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Faculty Reception

Faculty Reception 1 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Jeffrey Mott
Department: School of Health Professions: Physician Assistant Studies
Authors: Jeffrey Mott; Katherine Fogelberg; Brandi Lara

Establishing a Critical Incident Medical Response System on a Texas University Campus: Stop the Bleed Campaign

Purpose: The ever increasing incidence of non-accidental mass casualty incidents on educational institutions has commanded the attention of emergency management and medical trainers nationwide. The chaos at these scenes often presents numerous barriers to access for traditional Emergency Medical Services; thus, there is a need for faculty and student bystanders to be trained and properly equipped to effectively provide life sustaining medical care until law enforcement can secure the perimeter. Non medical personnel providing life sustaining medical treatment to the wounded has been a concept used on the modern battlefield for many years. Every Soldier deploying to combat for over a decade receives point of injury medical training and immediate access to life saving equipment. Such medical equipment is carried on their person, stored in nearby vehicles and mounted on the walls of high traffic areas such as dining facilities and gymnasiums. The purpose of this translational research project was to adopt the US military's Tactical Combat Casualty Care (TCCC) guidelines, which are currently considered to be the standard of care for military prehospital medicine, to a state University in Texas by implementing the White House endorsed Stop the Bleed Campaign.

Methods: The TCCC guidelines were adopted and successfully used by the US military for use during the Global War on Terrorism. These guidelines were later adapted to civilian law enforcement by the Committee on Tactical Emergency Casualty Care and the National Association of Emergency Medical Technicians by way of the Prehospital Trauma Life Support manual. The success of these programs in the civilian community provided a Segway for the Obama administration's White House endorsement of the Stop the Bleed Campaign. Such an endorsement has created the opportunity for grants providing funds for training and medical equipment to support the campaign. Through a grant provided to the University of North Texas Health Science Center (UNTHSC) by The North Central Texas Trauma Regional Advisory Council (NCTTRAC), UNTHSC has been able to purchase and preposition medical supplies throughout the university. Training on the medical equipment was initiated by former military veterans of the UNTHSC faculty and student body.

Results: The UNTHSC established a pilot program to train student and campus employees (faculty, staff & law enforcement) in tactical prehospital medical care on the most common preventable causes of death. The program consists of multiple components to include a three tiered medical supply system similar to the successful military model used for over 20 years. These include 1) Tourniquets per police officer and select students (Physician Assistant program), 2) Medical equipment bags for all campus police vehicles, and 3) Twenty Life Station®medical kits prepositioned in high traffic areas of the campus. Training to date has included 60% of the PA student body and 50% of the campus police officers.
Conclusion: The principles of medical care in the military tactical care environment are similar to those in the civilian tactical care environment. These military lessons learned on the modern battlefield have

met with a welcomed reception in the community nationwide at local, state and federal levels. The White House Stop the Bleed Campaign has been gaining notoriety nationwide. By implementing the program on the University of North Texas Health Science Center, it has paved the way for other Texas campuses to follow the established model.

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IRB/IACUC/IBC#: N/A

Faculty Reception 2 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Hriday K. Das
Department: GSBS: Pharmacology & Neuroscience
Authors: Hriday Das; Silahis S Hontiveros

Rapamycin decreases presenilin-1 in SK-N-SH cells

Purpose: Presenilin-1 (PS1) protein is the catalytic subunit of the γ-secretase complex, and participates in the processing of β-amyloid precursor protein (APP) to produce Aβ peptide and Notch 1 receptor to release Notch intracellular domain (NICD) in the cytoplasm. NICD subsequently migrates to the nucleus and causes Notch signaling by increasing the expression of the Hes1 gene. The mammalian target of rapamycin (mTOR) is a conserved Ser/Thr kinase that exist as two complexes known as mTORC1 and mTORC2. mTORC1 controls cellular homeostasis, and its activity is inhibited by a FDA approved drug rapamycin. mTOR activity has been directly linked to learning and memory. It has been reported that the buildup of Aβ increases the mTOR signaling, whereas decreasing mTOR signaling reduces Aβ levels suggesting an interrelationship between mTOR signaling and Aβ. Administration of rapamycin in 3XTg-AD mouse model of Alzheimer's disease (AD) rescues cognitive deficits and ameliorates Aβ and Tau pathology. But the precise molecular mechanisms by which rapamycin reduces Aβ in AD is not well characterized. The purpose of this research to dissect the mechanisms by which rapamycin inhibits PS1 expression and PS1/γ-secretase activity in human neuroblastoma SK-N-SH cells.

