area using double sided carbon adhesive on metal stubs. The amount of latent metal present was quantified using the scanning electron microscope. The elements picked up by the stubs were analyzed for the total weight percent of metallic components present on the sample.

#### **55 Rare Prothrombin Gene Mutation in a 15-year-old White Female**

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Prothrombin G20210a is a mutation in the prothrombin gene, which substitutes guanine to adenine. Carriers of this mutation have elevated plasma prothrombin levels and so hypercoagulability has been associated with a 2-to4-fold higher risk for venous thrombosis. We present a case of a 15-year-old white female who was diagnosed with this gene mutation six years prior to presenting for a well-child exam. Her father had this mutation and wanted her to go through genetic testing for it. She had never had any symptoms of a deep vein thrombosis (DVT) or a pulmonary embolism (PE) and her physical exam was within normal limits. While most carriers that develop thrombotic complications remain asymptomatic

until adulthood, some have recurrent thromboembolism before the age of 30 years. This case focuses on the lifelong education provided on symptoms and risk factors for developing thromboembolism, such as, tobacco use and oral contraceptives. Primary care providers should be aware of potential complications of this mutation such as pregnancy loss, young onset stroke and prevention, as well as treatment options.

## **56 Recognizing Anorectal Melanoma as a Diagnosis**

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Anorectal melanoma is an extremely aggressive, and rare condition that is not commonly suspected by practitioners. There is often a delay in the diagnosis of this neoplasm because it mimics benign conditions, most commonly as rectal hemorrhoids or polyps. The symptoms are non-specific which causes patients to delay seeking medical advice. Unfortunately, even after the diagnosis is made, limited researched has been performed for the ultimate treatment. The debate is currently between wide local excision (WLE) and abdominal perineal resection (APR). However, even with complete resection at the time of diagnosis, prognosis remains poor due to the intrusive nature of the neoplasm. In addition, research has not supported that adjuvant therapy is beneficial to patients. We present a case of a 50-year-old female without significant past medical history who was experiencing rectal discomfort and bleeding. Three hemorrhoids were noted on physical exam, and an elective hemorrhoidectomy was performed. Pathology revealed that one of the hemorrhoids was positive for nodular melanoma. A PET/CT scan was performed, and was negative for distant metastasis. She underwent a WLE of the lesion, and is currently scheduled for adjunctive immunotherapy.

## **57 Severe Adult Onset Dermatomyositis: An Uncommon Presentation of an Uncommon Disease**

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Dermatomyositis (DM) is a rare idiopathic inflammatory myositis with an incidence of 9.63 per million. The adult form of the disease often presents with characteristic symptoms including proximal muscle weakness, heliotrope rash, shawl sign, Gottron' papules, and periungal telangiectasias. Currently, the etiology of this disease is not well understood.

The following case discusses a 59-year-old female with DM refractory to treatment, who presented to her primary care physician complaining of increasing symptom severity. She was diagnosed with dermatomyositis seven years prior after developing muscle weakness, shawl sign, Gottron's papules, mechanic's hands, and cutaneous calcinosis. The only true diagnostic study of dermatomyositis is muscle biopsy, which often shows atrophied and inflamed muscle fibers, along with other histologic indicators of the disease. This patient's diagnosis was confirmed via muscle biopsy. The case of this patient is unique as she presented with late stage symptoms at the time of initial diagnosis. In addition, cutaneous calcinosis is an unexpected finding because it is typically a hallmark of juvenile DM.

Our patient received the standard treatment of DM; prednisone, hydroxychloroquine, mycophenolate mofetil (MMF), and methotrexate. She initially responded well to hydroxychloroquine, but had to stop the medication due to minor retinal toxicity. In addition, she was treated with MMF and saw

improvement in her symptoms, but the medication was discontinued for unknown reasons. Since stopping MMF, her calcinosis and muscular symptoms have worsened. She is currently taking prednisone and methotrexate, which are providing little symptom relief. Current literature suggests additional alternative treatments such as biologics including monoclonal antibodies, JAK inhibitors, and IL-6 receptor antagonists.

### **58 Withdrew Submission**

### **59 Simultaneous Transplantation and Bilateral Nephrectomy in Polycystic Kidney Disease**

Eric Mason

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Autosomal dominant polycystic kidney disease (ADPKD) is an inherited disorder that results in the development of renal cysts which may lead to deterioration of kidney function. While conservative measures may halt or slow the progression of the disease in some individuals, many patients require hemodialysis or transplantation for resolution. Unfortunately, cystic kidneys can also become massive in size and prone to infection provoking chronic issues such as pain, hypertension, recurrent infection, early satiety, or breathing difficulty. As such, many ADPKD patients require surgical removal of the native kidneys to manage symptoms and facilitate transplant. We describe the case of a 42 year old male with ADPKD presenting for simultaneous bilateral nephrectomy and renal transplantation. Despite a slightly prolonged hospitalization, this patient tolerated the simultaneous operations quite well and his associated symptoms of chronic pain and fatigue diminished. Consequently, this approach appears to effectively improve quality of life in this patient population but does carry some increased postoperative risks.

### **60 Staphylococcal Scalded Skin Syndrome in an Elderly Patient**

Adam Kostka

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Staphylococcal scalded skin syndrome (SSSS) is a rare condition that primarily affects children under 5 years of age, but has been known to affect adults. SSSS occurs as a result of toxins produced by certain *S. aureus* species that destroy the binding proteins between the epidermal layers of the skin, resulting in a characteristic bullae formation that mirrors that of a scald injury, hence the name of the condition. Adults who develop SSSS generally either have a weakened immune system or reduced capacity to excrete the toxins and therefore carry a higher chance of mortality due to these risk factors. We describe the case of an 87-year-old male who presented with bullae and areas of skin loss on his upper chest with a past medical history significant for systolic congestive heart failure, atrial fibrillation, hypertension, emphysema, dementia, and type II diabetes mellitus. During his stay, the patient was treated with vancomycin and clindamycin but continued to decompensate over the course of his stay and passed on his 8th day of admission.

### **61 The effectiveness of PBIS approach across race, gender, and age: A meta-analysis**

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A meta-analysis of single-subject research was conducted, examining the efficacy of positive behavior intervention support (PBIS) interventions across demographic variables (race, gender, types of disabilities and age of participants). In this study, 48 studies between 2006 to 2017 were included. A meta-analysis of published studies using tier three- interventions (based on FBA) were conducted to determine if and to what extent certain demographic variables influenced the efficacy of PBIS interventions. The results show that (1) the mean effect size for male was more the mean effect size for female, (2) the the mean effect size for Caucasian and African American participants were the same, (3) the mean effect size for Hispanic participants was less than the Caucasian and African American participants.

## **62 The Additive Effect of Estradiol and NRAS Mutation in the Development of Breast Cancer, Thyroid Cancer, and Leiomyomas**

Amanda Adams

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NRAS is a subtype of RAS proteins, known as proto-oncogenes, that cause normal cell transformation into cancerous cells when mutated. These random mutations are more likely to occur when there are existing growth factors leading to increased cell division. We present a case of a 48-year-old female with a past history of leiomyomas who later developed two different primary cancers within one year: ER/PR positive invasive ductal carcinoma and then papillary thyroid cancer with NRAS mutation. The striking commonality between these three conditions is a high level of estrogen sensitivity. Estrogen is a potent growth factor with a stronger effect in patients with increased receptor sensitivity or elevated estrogen levels. Estrogen increases cell proliferation through rapid activation of ERK, a component of the MAPK signaling pathway. This particular signaling pathway happens to be the same pathway that RAS proteins act upon. We propose that the environment created in estrogen sensitive patients increases the likelihood of mutation formation, particularly NRAS mutation, leading to this clinical presentation.

## **63 The influence of depression and anxiety upon clinical outcomes for diabetes**

Elham Heidari

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Introduction: Patients with type II diabetes have an increased risk of comorbid mental illness, including depression and anxiety. However, there is a paucity in data about the impact of these diagnoses upon glycemic control.

Research question or hypothesis: To determine the prevalence of depression and/or anxiety and to evaluate changes in clinical outcomes over the first year following diagnosis of type II diabetes.

Study design: Retrospective cohort utilizing electronic medical record (EMR) data from a primary care physician (PCP) group practice



Methods: Adult patients treated by PCPs in Western Pennsylvania with at least 12 months of EMR data post-diagnosis of type II diabetes (ICD-9 CM 250.00, 250.02) were identified. Incident cases had at least 6 months of EMR data prior to the first coding for diabetes. The presence of comorbid depression and/or anxiety was identified by ICD-9 CM coding 311 and 300.0x, respectively. Data extracted included patient demographics, laboratory/clinical markers, medication utilization and clinical outcomes. Change in hemoglobin A1c (HgbA1c) from baseline at diagnosis through one-year post-diagnosis was compared according to comorbid diagnosis using a repeated measures ANOVA.

Results: A total of 1822 predominantly Caucasian patients (47.1% female) with type II diabetes were evaluated. Of them, 1410 were diagnosed with diabetes only (77.4%), 148 diabetes with depression (8.1%), 215 diabetes with anxiety (11.8%) and 49 diabetes with both depression and anxiety (2.7%). Excluding missing data, a change in HgbA1c was evaluated in 1089 patients (59.8%). Significant reductions in HgbA1c occurred across all four groups ( $p < 0.001$ ), but comorbid diagnosis did not affect HgbA1c changes across patients ( $p = 0.163$ ).

Conclusions: Preliminary findings suggest that comorbid diagnoses of depression and/or anxiety have limited singular influence upon HgbA1c among patients with type II diabetes. Further work will examine additional clinical outcomes for diabetes and model the influence of demographic/clinical contributors to these outcomes.