Methods: SK-N-SH cell line was maintained in Dulbecco's modified Eagle medium containing 10% fetal bovine serum, 1% penicillin/streptomycin. Cells were treated with DMSO or different concentrations of rapamycin for 24 h. Total RNA and protein were prepared from treated cells. Amount of mRNA and protein expression were determined by real time quantitative reverse transcriptase-polymerase chain reaction (QRT-PCR) and western blot analysis respectively. Expression of proteins were confirmed by immunofluorescence staining (IFS) of DMSO and rapamycin treated cells. All data was analyzed using prism software and presented as means ± SEM. Comparison was made between groups by one-way ANOVA and Student–Newman–Keuls (SNK) test. A probability was considered to be significant with less than 0.05.

Results: Rapamycin decreases the expression of p-mTOR, PS1, NICD, and Hes 1 proteins as well as PS1-mRNA in SK-N-SH cells.

Conclusions: Rapamycin decreases PS1 protein levels and PS1/γ-secretase-mediated Notch 1 processing by inhibiting PS1 transcription. Hence we conclude that rapamycin may potentially reduce Aβ in AD by decreasing the transcription of the PS1 gene.

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Faculty Reception 3 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Liang-Jun Yan
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Liang-Jun Yan

Analysis of mitochondrial protein sulfenation during aging in the rat brain

Purpose: The purpose of the present study was to identify mitochondrial proteins that undergo changes in cysteine sulfenation during aging.

Methods: Studies were conducted in rats when they were 5 or 30 months of age. Following blocking of free protein thiols with N-ethylmaleimide, protein sulfenic acids were reduced by arsenite to free thiol groups that were subsequently labeled with biotin-maleimide. Samples were then comparatively analyzed by 2-dimensional Western blots, and proteins showing changes in sulfenation were selectively identified by mass spectrometry peptide sequencing.

Result: Five proteins were identified. Proteins showing an age-related decrease in sulfenation include pyruvate carboxylase and pyruvate dehydrogenase; while those showing an age-related increase in sulfenation include aconitase, mitofilin, and tubulin (α-1).

Conclusion: Results of the present study provide a general picture of mitochondrial protein sulfenation in brain oxidative stress and implicate the involvement of protein sulfenation in overall decline of mitochondrial function during brain aging.

Faculty Reception 4 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Miguel Reyes
Department: GSBS: Pharmacology & Neuroscience
Authors: Raul Vintimilla; Miguel Reyes; James Hall, PhD; Leigh Johnson; Sid O'Bryant, PhD

Prevalence of Metabolic Syndrome Components and other Cardiovascular Risk factors related to Cardiovascular Disease and Cognition: A Comparison between the HABLE and UNAM cohorts.

Background: In the United States, the number two cause of death among Latinos in general, and Mexican Americans in particular is cardiovascular disease (CVD). Prevalence of major cardiovascular risk factors (CVRF) is higher among Mexican Americans than non-Hispanic Whites. Metabolic syndrome (MS) is a group of CFRF associated with greater risk of diabetes, CVD, cognitive decline, and dementia. Reports of CVRF prevalence among Mexico population and Mexican Americans living in the US have been contradictory. In general, it has been reported that the prevalence of CFRF in Mexico is within the range of what is observed in the US. A few comparative studies have demonstrated that US born and Mexico-born Mexicans Americans have higher prevalence that their Mexican counterparts. Also, some studies found that the only components of the metabolic syndrome with a higher prevalence in Mexico are total cholesterol and HDL. The purpose of this study was to compare the distribution of MS components among Mexican Americans from the Health and Aging Brain Among Latino Elders study (HABLE), with data from the National Autonomous University of Mexico (UNAM). Our goal was to gain a better insight about the similarities and differences in the prevalence of CVRF associated with metabolic syndrome in Mexicans and a cohort of Mexican Americans living in the United States (US).