#### **64 The Search for a Missing Holocaust Army Officer Using DNA Analysis**

Molly Hildenbrand

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Forensic Science and Law | Bayer School of Natural and Environmental Sciences

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DNA extraction from skeletal and teeth material is burdened by low yields and potential degradation. This material also has added complications of contamination and PCR inhibitors making it difficult to process. The discovery of a soil surrounded and decomposed body at a historical landsite in Lithuania led to the aim of this study. It was possible the unidentified body belonged to a missing Lithuanian Army Officer, Jacob Gens, who served as head of the Vilnius Ghetto during the World War II era. Two teeth samples were removed from the discovered skeleton for DNA analysis. The samples were tested with comparison to a family reference sample.

Two protocols were obtained from the University of North Texas Center for Human Identification. The protocols were modified to fit personal laboratory use. The sample was first washed in bleach and 5% Tergazyme solution following with overnight incubation in demineralization buffer. The extraction was completed by addition of Phenol Chloroform Isoamyl Alcohol (25:24:1). Qiagen QIAquick Purification was used directly after for increased inhibitor removal. The family reference sample was extracted using DNA IQ system. The extracted DNA for both samples were quantified using Real Time Polymerase Chain Reaction (qPCR) and amplified using the commercial brand kits, Promega Fusion 5C and 6C. The samples were genotyped using a 3130 Genetic Analyzer and analyzed using GeneMarker software. The results of this study showed only 12 of 24 loci were concordant between the reference sample and extracted tooth material. Alu sequence testing was further performed to identify possible cultural continuity between the samples.

In conclusion, this study was not able to determine that Jacob Gen's remains were found. The study did show with the sensitivity of current DNA analyses, it is possible to obtain a full DNA profile from a highly degraded sample over 200 years old.

## **65 The Ramifications of Delayed Diagnosis for Femoral Neck Fractures**

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Fractures of the femoral neck vary in severity. Depending upon the extent, plain radiography is typically sufficient for detection. Unfortunately, some occult fractures may remain undiagnosed. Typically, these occult fractures are stress fractures caused by high levels of activity and osteopenia. Stress fractures of the femoral neck require less surgical intervention as opposed to complete trans-cervical fractures, which will often necessitate a total hip replacement (THR). Complete femoral neck fractures place the patient at a higher risk of complications from the injury itself and the required surgery. When stress fractures remain undiagnosed and untreated, they may worsen to complete femoral neck fractures. Early diagnosis of occult fractures requires suspicion on clinical assessment of the patient and appropriate use of magnetic resonance imaging (MRI). Through the early detection of stress fractures with MRI, providers may avoid complete femoral neck fractures by treating patients with less extensive interventions. We present a case of a 64-year-old male with a left femoral neck fracture, which was undiagnosed for 2 months after a chiropractic visit. The patient's initial plain radiography was unremarkable and further imaging was not ordered until 1 ½ months later. Once a complete femoral neck fracture was detected, a THR was indicated.

## **66 Trauma-Focused Interventions for Children in Schools**

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School-aged children spend the majority of their waking hours within the school setting. Today, schools are tasked with providing not only academic learning, but social and emotional learning as well. Traditional school models display adequate success in these three areas when serving typically developing children. However, schools often struggle to provide the needed supports to an especially vulnerable population of students, those who have experienced early childhood trauma. The effect of this shortfall has ramifications that penetrate numerous aspects of society. Victims of early childhood trauma have been found to be at far greater risk for negative later life outcomes. Further, many of the byproducts of early childhood trauma are manifested behaviorally, leading to challenging situations for teachers and school administrators. Students in urban schools are at a greater risk for trauma exposure. This creates a pressing need for more urban schools to adopt a trauma-sensitive schooling model. One evidence-based intervention that has been found effective with both urban and nonurban populations is Trauma-Focused cognitive behavioral therapy (TF-CBT). The purpose of this study is to examine the effects of TF-CBT on students displaying anxiety and challenging behaviors who have been victims of early childhood trauma in an urban setting during a single-subject concurrent multiple baseline across participants study.

## **67 The Relationship Between Developing Sitting Postural Control and Object Permanence in Infants with Neuromotor Disorders Presentation Type**

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Object permanence as a cognitive skill relates to motor skill in several ways (Soska, Adolph, & Johnson). Independent mobility in developing children closely correlates with the emergence of object permanence, which is the understanding that objects exist even when they are not directly visible (Anderson, Campos, Rivera, Dahl, Uchiyama, & Barbu-Roth). Sitting postural control links to some very early behaviors of object understanding and cognition. However, these relationships have not been shown in children with neuromotor dysfunction. Nineteen infants who were delayed in developing sitting (mean age 11.8 months at entry,  $SD=3$  months) were followed for 3 months. Seven had documented brain injury; all infants were eligible for early intervention services. Object permanence items were extracted from the Bayley cognitive assessment (Bayley, 2006) and additional items from developmental studies with typically developing infants were added to create a 1-10 numerical scale. Video from a sagittal view within a two-dimensional software program was used to measure angle of forward lean when support was released from the infant's trunk in a floor sitting position.

Both object permanence skill ( $p=0.022$ ) and sitting skill ( $p=0.004$ ) increased significantly from baseline to 3-month testing. There was a significant correlation between sitting posture at the 3-month testing and object permanence scores ( $r=.436$ ,  $p=0.031$ ), but no significant relationship at baseline. Linear regression analysis indicated that both baseline object permanence scores ( $p=0.001$ ) and sitting skill at 3-months ( $p=0.05$ ) contributed significantly to the variance in 3-month object permanence scores. In addition, infants who could sit for at least 3 seconds, arms free (item 24, GMFM 88), showed significantly higher object permanence scores (mean=7.6) than infants needing support to sit (mean=3.2);  $p=0.00$ ). Further study should focus on blending motor intervention with specific cognitive challenges to enhance the early learning opportunities for infants with motor challenges.â€œ

## **68 The Use of Electroconvulsive Therapy in a 17 year old Female with Major Depressive Disorder and Low Serotonin Levels**

Siobhan Dwyer

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Pediatric electroconvulsive therapy (ECT) has been shown to be an effective treatment option for its use in depression, psychotic disorders, catatonia, suicidality, and bipolar disorder in patients who are unresponsive to different medication regimens. However, the stigma and hesitancy of ECT in children and adolescents poses a challenge for what could be a treatment option with positive results in this patient population. As a result, pediatric ECT has not been widely performed or studied. The following report summarizes the case of a 17 year old white female, with a significant past medical history of major depressive disorder, anxiety disorder and attempted suicide, who underwent ECT due to her severe depression, unresponsiveness to variety of medication trials, and low serotonin levels. After undergoing 8 treatments of both unilateral and bilateral ECT, the patient demonstrated significant improvement in her depressive symptoms, thus raising the question of serotonin's role in depression.

## **69 Who to choose: Exploring criteria for admission into a counselor education program**

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Criteria for admissions into a counselor education program varies across universities. Counselor education faculty generally agree on the screening process for prospective students is an important part of the selection process. However, many counselor educators disagree on the criteria and standards used in this admission process. Many factors, such as GRE scores, undergraduate GPA, and admissions essays are all taken into consideration when selecting prospective students. This presentation explored the current research on student success with admissions and screenings for prospective students in counselor education.

## **70 Working Towards Inclusive Cities: Using Public History to Combat Gentrification In East Liberty**

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Faculty Advisor: Alima Bucciantini, Ph.D.

The city of Pittsburgh is at a crossroads. As it sheds its industrial past and embraces an economy in tech, eds and meds, it must decide who the city is for. Will Pittsburgh follow in the footsteps of other gentrified cities whose transformation has occurred at the expense of lower-income communities, or will it find ways to ensure its revitalization benefits all its citizens?

The Pittsburgh neighborhood of East Liberty, along with many other urban neighborhoods, is being rapidly transformed by the U.S. back-to-the-city movement. However, East Liberty's extensive redevelopment is catering to wealthy outsiders rather than the existing community, resulting in the isolation and displacement of longtime residents. This poster will explore how community engagement in public history can combat the negative effects of gentrification. Models for a more inclusive approach to East Liberty's development will be provided using examples from other cities that have facilitated community engagement in local history-focused projects. Including community members in the planning process can allow them to exert ownership over their surrounding environment, thus securing their place in the revitalized neighborhood.

## **71 Utilizing Therapeutic Hypothermia in the Perinatal Period**

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Hypoxic ischemic encephalopathy continues to be one of the main causes of mortality and morbidity in the neonatal period. However, the use of systemic therapeutic hypothermia has significantly improved neurologic outcomes following hypoxic injury. Asphyxia during the perinatal period can be especially damaging to neonates, resulting in decreased cerebral blood flow and poor oxygen delivery to the brain. Therapeutic hypothermia has previously been reserved for infants who meet specific criteria; however, in this case study, we examine the use of therapeutic hypothermia in a 35-week gestation neonate that did not meet criteria, but had an abnormal neurological exam. Upon delivery, the infant was non-responsive, requiring immediate resuscitation and positive pressure ventilation. On physical exam, the neonate was hypotonic with absent primitive reflexes and occasional spontaneous movements.

Combined with an abnormal umbilical cord blood gas, her physical exam was highly suggestive of developing hypoxic encephalopathy and therapeutic hypothermia was initiated for 72 hours. Following treatment, the infant was discharged with no evidence of neurological deficits supporting the use of therapeutic hypothermia in any infants with signs and symptoms of hypoxic encephalopathy.

## **72 To Test or Not to Test: Barriers in the Diagnosis of Lynch Syndrome**

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Lynch syndrome is an autosomal dominant disorder that increases the risk of numerous cancers, including colorectal, small intestine, gynecological, liver, skin and brain cancers, due to defects in DNA mismatch repair genes. The only current method to diagnose Lynch syndrome is through genetic testing, but under the current guidelines, there are specific criteria that have to be met before testing is recommended.

A 62 year old female presented to the general surgery office after a recent emergency department visit. She had been experiencing symptoms of abdominal pain with associated nausea, lower abdominal bloating, urinary frequency and urgency, malodorous urine and dark stools for approximately the last three months. She had also experienced a 50 pound weight loss in the past eight months. Her past medical history was significant for endometriosis, irritable bowel syndrome and endometrial cancer, status post total abdominal hysterectomy and bilateral salpingoophorectomy 4 years prior. A CT scan revealed a mass of the right adnexa, also involving the right ureter. The patient had a family history of strokes in her father, and skin and lung cancer in a maternal uncle. It has recently been suspected she had Lynch syndrome, but due to the lack of strong family history of cancer, insurance would not cover genetic testing and the patient could not afford to pay out of pocket.

This case is an example of how the current diagnostic process of genetic testing can lead to cases of Lynch syndrome going undiagnosed. If patients do receive a diagnosis of Lynch Syndrome, they can undergo more intensive screening and have better long term survival.

## **73 Usher Syndrome: A Case from a Primary Care Perspective**

Austin Grewe

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Usher syndrome is a rare autosomal recessive disorder that is mainly characterized by sensorineural hearing loss and vision loss. There are three clinical subtypes. Type I presents with profound sensorineural hearing loss at birth, progressive retinitis pigmentosa by age 10, and ongoing vestibular issues as vision deteriorates. Type II presents with moderate to severe sensorineural hearing loss at birth, progressive retinitis pigmentosa that develops in late childhood or teenage years, and no vestibular deficits. Type III has normal hearing at birth, but progressive sensorineural hearing loss that occurs during childhood, retinitis pigmentosa of variable severity that begins in teens, and possible mild vestibular deficits. Type I and II account for ~95% of cases in the US. There are currently 11 genes identified to be associated with Usher syndrome that are expressed in the photoreceptors of the eyes and in the inner hair cells of the ear. Diagnosis of Usher syndrome requires a thorough hearing, vision, and vestibular evaluation usually by a team of healthcare professionals. Treatment includes hearing aids

or cochlear implants and oral vitamin A supplements. We present a case of Usher syndrome type I in a 60-year-old white male who has had symptoms of hearing loss, retinitis pigmentosa, and vestibular deficits successfully treated. Deficits typically manifest early on in a patient's life and can have a significant impact on quality of life. As a result, early detection with an accurate diagnosis is especially important.

#### **74 Isolated Cranial Nerve VI Palsy: An Uncommon Manifestation of *Mycoplasma pneumoniae***

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Faculty Advisor: Kristin D'Acunto, MPA, PA-C

*Mycoplasma pneumoniae* is a human pathogen responsible for up to 40% of respiratory tract infections through the transmission of respiratory droplets. It commonly produces a mild and self-limiting respiratory illness characterized by a nonproductive cough, dyspnea, pharyngitis, cervical adenopathy, low-grade fever, myalgias and fatigue. Rare manifestations of the infection have been described and involve the gastrointestinal, dermatologic, cardiovascular, renal, and central nervous systems. Cases presenting with extrapulmonary manifestations are correlated with an increased risk of morbidity, mortality, and hospitalizations. Of the reported CNS manifestations, cranial nerve VI (abducens nerve) palsy has been described just once in literature. Treatment for *M. pneumoniae* typically includes macrolide antibiotic therapy with possible additions of corticosteroids or immunoglobulins to address extrapulmonary manifestations. We present a case of a 53-year-old white male who presented to the emergency department with worsening dyspnea, binocular horizontal diplopia, and blurred vision. Through physical examination and laboratory findings, the patient was diagnosed with *M. pneumoniae* pneumonia and isolated right CN VI palsy. The unexpected severity of the infection required a 4 day ICU stay, BiPAP, fluoroquinolone antibiotic therapy, corticosteroid therapy, and eye patching. The patient was ultimately discharged in stable condition reporting improvement in his breathing and vision.

#### **\*75 The effect of a mindfulness intervention on the depression symptoms of mothers in treatment for an opioid use disorder**

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**BACKGROUND:** Mothers with an opioid use disorder experience a high prevalence of depression which can influence parenting and addiction treatment outcomes. In the general population, mindfulness based parenting intervention has been seen to reduce depression symptoms. To date, it is unknown if mindfulness intervention achieves change in depression symptoms for populations of women in treatment for an opioid use disorder.

**METHODS:** A secondary data analysis was conducted after the implementation of a mindfulness intervention with mothers in treatment for an opioid use disorder. The aims of the secondary analysis were to describe demographic characteristics associated with depression among the participants, to investigate characteristics associated with participation in the intervention, and to evaluate the effect of the intervention on depression symptoms.

**RESULTS:** At baseline, over 45% of participants received moderate to severe total scores using the Beck Depression Inventory-II. Women were more likely to select the mindfulness intervention group over the control group if they were not pregnant (OR .402; 95% CI [.64-1.759]), had more than one child (OR 1.061; 95% CI [.64-1.759]), or were unemployed (OR .236; 95% CI [.068-.813]). There was a significant decrease in depression total scores (M=3.6 [1.2,6.1]) for the intervention group (n=65) comparing pre versus post intervention depression scores (t(64)=3.1, p=.003). Those in the intervention who entered the study with low to mild depression scores experienced less of a difference (M=.47, SD=15.2) in depression scores than those who entered the study with moderate to severe depression scores (M=6.6, SD = 13.5), (t(64)=-2.1, p<.05).

**CONCLUSIONS:** The results of this study indicate that a mindfulness approach to behavioral interventions may be feasible and needed for this population, given the high prevalence and severity of depression symptoms in the women who participated. Mindfulness may be effective in addressing depression outcomes for women in treatment for an opioid use disorder.

### **\*76 Balancing Individual and Society: Advancing Cross-Cultural Responsiveness in Clinical Practice**

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During the past few decades, the arrival of different nationalities, religions, and ethnicities, with their own customs, values, traditions, and languages has radically transformed the civil, social and medical landscape of the American society. The impact from these demographic and interethnic variations has been particularly acute on the establishment of healthcare amid the everyday clinical encounter of providers and patients with their own culturally diverse health, disease and autonomy behaviors, patterns and practices. These differences in belief systems can often result in conscious or unconscious perceptions of distrust, racial bias, discrimination, and negative stereotypes; influencing important healthcare decisions that can affect the quality and outcome of care. Cultural and linguistic responsiveness is seen as an instrumental mechanism of change in reducing the racial and ethnic disparities in healthcare and improving health results for millions of minority Americans.

Implementation of patient-centered policies at multiple levels in the healthcare system, diversification of the workforce, accumulation of interpreter or bilingual services, training and education focused on multicultural curricula is crucial in enhancing culturally effective care. Awareness of communication patterns, etiquette, health beliefs and social values will significantly foster professional and practical healthcare ethics and help avoid cultural imposition of western bioethical principles. The cross-cultural inductive approach of the patient as an instructor based on the LEARN guidelines will help facilitate decision-making between the physicians and patients by employing health behaviors and practices through shared listening, education, and negotiation and providing good clinical care to an increasing diverse American population.

### **77 Regulation of Circadian Rhythms to Slow the Progression of Alzheimer's Disease**

Hayley Barblock

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The pathophysiology of Alzheimer's disease (AD) is largely unidentified and a topic of extensive research in the past decade which has resulted in lack of preventative measures and a cure. We present a case of a 76-year old white female with AD undergoing progressive cognitive decline and memory loss. The only lapse in this decline was during her 10-day inpatient psychiatric unit stay. Her cognitive enhancement medications were not changed during her inpatient admission, but her schedule was more strictly regulated under the care of the staff in the psychiatric unit. Directed by best evidence, this normalization of her circadian rhythm demonstrated that AD gene expression may be influenced by sleep-wake cycles. After 3 months of treatment via informal circadian rhythm normalization, her cognition did not return to baseline, but has remained unchanged, suggesting that circadian rhythm normalization may influence progression of this disease.

### **\*\*78 Chronic Ankle Instability and Hip Muscle Function: a Systematic Review**

Lindsay Carroll

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Faculty Advisor: Benjamin Kivlan, Ph.D., PT, SCS, OCS

**Purpose/background:** The connection between hip strength and knee function is widely accepted in rehabilitation<sup>1-6</sup>. Less is known, however, about how muscle function of the hip may affect the ankle, specifically in people with chronic ankle instability (CAI). The purpose of this review is to provide a cohesive summary of the current available evidence examining hip muscle function in people with chronic ankle instability so that clinicians are better able to treat these patients.

**Methods:** An electronic search of PubMed was performed to identify studies published in peer-reviewed journals that directly examined hip muscle function in people with chronic ankle instability. Studies published between January 1, 2010 and September 30, 2017 were identified using varying combinations of the keywords “ankle”, “hip”, “chronic ankle instability”, “muscle performance”, “kinematics”, and “biomechanics”.

**Results:** Seven of eight identified articles demonstrated differences in hip muscle function in people with CAI versus healthy controls. Two studies found decreased strength of the hip abductors, external rotators and flexors in this population<sup>7,8</sup>. Five studies examined muscle activation quantity and timing of biceps femoris, rectus femoris, gluteus medius and gluteus maximus during dynamic tasks and, though there was variability of specific findings between studies, people with CAI were found to be different when compared to healthy controls or copers<sup>9-13</sup>. A single study<sup>14</sup> did not find a difference in the quantity of activity of the gluteus maximus, gluteus medius, rectus femoris or semitendinosus during walking, turning and side-cutting.

**Conclusions:** Seven of eight studies found differences in proximal muscle function in people with CAI versus controls. The findings of this systematic review suggest that this population may benefit from a rehabilitation program that includes assessment and training of the proximal hip musculature. More research is needed to determine the extent to which specific hip musculature varies in people with chronic ankle instability.