Methods: Data were analyzed in 290 participants (197 female), 60 years and older, from the ongoing HABLE study, and compared with data from a study done in 161 subjects (101 female), 60 years and older, at the UNAM. CVRF entered in the models included: fasting glucose, total cholesterol, HDL cholesterol, triglycerides, body mass index (BMI), abdominal circumference, and systolic and diastolic blood pressure. According to the National Cholesterol Education Program (ATP III), metabolic syndrome was defined as having 3 or more of the following: abdominal circumference ≥ 40 inches in males or ≥ 35 inches in females, triglycerides ≥ 150 mg/dl, HDL-Cholesterol < 40 mg/dl in males or < 50 mg/dl in females, fasting glucose ≥ 100 mg/dl, and blood pressure ≥130/≥85. We used ANOVA to compare the means of the CVRF, and chi square to compare the prevalence of MS between both cohorts. Analysis was split by gender.

Results: In both, male and female subjects, no significant difference was found for glucose and triglycerides levels among the two cohorts. . Between males, the UNAM cohort had higher levels of cholesterol (F=3.11, p=0.007), and HDL (F=1216.7, p2(1, N = 93) = 13.2, p = 0.0003 when comparing with males of the UNAM cohort. The difference in prevalence between females from both cohorts was not significant.

Conclusion: In our study, with the exception of cholesterol and HDL, the prevalence of CVRF and metabolic syndrome was higher in urban dwelling Mexican Americans enrolled in the HABLE study than Mexicans enrolled in the UNAM study. Mexican Americans suffer a higher burden of CFRF and

Faculty Reception 5 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Emily Paslay, PT, DPT
Department: School of Health Professions: Physical Therapy
Authors: Emily Paslay

Spontaneous Regression of a Cervical Disc Herniation: A Case Report

Background and purpose: The purpose of this report is to highlight a case of a cervical disc herniation and spinal cord compression that regressed spontaneously following conservative treatment. The natural history and positive likelihood of spontaneous regression of disc herniation in the lumbar spine have been well documented. However, the clinical course of cervical disc herniation remains poorly established. Due to the concern for spinal cord injury, patients with signs of cord compression are often referred for surgery. This case, along with others mentioned in the literature, suggests the possibility of disc regression and symptom improvement with conservative treatment.

Case Information: The patient was a 34-year-old female who presented to her primary care physician with nontraumatic onset of neck pain and right upper extremity tingling and pain one month prior. Magnetic resonance imaging (MRI) of the cervical spine revealed a four-millimeter, paracentral disc extrusion at C6-7 with migration to the body of C7 and spinal cord flattening. The patient was referred to a neurosurgeon who recommended surgical intervention due to evidence of spinal cord compression and risk of myelopathy with future injury. The patient refused surgical intervention at that time. Following conservative treatment, an MRI performed six months later revealed spontaneous regression of the C6-7 herniation from four millimeters to two millimeters with no evidence of spinal cord compression. Right upper extremity symptoms resolved and neck pain significantly decreased, with the greatest improvement occurring in the first two months.

Conclusions: In cases of cervical disc herniation with spinal cord compression, the treatment course historically favors surgical intervention; however this report reveals a case of cervical disc herniation with spinal cord compression that spontaneously regressed in six months resulting in resolution of upper extremity radicular symptoms. There are similar case reports in the literature, though only two known cases have been reported within the last ten years. Future studies should be designed to capture higher level evidence of the natural history of large cervical disc herniation with cord compression.

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IRB/IACUC/IBC#: N/A

Faculty Reception 6 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Lijuan Quan
Department: School of Health Professions: Physical Therapy
Authors: Lijuan Quan; Haylie Miller

Treatment of hyperbaric oxygen combine with cannabidiol promote recovery of brain damage in newborn rats with hypoxia-ischemia

Objective: Hypoxic-ischemic (HI) encephalopathy is a severe disease seen commonly in clinical settings. However, there is a limited body of work on effective therapies to repair HI brain damage. To test the potential neuroprotective effects of cannabidiol (CBD) and hyperbaric oxygen (HBO) treatments against HI brain damage, we carried out series of experiments on newborn rats with brain damage induced by HI.

Methods: We included 7-day-old newborn rats in this study. After creating the HI model, rats were grouped into an untreated HI model group, an HI+HBO-treated group, an HI+CBD-treated group, HI+HBO+CBD-treated group, and a sham control group. After one week of treatment, a subset of pups completed a T-maze task, and we collected CSF to measure the concentration of NSE and S100 β protein. Afterwards, the pups were sacrificed and we measured the concentration of MDA, SOD, TNF-a and IL-β and expression level of TNF-a and NSE in hippocampal tissue. The remaining pups completed the radial arm maze and foot fault test.

Results: Two weeks after HI (P22), pups showed reduced correct responses to retraction in the T-maze test, and P30 pups with HI needed more time to visit 3 baited arms. The number of errors increased in the radial arm maze, and number of foot-faults also increased in the foot-fault test. Along with loss of brain weight, concentration of SOD was reduced and MDA, TNF-a, and IL-β were increased in brain tissue. NSE and S100 β protein concentration increased in CSF, as well as the expression level of TNF-a and NSE. Pups that were treated with HBO, CBD, or HBO+CBD showed less brain weight loss and better performance on behavioral tests. They also had increased SOD and reduced MDA, TNF-a, and IL-β level of brain tissue, as well reduced NSE and S100 β protein in CSF. The expression level of TNF-a and NSE were also reduced. HBO+CBD treatment exhibited better therapeutic effect than HBO or CBD alone.

Conclusions: The combination treatment of HBO+CBD on rat pups with HI-induced brain damage achieved better results in reducing brain damage and preserving neurobehavioral performance than HBO or CBD alone. This novel therapeutic may be an appropriate avenue for exploration in other models, given its neuroprotective potential.

Keywords: hypoxia-ischemia; cannabidiol; hyperbaric oxygen; brain damage; combination treatment; neuroprotective

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Faculty Reception 7 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Rafal Fudala
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Sebastian Requena; Olga Ponomarchuk; Marlius Castillo; Jonathan Rebik; Emmanuelle Brochiero; Julian Borejdo; Ignacy Gryczynski; Sergei Dzyuba; Zygmunt Gryczynski; Ryszard Grygorczyk; Rafal Fudala

Imaging viscosity of intragranular mucin matrix in cystic fibrosis cells

Purpose: Abnormalities of mucus viscosity play a critical role in the athogenesis of several respiratory diseases, including cystic fibrosis (CF). Currently, there are no approaches to assess the rheological properties of mucin granule matrices in live cells. This is the first example of the use of a molecular rotor, a BODIPY dye, to quantitatively visualize the viscosity of intragranular mucin matrices in a large population of individual granules in differentiated primary bronchial epithelial cells using fluorescence lifetime imaging microscopy.

Methods: We use a simple fluorescent phenyl-BODIPY rotor molecule which is readily uptaken into mucin granules and exhibits dramatic changes in its fluorescent lifetime as a function of its environments viscosity. To measure the distribution of viscosities in intracellular mucin, we use fluorescence lifetime microscopy (FLIM) to image the non-CF and CF. We employ a machine learning algorithm to analyze the pictures and use a combination of Python and ImageJ to compute the size and viscosity distribution of intracellular mucin granules.

Results: In this work, we demonstrate the use of a simple BODIPY rotor to measure the apparent viscosity of intracellular mucin granules in human bronchial epithelial cells with and without CF. The molecular rotor is readily taken up into mucin granules and can be used to quantify the intracellular viscosity of mucin granules. Additionally, as a control, we use a non-rotor analog of the phenyl-BODIPY probe which is demonstrates little or no change in its fluorescent lifetime. Our results indicate the molecular rotor can be a valuable tool to study and quantify mucus pathology in diseased cells.