### **\*79 Understanding the Sexual Assault Kit Backlog in Pennsylvania**

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The sexual assault kit backlog is a national problem with over 400,000 untested sexual assault kits nationwide. While this is a huge issue that cannot be solved overnight, continual improvements and changes are needed to reduce and hopefully eliminate the backlog.

This research examines work going on nationwide and aims to better understand the backlog issues specifically in Pennsylvania. Furthermore, the research examines a program utilized by the law enforcement community that garnered necessary resources. First, a comprehensive review of improved practices in proactive jurisdictions nationwide was conducted to identify general policies and procedures that could be implemented elsewhere. Next, interviews with key stakeholders identified specific issues in Pennsylvania. Based on these discussions a survey was developed to gather data related to sexual assault case practices across Pennsylvania. Finally, examination of a grant program previously used by law enforcement indicates potential parallels for employing additional forensic scientists in an effort to reduce and eliminate the backlog.

Ending the backlog of untested sexual assault kits in the United States will require a multidisciplinary and collaborative approach. A deep commitment at all levels of government will require every state to have clear policies and procedures for handling sexual assault kits that will help to create a criminal justice system that holds offenders accountable and creates opportunities for healing and justice for survivors.

### **\*80 Nanoparticle-mediated BDNF siRNA delivery for Chronic Pain Therapy**

Kandarp Dave

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Over 25 million adults in the United States are living with chronic (neuropathic) pain, a persistent injury to the nervous system that severely affects the quality of life[1, 2]. Currently available small molecule therapies provide only palliative relief and are associated with intolerable side effects at therapeutic doses[3]. Molecular understanding of neuropathic pain has led to development of potential biologic therapeutic targets such as neurotrophic factors which, if delivered at target site, can result in potent effects. Increased synthesis of brain-derived neurotrophic factor (BDNF, neuromodulator of spinal nociception) in the dorsal root of ganglion (DRG) in inflammatory and neuropathic pain models suggests that knockdown of BDNF in DRG could provide a promising strategy to treat chronic pain[2, 4]. Our goal is to deliver short interfering RNA (siRNA) against BDNF to target the pathophysiological processes that cause chronic pain. We hypothesize that lipid nanoparticle-mediated BDNF siRNA delivery is a safe and highly efficient process that will mediate specific knockdown of BDNF in the DRG region. The Lipid nanoparticle (LNPs), in our studies, are composed of biodegradable lipidoid formulated with cholesterol, 1,2-Distearoyl-sn- glycerol 3- phosphocholine, Polyethylene glycol, and siRNA to form nanoparticles. The complexation of siRNA in LNPs will be evaluated by agarose gel retardation assay. LNPs will be characterized by particle size distribution and zeta potential using light scattering techniques. To determine siRNA delivery efficacy in cells, we will conduct LNPs transfection in the U-87 MG

glioblastoma cell line and use western blot to determine protein knockdown. Furthermore, the cytocompatibility of LNPs will be determined using an ATP assay. Results of the above studies are expected to allow optimization of the LNP formulation to achieve safe and specific knockdown of BDNF.

### **\*81 Narrative Comprehension by People with Aphasia given Single versus Multiple Modality Presentation**

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People with aphasia have difficulty comprehending written material and auditory material. Previous studies found that people with aphasia benefit when information is presented through multiple modalities. However, researchers have yet to examine the benefits of presenting paragraph-level information simultaneously through written and spoken modalities. The purpose of this study is to evaluate comprehension by people with aphasia when listening, reading, or listening and reading narratives.

Participants included 20 adults with chronic aphasia. The participants listened, read, or listened and read 12 different paragraphs. Following each paragraph, the participants answered 10 multiple choice questions using Written Choice Strategy. Accuracy, time spent reviewing the materials, and preferences were measured across conditions.

The majority of participants showed a significant increase in comprehension during the combined condition. There were no significant differences between reading only and listening only. The listening condition was significantly faster than the reading and combined conditions. Finally, most participants selected the listening and reading combined condition as their first choice (n=15/20).

These results suggest many people with aphasia may benefit from tools that present information in a combined format (e.g., text to speech systems) and this format may not add additional required processing time. Additional clinical implications will be discussed.

### **\*82 A Computational Model of Team-based Dynamics in the Workplace**

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Large organizations often divide workers into small teams for the completion of essential tasks. In an effort to maximize the number of tasks completed over time, it is common practice for organizations to hire workers with the highest level of education and experience. However, despite capable workers being hired, the ability of teams to complete tasks may suffer if the workers' individual motivational needs are not satisfied.

To explore the impact of incentive-based motivation on the success of team-driven organizations, we developed an agent-based model that stochastically simulates the proficiency of 100 workers with varying abilities and motive profiles to complete time-sensitive tasks in small groups. The model is initialized by randomly assigning each of the 100 workers an ability value (1 through 5) and a motive profile from initial probability distributions. A motive profile is a 3-parameter equation that quantifies a

worker's tendency to actualize his or her potential based on the individual's motivational needs for affiliation, achievement, and power. The model creates new tasks as workers become available; each new task is assigned a random difficulty value and a team of 2 to 4 workers. During each time step, each worker contributes to their assigned task at a rate determined by the worker's ability and motive profile, the difficulty of the task, the proximity of the task to completion, and the team's experience with similar tasks. At the end of 365 time steps (1 year), the model outputs the total number of completed tasks, as well as other measures of success. By simulating the model hundreds of times for different sets of initial distributions and analyzing output, we are able to determine which worker attributes lead to increased team-based productivity. Results aid in understanding optimal hiring and human resource allocation in a team-driven organization.

### **83 Gifted Academic Abilities and Social Parallels to Autism in a 5-year-old with Agenesis of Corpus Callosum**

Kaitlyn Eagle

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Faculty Advisor: Brenda Swanson-Biearman, DNP, NPH, RN

The personality traits and educational implications of agenesis of corpus callosum (AgCC) have been compared to those seen in autism spectrum disorder. AgCC has been proven to potentially cause mental retardation, seizures, and developmental delays. However, the idea of higher cognitive functioning related to an AgCC diagnosis has not been researched. This report aims to explore the uncertainty surrounding the academic and social impacts of AgCC. This is a case study of a 5-year-old white male who was diagnosed postnatally with AgCC. He was discharged from neurological care after reaching all appropriate developmental milestones and remaining seizure free. His current clinical findings include a shy affect, poor eye contact, and guarded communication. Otherwise, his physical exam is grossly within normal limits. Clinically, he has been diagnosed with social anxiety, which is being treated with psychotherapy. He is enrolled in a preschool program for children with various delays; however, the patient is performing above average academically. This case suggests that the psychosocial effects of AgCC can be closely compared to the characteristics of autism spectrum disorder. Future research is warranted to discover if AgCC could be related to heightened intellectual abilities.

### **84 Gaining a competitive advantage in leased commercial spaces**

Michael Findley

A.J. Palumbo School of Business Administration

Faculty Advisor: Robert Sroufe, Ph.D

Research Problem: Organizations who rely on operating in leased building spaces are often at a marked disadvantage when it comes to conducting building retrofits. The problem addressed in this study will explore how leases can include environmental and social sustainability performance measures. New leasing structures can provide the opportunity to decrease the organization's environmental footprint and cost savings through decreased utility costs. However, the tenant-property owner relationships often fail to recognize more impactful areas of cost savings related to improving employee health and productivity through the creation of a healthy work place environment. Shortcomings in communication and a potential lack of knowledge pertaining to available resources between the tenant, property owner, and facilities management teams can perpetuate this issue and inhibit solutions benefiting all stakeholders.

**Methods:** The research in this study takes a multi-methods approach to secondary and primary data collection to propose an innovative approach to leasing building space and will address questions as to who is responsible for building upgrades and maintenance, to help achieve goals set in place by both parties. The concept of “Green Leasing” will be discussed as a conduit to achieve these goals. Primary research provides a foundation for the study by looking at a large multinational company case study and data from various organization representing those who have been successful in the “Green Leasing” sector. Next, financial analysis proves the economics benefits for all involved stakeholders and applied as to study the contrast between this leasing strategy and traditional strategies.

**Findings:** Outcomes of the research show a dynamic landscape of benefits including an emphasis on non-traditional cost savings from improving the environmental qualities for employees, improved employee morale and performance, focus on benefits to the property owner through enhanced leasing rates, and access to more clients that have a strong interest in sustainability.

### **85 Mixed Signals: The Politics Surrounding Nikita Khrushchev’s 1959 Visit to America**

Alec Fisanick

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At the height of the cold war, Nikita Khrushchev was invited to travel and witness the best of the United States in the first state visit between the two countries. President Dwight Eisenhower claimed the purpose of the trip was for Khrushchev to gain a better understanding of the United States. One of the cities the Soviet delegation wished Khrushchev to see in September 1959 was Pittsburgh, Pennsylvania. The State Department did not share these same feelings. **Mixed Feelings: The Politics Surrounding Nikita Khrushchev’s 1959 Visit to America** argues that the State Department did everything in the organization’s power to disrupt Khrushchev’s visit to Pittsburgh behind the scenes out of fear that it would become a propaganda tool for the Soviet Union because of a national steel union strike. Prior research has dismissed the Pittsburgh stop as insignificant: Khrushchev came to the city, saw a manufacturing plant, and left. But so much more happened in the planning stages and the visit itself which offers a better way of understanding how diplomacy at the height of the Cold War took place. A union strike, a prayer, and an appeal for better relations are all highlights coming out of Pittsburgh which explain why Khrushchev’s American tour needs to be reexamined.

### **86 Expanding the Boundaries: Performing a LINX procedure on a Patient with a 4-cm Hiatal Hernia**

Emily Emsurak

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Faculty Advisor: Brenda Swanson-Biearman, DNP, MPH, RN

An 80-year-old white female with a 30-year past medical history of GERD, a 4-cm hiatal hernia, and a 10-year history of coronary artery disease (CAD), being treated with Coumadin, presented to the surgical department. A hernia reduction was necessary, but patient age and comorbid conditions were of concern for the standard Nissen fundoplasty. The LINX procedure is not indicated in a patient with a hiatal hernia greater than 3cm due to lack of trial studies to prove if the LINX device can withstand the upward pressure of the hernia. The LINX procedure was performed because it was less invasive and has a shorter recovery period than the Nissen fundoplasty. During the Nissen fundoplasty, multiple short gastric vessels are removed; blood flow to the stomach could have been compromised after the

procedure due to significant atherosclerosis. The LINX procedure involves the placement of the LINX device on the esophagus to act as a replacement for the weakened lower esophageal sphincter. The device augments the physiologic barrier to reflux and maintains physiological function of the stomach. The LINX procedure in this patient was successful at reducing the hernia and treating GERD. The patient remained stable without complications at the one-month follow-up appointment.

### **87 The Next Step for Quaternary Diamond-like Semiconductors with Applications in Nonlinear Optics**

Jennifer Glenn

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For decades, diamond-like semiconductors (DLSs) have been gaining interest for their use in nonlinear optical (NLO) applications due to their attractive physicochemical properties, which can be tailored by controlling their composition. Current materials have the drawback of not being able to withstand high-powered lasers; however, new materials can be engineered to overcome this challenge. It is of paramount importance that new materials be discovered due to their applications in IR countermeasure systems and explosive device detection for the military, and disease monitoring and laser surgery in the field of medicine. The DLSs used in these applications are all related in that their crystal structures are derived from that of either cubic or hexagonal diamond. To produce a DLS that will also possess NLO properties, several guidelines must be followed. These guidelines include that all the ions are tetrahedrally coordinated, the average number of valence electrons per ion must be four, and the average number of valence electrons per anion must be eight. These guidelines have been used to create binary (II-VI), ternary (I-II-VI<sub>2</sub>) and quaternary (I<sub>2</sub>-II-IV-VI<sub>4</sub>) DLSs. Through the progression of these materials additional degrees of tunability have resulted in improvements in desired properties. The question has thus become, what is the next step to further improving tunability and physical properties? This presentation will focus on what the next logical steps are and the new materials that have resulted from them. A comparison of the physicochemical properties of quaternary, I<sub>2</sub>-II-IV-VI<sub>4</sub>, DLSs to these new materials will also be presented.

### **88 Predictors of and Reasons for Unreported Sport-Related Concussions**

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Faculty Advisor: Ara Schmitt, Ph.D.

Purpose: The negative consequences of sport-related concussions (SRC) can only be avoided when an athlete is identified as having experienced a concussion and evidence-based treatments are applied. Kroshus, et al. (2015) reported that nearly 48% of college athletes (excluding hockey and football) continued to play while symptomatic of a possible concussion. The reasons for continuing to play while injured are increasingly a focus of study by concussion researchers. This study aims to understand variables associated with the un-reporting of concussive symptoms among college athletes. Previous studies suggest that gender, pressure from teammates/coaches/family members/fans, existing knowledge of concussion, and previous history of concussion might be related to athletes not reporting concussions. This study aims to answer two research questions: 1) To what extent do gender, pressure from others, existing knowledge of concussion, and previous history of concussion predict the number

of unreported concussions in college athletes; and 2) What are reasons why college athletes have not reported a suspected concussion.

Methods: In this study, 985 collegiate athlete participants completed a comprehensive survey regarding concussion knowledge and beliefs, and previous experiences with concussions, including the reporting of concussions. To answer the first research question, hierarchical regression will be used to determine the amount of variance accounted for by gender, pressure from teammates/coaches/family members/fans, existing knowledge of concussion, and number of previous concussions in the prediction of number of unreported concussions while playing college sports. Frequency counts will be computed to identify the reasons why the college athlete participants did not report a suspected concussion. These data will also be visually displayed using a bar graph.

Discussion: Discussion of this poster will focus on implications of findings for sports-related concussion research and practice implications for those who treat and manage athletes and sports-related concussions.

### **89 Olfactory hallucinations in a patient with anaplastic oligodendroglioma**

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Olfactory hallucination is a rare psychiatric symptom that occurs most commonly in the presence of an organic brain lesion, epilepsy or head injury. Due to its rare occurrence, diagnosis of olfactory hallucinations is often difficult and appropriate management is generally unknown. We present the case of a 47-year old white male who was admitted on a 302 to the inpatient psychiatric unit following an incident in which he broke out of a window at his personal care home because he believed there was a fire in the hallway. This patient requires full-time care due to his past medical history of a right-sided temporal anaplastic oligodendroglioma (AO), diagnosed 5 years prior, as well as left-sided hemiparesis, epilepsy, dementia, and depression. The patient reported multiple instances of smoke and fume olfactory hallucinations since his diagnosis of AO without any other psychotic symptoms. Treatment in the inpatient unit was focused on suppressing hallucinations with cognitive-behavioral therapy as well as medical therapy with Zoloft 50 mg PO daily. At the time of discharge, the patient was experiencing decreased frequency and intensity of the olfactory hallucinations.

### **\*90 Narrative Authority: Patient-Physician Relationship as a Partnership**

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Keywords: Paternalism, autonomy, patient-physician relation, partnership, clinical consultation, genetics, narrative authority.

Paternalism was once considered as an effective medical practice in the healthcare arena. As healthcare focuses on a more patient-centered model, the negative effects of paternalism seek to be avoided. The well-being of the patient extends beyond medical health, and is also understood to include the patient's worldview, beliefs, and social norms. To overcome the negative affect of paternalism, patient autonomy

must be reimagined in ways that build trust, promote dialogue, and foster consensus between the patient and physician.

When patient autonomy is given a prominent role in a patient-centered model, the physician, or the hospital-defined process, may give too much weight to patient's voice or preferences. When the physician's role holds sway in a paternalistic model, the physician may be insufficiently attentive to the needs and preferences of the patient. To provide effective treatment and care, and to rely on ethics as our guide, the voices of both the physician and the patient voices must to be heard, valued, and respected.

The paper/poster will offer a model for healthcare decision-making between physician and patient, founded on a shared and interactive relation. In this model, the patient and physician interact to promote empathetic communication and consensus-based decision making. This model provides the opportunity to positively transform the patient-physician relationship into one which is other-oriented, empathy-focused, dialogue-based, culturally sensitive, mindful to value judgments. This approach can be described as life-story based insofar as it engages the relation between physician and patient in a dialogic manner—hence the use of the concept of Narrative Authority to describe the relationship. That is, Narrative Authority reflects the dialogic engagement of the physician and patient in partnership together in the quest for effective patient treatment and care.

This paper/poster will apply the new model of the physician/patient relationship to widespread, practical arena of clinical ethics consultation to describe best practices based on this new model. Finally, the paper/poster will apply both the new model and its implications for ethics consultation to clinical genetics ethics consultation to explore best practices in this fast emerging field of genomics medicine.

### **91 Understanding a New Client: Polyamory**

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Living in the twenty first century there are numerous different types of clients that we as counselors can have walk through the door. Larger populations such as couples, addicts, and those suffering from mood disorders are repeatedly discussed in education, but what about a new type of client. How do we approach them? Before we can learn to counsel something new, we must first be able to understand. So, polyamory. What is it? Polyamory is a form of relationships in which people choose to have multiple loving partners in an ethical and responsible way. It is also known as "non-monogamy". The concept of "non-monogamy" is not a new idea and has exist all throughout history, including the Bible and the Quran. We then come to the question, if this is something that has existed throughout history, why is it not discussed? In most western societies polyamory is not the popular form of a union, but is still a population that is in need of counseling.

### **\*92 Exploring Fertility Options with a Unicornuate Uterus**

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Congenital uterine anomalies are known to pose challenges with pregnancy, specifically maintaining a viable fetus. In a unicornuate uterus, the uterus lacks the capacity to carry a fetus to term and provide sufficient nutrients. The patient summarized is a 33-year-old G5P1122 white female with a unicornuate uterus and rudimentary horn. After difficulty sustaining pregnancies, she began intrauterine insemination (IUI) and hormone therapy. She presented at 38 weeks gestation with her third child, but each pregnancy had posed adverse events. Research has shown conventional fertility options, including in-vitro fertilization (IVF) and hormone therapy, have not proven to increase pregnancy outcomes. However, a new surgical approach that makes a transcervical incision into the uterine cavity to increase capacity has significantly improved the maintenance of pregnancies. Based on this research, this patient's fertility treatment did not help decrease the negative outcomes seen during her pregnancies. Therefore, fertility options should be aimed toward the maintenance of pregnancy, not necessarily conception.

**\*93 Pediatric Oncology in Tanzania: A study of current epidemiology, diagnostics, treatments, outcomes, and barriers to care in the Kilimanjaro Region**

Julia Marn

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Pediatric Cancer is the number one cause of death by disease in children living in high-income countries (HICs). Despite this harrowing statistic, overall survival rates in HICs have increased dramatically within the last 40 years from 10% to nearly 85%. Meanwhile, lower and middle-income countries (LMICs), where 80% of the world's children live, face survival rates of only 5-25%. Until recently, foreign aid to Africa focused on basic health care and prevention of communicable disease. Thus, resources for non-communicable diseases (NCDs) such as cancer are only beginning to appear, and are paced far behind developed nations. By a significant margin, Sub-Saharan Africa has the lowest survival rates in the world for pediatric malignancy. The reason is multifactorial: inferior diagnostic, treatment, and palliation capabilities, challenging socioeconomic factors, inadequate number of trained professionals, and lack of access to care, contribute to a convoluted situation surrounding pediatric cancer care.

Tanzania is a low-income country in East Africa with almost half of its citizens living below poverty line. In Tanzania, 45% of the population is under the age of 15. No national cancer registry exists in Tanzania to date, so the incidence and distribution of pediatric cancer is unknown. Currently, three cancer centers exist in Tanzania for nearly 56 million people. This study evaluates the epidemiology, diagnostics, treatment, outcomes, and barriers to pediatric oncology care at these three hospitals with predominant focus on the newest center in northern Tanzania; Kilimanjaro Christian Medical Center (KCMC). A retrospective study on pediatric cancer cases at KCMC after the center's first year of operation was completed. The purpose of this study was to provide information that may help to advance pediatric oncology care for children affected by childhood cancer in Tanzania. This study presents one of the first reports on pediatric cancer care in Tanzania's northeastern catchment zone.

**94 Tacrolimus- induced Thrombotic Microangiopathy in a Small Bowel Transplant Patient**

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Thrombotic microangiopathy (TMA) is serious medical emergency resulting in thrombosis within the microvasculature due to endothelial injury. Unfortunately, initial signs and symptoms of TMA are vague and non-specific, often lead to late diagnosis. Thus, TMA remains a potentially fatal hemolytic crisis when unrecognized and untreated. Although TMA has numerous causes, this disorder in the setting of small bowel transplant (SBT) is largely unexplored. In the United States, the recommended SBT immunosuppression protocol includes a calcineurin inhibitor, tacrolimus (Prograf) as the primary agent to prevent organ rejection post-transplant. In rare cases, this medication is known to cause drug-induced thrombotic microangiopathy (DITMA). Patients with SBT are at highest risk for graft failure, thus, regimens require increased doses of immunosuppressive medications when compared with other abdominal organ transplants. There is a critical urgency to first, diagnose the pathology early, and second, understand the pharmacokinetic and immunologic processes of DITMA to reduce the morbidity and mortality of post-transplant patients, and to limit complications of chronic immunosuppression that threaten length and quality of life. We present a case of a 36yo SBT patient presenting with DITMA secondary to tacrolimus, despite normal drug levels, as well as the treatment methods initiated.

### **95 Chronic Pain Management of Acute Intermittent Porphyria**

Emily Molik

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Acute intermittent porphyria (AIP) is a type of autosomal dominant neurovisceral porphyria involving a dysfunction of heme metabolism. The gene mutation itself has low penetrance, but when exacerbating factors such as stress, medications, or hormonal changes signal the liver to increase heme production, toxic levels of heme intermediates accumulate which causes the patient to become symptomatic. Patients frequently present to the emergency department with gastrointestinal, neurologic, psychological and nephrogenic symptoms. Diagnosis and subsequent treatment of the symptoms of AIP rely on a confirmed diagnosis of elevated urinary porphobilinogen during an acute attack. While opioid analgesics are commonly used acutely for pain management during porphyria attacks, they are not recommended for daily pain management. This case report focuses on discussing the treatment of chronic daily symptoms rather than acute symptoms present during an exacerbation. We present a case of a 46-year-old female diagnosed with AIP who presented in the office setting for a monthly well check and new prescription of Fentanyl. She was being prescribed Fentanyl and gabapentin for pain management due to AIP and other conditions after failed trials of ibuprofen, oxycodone and hydrocodone. Chronic pain from AIP is commonly controlled with NSAIDs, reserving controlled substances for acute exacerbations in the emergent setting.

### **\*96 Experiences of Overweight and Obese Adults with Weight Management Technology**

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How to use weight management technology effectively to aid weight loss is not well understood. No qualitative studies have specifically examined the experiences of using this technology among overweight and obese adults. The aim of this study was to describe the lived experience and meaning of the use of weight management technology by overweight and obese adults. A phenomenological mini-study was conducted with five overweight and obese adult participants (n = 4 females, n = 1 male) who

use weight loss technology. Participants were recruited through purposive and snowball sampling in an urban Midwestern community. Data were collected through semi-structured interviews that were recorded and transcribed verbatim using Dragon Naturally Speaking 13.0. Transcriptions were verified against recordings, and analyzed with inductive open coding in NVivo 11 using Giorgiâ's method of phenomenological analysis. Three themes and ten subthemes emerged from the analysis: 1) multiple weight management technology tools and uses (weight loss, attaining proper nutrition, and heart rate monitoring for physical training), 2) cycling of weight management technology use and bodyweight (entering data, tracking, self-monitoring, achieving incentives and health goals, going off the wagon, weight fluctuation, and getting back on track), and 3) motivation gained through gaming and social support are important. The data entry burden was described as a deterrent to self-monitoring adherence. Satisfying indulgences, emotional eating, and inability to verify nutrition information were described as reasons for falling off the wagon. Weight regain was described as the trigger for getting back on track. This study reveals a preliminary depiction of how obese and overweight adults experience and use weight loss technology. Further research is needed to 1) examine the relationship between feedback through gamification and motivation to manage weight, and 2) discover ways to decrease the data entry burden associated with weight management technology while increasing self-monitoring adherence.

### **\*97 Community Pharmacist and Substance Use Disorder: Attitudes, Knowledge and Practices: A Systematic Literature Review**

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Faculty Advisor: Vincent Giannetti, Ph.D.

Background: Over the last two decades, the abuse of controlled substances, particularly opiates, has reached significant proportions in the US. An estimated 25 million people initiated non-medical use of pain relievers between 2002 and 2011. The number of deaths per year attributed to prescription opioid medications reached 16,651 in 2010. Limited literature is available assessing pharmacist knowledge, attitudes and practices regarding patients with substance use disorder (SUD), despite growing prevalence of SUD in the community. An increasing number of states have provided opportunity for widespread dispensing of naloxone by pharmacists, suboxone is now widely dispensed to treat opioid addiction and pharmacists are increasingly expected to screen for prescription drug abuse. Additional understanding is needed regarding existing barriers to community pharmacists' role in screening, dispensing and counseling to improve services to this population.

Objective: To conduct a systematic literature review to 1) Identify papers describing community pharmacist attitudes, knowledge and practices in treating substance use disorder and 2) Make policy, practice and research recommendations based on identified gaps in the literature.

Methods: The literature review is being conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The search was conducted in PubMed, Scopus and Psych Info electronic databases up to December 2017. Select MeSH terms include Pharmacist, Substance Use Disorder, Attitudes, and pharmacy practice terms like Medication therapy management and Drug Abuse Screening. The exclusion criteria included reviews, RCTs or pharmacological studies, and non-English articles.

Outcomes: The initial review yielded 2393 results after duplicate removal. 424 papers have been selected for full text review. Final qualitative synthesis will be conducted on papers that assess pharmacist knowledge and attitudes or describe practice policies. The discussion will focus upon policy and research recommendations to improve pharmacist practice with SUD.

### **\*98 Capgras Syndrome: The Delusion of Imposters**

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Delusional misidentification syndromes (DMSs) are a rare group of neurological and psychological disorders, all involving the idea that one person is an exact likeness of another person. Capgras syndrome (CS) is the most common DMS. CS was originally identified in a patient with schizophrenia. CS occurs when a patient holds the delusion that a well-known person has been replaced by an identical imposter or multiple imposters. We present a case of a 50 year-old Caucasian female with a ten-year past medical history of untreated hypothyroidism and a twenty-year history of untreated depression, who was diagnosed with late-onset schizophrenia and treatment resistant Capgras syndrome. CS is described as a hypofamiliarity disorder, meaning that patients' perceive familiar or well-known faces as unfamiliar, or as strangers. Various theories exist, but the etiology of CS is unknown. Some theories state that CS occurs due to abnormalities in facial processing. Many hypotheses focus on brain areas involved in processing familiar stimuli, although the brain regions have yet to be identified definitively. Studies on patients with lesion induced DMS have been used to identify possible brain regions involved in the pathogenesis of CS.

### **99 Takotsubo Cardiomyopathy in the Post-Operative Period**

Rebecca Swanson

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Takotsubo cardiomyopathy is a condition characterized by symptoms of a myocardial infarction, or acute coronary syndrome, without any evidence of coronary artery disease. Commonly referred to as "broken heart syndrome," Takotsubo cardiomyopathy is typically associated with emotional stressors, such as the death of a loved one. Takotsubo cardiomyopathy is a diagnosis that is rarely considered in the post-operative period after the physical stress of a surgery. The following case describes a 59-year-old white male who presented to the emergency department 48 hours after a left-sided knee replacement with a fever of 101°F, shortness of breath, and generalized weakness for two hours. He was tachycardic, hypotensive, and febrile and was evaluated for a pulmonary embolism. However, the CT angiogram, CBC with differential, d-dimer, and electrocardiogram were all within normal limits. His troponin levels were elevated which necessitated a cardiac evaluation. An echocardiogram was performed, which revealed left ventricular apical ballooning consistent with Takotsubo cardiomyopathy. Cardiac catheterization revealed no coronary artery occlusion, and the patient was discharged two days after admission and placed on lisinopril.

### **\*100 Barriers to Accessing Healthcare and Educational Services for Children with Autism Spectrum Disorders**

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Faculty Advisor: Tammy Hughes, Ph.D.

For children with an autism spectrum disorder (ASD), early identification and access to intervention services is considered critical for reducing symptoms, improving language, increasing cognitive abilities (Hume, Bellini, & Pratt, 2005). Although the importance of early services is well documented, many youth in the United States face significant barriers that prevent them from accessing intervention services during this crucial period of development. Poverty is one common barrier. Families that are in lower socioeconomic groups often lack knowledge about services, and only access services when there is a crisis, rather than receiving preventative care (Liptak, et. al., 2008). Familial stress and cultural expectations (Liptak et al., 2008; Longtin & Principe, 2016) as well as parental level of education can also negatively impact the amount of resources that are accessed during the critical development period. Our study seeks to analyze factors that impact accessing healthcare and educational services for ASD youth through a large-scale national data set. By documenting the impact of these barriers, we hope that result may influence the outreach practices of community and school mental health professionals.

### **\*101 A Qualitative Mini-Study of young adults who use electronic nicotine delivery systems (ENDS)**

Beth Tremblay

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Faculty Advisor: Melanie Turk, Ph.D., RN

Title: A Qualitative Mini-Study of young adults who use electronic nicotine delivery systems (ENDS)

Purpose: The purpose of this study is to understand the beliefs, values, and experiences of young adults (age 18-25) who use ENDS, or "Vapes."

Background: Vaping is the act of inhaling an aerosolized liquid which contains known carcinogens. More than nine million adults currently use ENDS. There is little research about young adults who use ENDS.

Method: Participants were recruited via snowball method for this focused ethnography mini-study of young adults who currently vape (N =4) including three males and one female. Data were collected by audio-recording semi-structured interviews over four months which were transcribed into NVivo 11 software. Leininger's phases of data analysis guided analysis. The descriptors and components were categorized. Patterns were identified from the categories.

Results: Ten categories were identified and three patterns subsequently emerged; Feeling Shamed about Vaping, Uncertainty of Health Implications and, Positive Sensory Experiences. Participants expressed experiences of being shamed for Vaping and some expressed embarrassment about the behavior. Participants believed that Vaping is healthier than cigarette smoking, but also shared concern about possible unknown negative health effects. Positive sensory experiences, such as flavor or a "buzz" were valued by participants.

Conclusions and Implications: Research in the area of Vaping is lacking, and the full implications of this behavior on health are not completely known. Yet, health concerns related to vaping should be

addressed when caring for young adults. More information is needed about the knowledge level of young adults related to health implications of using Vaping products. Future research should explore how the positive sensory experience may influence the continuation of the behavior past any nicotine dependency or despite feelings of shame. Additional future research may also test educational interventions to decrease Vaping behavior in this population.

### **102 Incarcerated Vermiform Appendix Within an Umbilical Hernia: An Approach to Evaluation and Management**

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Faculty Advisor: Kristin D'Acunto, MPA, PA-C

Umbilical hernias are a common condition addressed by the general surgery team. Left untreated, they pose several adverse health outcomes including bowel obstruction and tissue ischemia. Most often, loops of small bowel and/or omentum are incarcerated within the hernia sac. This case report follows a 58 year old female patient referred for inpatient surgical consult with a painful umbilical mass, epigastric discomfort, nausea, and vomiting. The patient was diagnosed with an incarcerated hernia and scheduled to have it surgically reduced and to have the defect repaired with mesh. During the procedure, it was determined laparoscopically that the patient's vermiform appendix was incarcerated within the hernia sac. Due to the friable condition of the appendix, an elective appendectomy was performed. The surgical site was closed without repairing the hernia to prevent infection of the surgical mesh following the appendectomy. Elective repair of the hernia with mesh was performed several weeks later without complication. The case illustrates the potential for abnormal presentation of incarcerated umbilical hernias and the necessity to adapt the scheduled procedure regarding abnormal findings. Additionally, it highlights the importance of delaying the introduction of surgical mesh following a contaminated procedure, such as an appendectomy.

### **103 Prophylactic TLH-BSO for Patients with Lynch Syndrome**

Meghan Young

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Lynch syndrome is an autosomal dominant disorder that increases the risk of various types of cancer in individuals carrying the gene mutation. Cancers of the colon, endometrium, and ovaries are acutely prominent in these patients and, therefore, it is recommended that they undergo routine gynecologic and colonoscopy surveillance. This is a case of a 45-year-old female with a past medical history significant for Lynch syndrome, who presented to surgery for a total laparoscopic hysterectomy, bilateral salpingo-oophorectomy (TLH-BSO) secondary to a complex ovarian mass found on screening ultrasonography. The cyst was suspected to be either a complex cyst or solid mass and required biopsy. The patient elected for a robotic-assisted TLH-BSO to remove her uterus, fallopian tubes, and ovaries to prevent primary endometrial and ovarian cancers, and obtain biopsy of the mass. Due to the increased risk of gynecological cancers in Lynch syndrome carriers, surveillance of these women results in earlier detection of precancerous lesions and improved morbidity and mortality. Prophylactic TLH-BSO results in a reduction in the cancer incidence in these patients, as well as improved positive lifestyle modifications.

### **\*104 Gene Delivery to the BBB for Ischemic Stroke Therapy**

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Ischemic stroke can result in dysfunction and death of brain neurons, affecting neuronal communication via synapses, and lead to neurological deficits and disability [1]. It has been reported that brain-derived neurotrophic factor (BDNF) is an essential nervous system growth factor in the brain which maintains physiological processes of the normal, intact adult brain, including supporting neuronal activity, function and survival throughout life [2, 3]. Insufficient delivery of BDNF is a major challenge that limits its potential to treat stroke, even in a stroke model where the blood-brain barrier (BBB) might have been disrupted [2].

The goal of our research is to deliver BDNF DNA (via transfection) to brain microvessel endothelial cells that line the BBB. Transfection is an experimental process by which exogenous (foreign) DNA molecules is safely delivered into a cell/animal. Our hypothesis is that BDNF DNA NPs will transfect brain microvessel endothelial cells and the secreted BDNF protein will slow down cell death and revive the function of the surviving neurons. In our project, we have used poly (ethyleneglycol)x -block-polyaspartamide with diethylenetriaminey side chains (PEG5K-DET48, abbreviated as PEG-DET henceforth) as the polycation and Pluronic P84 (P84) as an excipient to form DNA nanoparticles (NPs) to deliver BDNF DNA to brain endothelial cells. Our DNA NPs showed high transfection in a cell model of the human BBB (hCMEC/D3 cells). Moreover, we have demonstrated that both PEG-DET and P84 are safe excipients using a Lucifer Yellow transcellular permeability assay and luminescent ATP assay. To allow testing the main hypothesis, two approaches will be pursued. First, we will deliver BDNF DNA NP to hCMEC/D3 cells cultured in an in vitro stroke setting- oxygen-glucose deprivation model (OGD) to determine and optimize transfection parameters. Second, we will transfect D3 monolayers co-cultured with the human cortical (HCN-2) neurons in a Transwell format to determine functional activity of BDNF DNA NPs in an OGD model [4]. We expect that optimal formulations of BDNF DNA NPs with low toxicity will decrease neuronal cell death in an in vitro stroke model.

### **\*\*105 The Effectiveness of a Peer-Mediated Intervention on Writing Skills in Students With Autism Spectrum Disorder and Student with a Learning Difficulty in Inclusive Classroom**

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Educating children with special needs in the general education setting instead of special education setting has been promoted by the regular education initiative. General education teachers have faced the challenges of providing an effective instruction to children with special needs within their classrooms. The push for inclusion increased the complexity of teaching because teachers, who were once only responsible for educating students without disabilities, were suddenly asked to provide services to students with disabilities with little or no training or professional development. The classroom teachers face instructional challenges that have grown as the number of students identified

with a disability has grown. One of the promised methods to solve these problems and to improve student proficiency in several disciplines is using peer tutoring intervention. Peer tutoring means cooperative teaching between a pair of students where a student with high ability take turns acting, coaching, and correcting errors as the tutor of a student with low ability under supervision of a teacher. The purpose of this study is to better understand the effects of peer support strategies on student with high functioning of autism and students with learning difficulty. Four students with diverse culture backgrounds in seventh and eighth grades whose ages ranged from 13 to 15 years of age will participate in this study. One participant has a diagnosis with ASD and another is a student with a LDC, and are enrolled in English writing class. Another two typically-developing peers who are high achievers will work as tutors for the two participants with disabilities under the supervision of a teacher. A multiple base line design is implemented across students' writing skills to examine the effectiveness of the intervention. The results and limitation of this study will be discussed.

**\*\*106 Identification of Genetic Elements that Regulate a Cyclic di-GMP Mediated Multicellular Trait in *Pseudomonas fluorescens***

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Biological Sciences | Bayer School of Natural and Environmental Sciences

Faculty Advisor: Wook Kim, Ph. D.

Biofilms comprise densely packed cells that compete for nutrients and space, where individuals must adapt or risk starvation and even death. Fierce competition, however, is not the sole driver as the metabolic waste of one cell could inadvertently or mutually function as a resource for another. Biofilms are intrinsically heterogeneous, we thus predict a greater role for multicellular interactions that extend beyond a simple feast-and-famine model. We recently described an emergent multicellular trait in bacterial colonies where two morphotypes repeatedly and bi-directionally evolve to spread out and conquer new territory together. Whole-genome sequencing of mutants suggests that the division of labor manifests through cyclic di-GMP (CdG) modulation. CdG is a universal signaling molecule in bacteria, which drives individual cells to aggregate into biofilms. Here, we analyze the genomes of 64 mutants along with a phenotypic assay to strengthen the role of c-di-GMP modulation as the exclusive driver of the division of labor. We find that the Wsp signal transduction system is the most common target, but also find causal mutations in genes that are either predicted or not known to modulate c-di-GMP. Our phenotypic assay supports our predictions and reveals the potential for a distribution of c-di-GMP levels across individual mutations. A key implication is that multicellular trait could manifest through varying CdG levels without mutations. This work demonstrates the potential for our experimental evolution system to systematically map CdG regulatory switches and uncover new innovations of molecular evolution.

**\*\*107 Determination of Gunshot Residue Settling Velocity**

Cassidy Schultheis

Other Authors: Allison Laneve, M.S., Stephanie Hrico, M.S.

Forensic Science and Law | Bayer School of Natural and Environmental Sciences

Faculty Advisor: Stephanie Wetzel, Ph.D.

Determination of Gunshot Residue Settling Velocity

Cassidy Schultheis, B.S., Stephanie J. Wetzel, Ph.D., Allison Laneve, M.S., Stephanie Hrico, M.S.

Gunshot residue (GSR) is a type of trace evidence that can be used in any type of forensic case involving a discharged firearm. GSR consists of all particulate expelled from a firearm during discharge. Inorganic GSR samples were collected onto 0.4-micron polycarbonate membrane filters that were held above the ground by metal stands. The filters located inside the shooting room were connected to air pumps that were located outside the shooting room. The filters were placed at various heights above the ground. Once the firearm was discharged, the filters were turned on at different time intervals to determine an approximate settling velocity. The filters were transferred onto SEM stubs and analyzed using the Aspect 75 Scanning Electron Microscope and Zeppelin Energy Dispersive X-ray Spectroscopy Software with a RJ Lee Group Detector. The data has shown that the particles fall at considerably lower rates than expected; there was still a significant number of particles present in the air up to 5 hours after discharge. The results show there is a possibility that bystanders entering and exiting the crime scene may become contaminated with GSR.

**\*\*108 Reconsidering the Immutability of "Race": An Examination of the Disconnect Between "Race" in Title VII Jurisprudence and Social Science Literature**

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School of Law

Faculty Advisor: Ella Kwisnek, J.D., M.S.Ed

This article discusses reconceptualizing racial discrimination under Title VII of the Civil Rights Act in light of modern social science theories on racial identity. Title VII prohibits employment discrimination on the basis of race, color, religion, sex, or national origin, and the judiciary calls these bases for discrimination ‘protected classes.’ To bring a successful legal claim under Title VII, a person must demonstrate that she actually belongs to a protected class. In the case of a claim of racial discrimination, this means the plaintiff must belong to a racial group based on immutable characteristics, which are traits that cannot simply be ‘changed at will’ Categorizing people by ‘race,’ however, proves to be increasingly complex in both theory and practice, as the global understanding of ‘race’ shifts. This article discusses modern social science theories of identity to demonstrate that racial identity is derived from a complex set of traits that rely on social context for meaning. This article argues that Title VII should be amended, or the courts’ interpretation shifted, to allow legal recovery for those who are perceived as possessing or who actually possess traits, either mutable or immutable, that correlate with the protected class of race.

**\*\*109 Isolation of veraguamides from cyanobacteria of the genus *Oscillatoria***

Andrea Rague

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Nature has long been a source of treatments for illness and injuries. Over time, the role of studying the medicinal properties of plants has become the job of organic chemists who study the chemical constituents of these plant extracts. These organic chemists-or natural product chemists-have been able to determine the compounds responsible for the biological activities of thousands of plants. Recently, natural products chemists have begun to explore marine environments as a new source of biologically active compounds. The ocean is a unique environment because of the competition between, and the



ease of dispersion of organisms. Currently, thousands of compounds have been discovered from the ocean with a variety of biological activities in humans.

My research focuses on a marine cyanobacterial sample collected from the Las Perlas Archipelago off of the southern coast of Panama. The cyanobacterial extract (3.3414 g) showed mild central nervous system activity (IC50: 5-HT3 = 3736 nM, CB2 = 3385 nM, PBR = 180 nM, Sigma 2 = 722 nM), and after crude fractionation, several of the sub-fractions demonstrated affinity for serotonin receptors (5-HT1A, 5-HT2A, 5-HT2C, 5-HT7). Further separation of this extract using column chromatography and high pressure liquid chromatography, led to the isolation of two novel depsipeptides, veraguamide M (2.7 mg) and veraguamide N (1.0 mg), and two known depsipeptides, veraguamide C (1.0 mg) and veraguamide L (0.8 mg). Nuclear magnetic resonance spectroscopy and mass spectrometry were used to determine the structures of these compounds, which were then tested for their in vitro and in vivo activities in depression, anxiety, and cancer cytotoxicity assays. The isolation, structure elucidation, and biological activities of these compounds will be presented.

**\*\*110 Abstract: Research Integrity Challenges in Developing Countries**

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Faculty Advisor: Henk ten Have, MD, Ph.D

Research integrity refers to the quality of retaining and consistently following high moral codes and values and professional principles, as supplemented by professional institutions and research organizations. The concept of vulnerability is extensively used in guidelines that maintain research integrity. A major concern associated with vulnerability in research is exploitation. Minimizing the possibilities of exploitation in developing countries is a big challenge for research integrity. Research conducted in developing countries, apprehensions about cultural differences, the vulnerability of research subjects, and conditions that limit voluntary informed consent have created several requirements in ethics guidance papers. These requirements aim to achieve respect and protection for vulnerable individuals and autonomous choice. The protection of vulnerable persons is a fundamental concern in research and clinical ethics.

Informed consent is the base of bioethics, the tangible indication of respect for people, particularly for vulnerable populations in research and clinical care. It aims to protect the human dignity of research participants and rights of researchers. Nevertheless, it is an insufficient means to protect participants from exploitation. In developing countries, several factors including, the lack of access to health services, reduced autonomy, lack of awareness of human rights with roots in illiteracy and poverty, and lax regulatory oversight can undermine the process of informed consent as a protective measure of the vulnerable populations in research and clinical care and can increase the likelihood of exploitation. Vulnerable research subjects in developing countries cannot give voluntary consent because their decision-making capacity is compromised due to social and economic conditions.

While researchers may be accustomed to recognizing vulnerabilities associated with the physical and mental condition of research subjects, it may require more conscious effort to identify and explore how social, political, and environmental factors in developing countries result in or aggravate vulnerabilities and poses a real concern to research integrity.

### **\*\*111 Exiting White Supremacy: Understanding Activist Interventions**

Jayne Jenkins

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Faculty Advisor: Elizabeth Fein, Ph.D.

Exit groups are networks of activists, service providers, academics, and state agencies that attempt to support right-wing hate group members as they 'exit' a life of hate. The purpose of this study is to better understand how Exit groups engage with communities of former right-wing hate group members at the level of methodological and clinical technique, and how they define efficacy in these pursuits. Using theories of transformative change, clinical practice, and understandings of the individual within supportive care systems, I aim to apply what might be called a psychological lens to their strategies and methods, and the processes of refinement thereof. Researchers have taken up aspects of this work, and I will build on this foundation by focusing particularly on the facilitative work undertaken by the activists and service agencies supporting the process of change. Said succinctly, I would like to examine their work as if they were a set of psychological techniques, and attempt to gauge efficacy and outcomes, and whether these terms can be applied to this context. Some work toward this understanding has begun with individual Exit groups, for instance Tina W. Christensen's work with Exit Sweden (2015). Yet, a comparative understanding of the various ways Exit groups take up their call to address radical right-wing hate has of yet been attempted.

This interview based Critical Participation Action Research study proposes to compare several discrete Exit groups and better understand the particular ways they have come to define efficacy, and the variations of strategy, method, and tools for refinement that have been employed by each group toward the goal of helping former radical right wing hate-group members exit the White Supremacist lifestyle.

### **\*\*112 Bending or Breaking? Towards a Determination of Undue Hardship in Mental Health and Reproductive Care among Hasidic (Ultra-Orthodox) Jews.**

Yoelit Lipinsky

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Faculty Advisor: Joris Gielen, Ph.D

Religious accommodation in healthcare has reached a point of tension. A religious patient finds it difficult to separate autonomous choices from religiously informed pronouncements. This is more pronounced with more orthodox followers of a religion. Within modern Judaism, the Hasidic branch display many features that attempt to reproduce features of 18th and 19th century Jewish life in the Russian Empire's Pale of Settlement. Many, if not most families speak little English, are patriarchal and do not make medical decisions without rabbinical consultation. Further, the notion of mental illness is still taboo in this insular society. Rather, it is the result of the "yatzar ha-rah" or "bad spirit" that can be exorcised via prayer and repentance.

Another unique clinical encounter may be found in reproduction. The menstrual purity laws govern coitus and procreation and can prevent natural pregnancy. There has been an increase in literature about whether and how it is ethical to prescribe oral contraception to these women; not for normative purposes but rather, to align their cycle with the Biblical mandates. Moreover, the technicalities of reproductive technologies (including spermatozoa testing) are more complex in for the Hasidic community and has its own unique mental health implications

Literature will be drawn from the two epi-centers of Ultra-Orthodoxy: New York and Israel. Israel is particularly interesting as the hospitals are built around both secular medicine and Jewish law (halakha) However, they too wrestle with the question of accommodation, and may well provide useful examples to investigate at what point undue hardship can be invoked.

### **113 Effect of Ultrasound Biofeedback on Accent Modification**

Courtney Armstrong

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Faculty Advisor: Heather Rusiewicz, Ph.D.

With the increase of language diversity in the United States comes a decrease in communication efficiency. A portion of individuals may choose to seek out accent modification services, perhaps due to decreased intelligibility and/or communication challenges. This study will focus on implementing ultrasound biofeedback therapy to improve speech sound accuracy and intelligibility. The current study posits that implementing ultrasound visual biofeedback will improve the speech sound accuracy for individuals producing foreign-accented speech, namely Mandarin, similar to the positive impact ultrasound feedback has on the treatment success for individuals with speech sound disorders.

Theoretical support for the use of ultrasound visual biofeedback for accent modification and the underlying mechanisms of an accent will be discussed. Specific examples of ultrasound implementation will be provided via case presentations. Finally, data on the effectiveness of ultrasound implementation and the improvement of accented speech sounds will be discussed.

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