Conclusion: We demonstrated that BODIPY-rotor could probe intragranular viscosities of CF and non-CF cells. Importantly, two different populations of viscosities were identified in the CF granules as opposed to a single population of viscosities in non-CF granules. This indicates a heterogeneous nature of the CF granules, which might be related to the pathology. Overall, our results suggest that BODIPY viscometers could be viable tools for assessing the viscoelastic properties of mucin matrix within intact granules in live cells. Combining FLIM studies with such molecular viscometers should provide valuable insight into various stages of CF mucus pathogenesis, and potentially could aid in the development of efficient therapeutic approaches to combat the disease.

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Faculty Reception 8 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Ramesh Kasetti
Department: North Texas Eye Research Institute
Authors: Ramesh Babu Kasetti; Pinkal Patel; Gulab Zode

Ex-vivo human anterior segment culture: a suitable model for glaucoma research

Purpose: The available human models to study the trabecular meshwork (TM) pathology in glaucoma are very limited. The well-established ex-vivo human anterior segment perfusion system requires intact eyes and cost intensive. Here we tested the feasibility of ex-vivo human anterior segment culture to use as a model for glaucoma research.

Methods: Human rejected corneas with intact TM ring were obtained from the Lions Eye Institute (Tampla, Florida) in accordance with Declaration of Helsinki guidelines for research involving human tissue. The anterior segments were dissected into 4 equal quadrants and each quadrant was cultured in a 24 well plate using DMEM media added with 10% FBS and 1% Pen-strep. The anterior segment quadrants either treated with 100nM dexamethasone or 5ng per ml recombinant Tgfβ2 (in 0.5% FBS containing media) with appropriate vehicles or transduced with Adenoviral mediated wild type or mutant myocilin for up to 7 days. The spent media was collected for western blot analysis and cultured tissues were fixed and paraffin sections were utilized for immnostaining.

Results: The TM morphology is well preserved in human rejected corneas before and after 7 days of culture, observed in H&E staining. The dexamethasone, Tgfβ2 and mutant myocilin induced glaucomatous changes like increased extracellular matrix proteins, increased ER stress were observed in the TM of dexamethasone, Tgfβ2 and mutant myocilin treated tissue sections compared to their respective controls. The western blot analysis of spent media clearly showed an increase of myocilin and fibronectin levels in dexamethasone treated samples whereas an increase in fibronectin observed in Tgfβ2 treated samples. As expected mutant myocilin secretion is hampered in Ad5-mutant-myocilin transduced quadrant tissue samples compared to that of Ad5-wildtype-myocilin. The tissue disintegration rate in an ex-vivo culture was monitored by counting tunnel positive cells at the TM region at different time points.

Conclusion: The ex-vivo human anterior segment culture is an effective model to study the TM pathology in glaucoma research. Moreover this model is cost-effective and the rejected corneas available with ease.

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Faculty Reception 9 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Kangling Wang
Department: Other
Authors: Kangling Wang; Howe Liu; Yasser Salem; Wen Wu

An ERP study on attention bias in experimental pain individuals under different cognitive loads.

Purpose: The aim of the present study was to investigate the behavioral and electrophysiological differences between experimental pain persons and healthy controls when conducting attention bias task under different cognitive load conditions.

Methods: 30 healthy subjects were recruited from the Southern medical university of China, into which equally divided the experimental pain group and healthy control group (7 female/15 and 8 female /15; mean age ± SD: 22.53±2.35 and 21.69±3.25 respectively; mean years of education ± SD:16.30 ±3.58 and 15.78 ±3.65 respectively). All subjects underwent ERP examination when completing an attention bias task. The experimental pain subjects simulated pain by spraying capsaicin on the inner side of the upper arm with an average pain score of 6.08±2.33. Healthy control group reported no pain.

Results: Behavioral results showed that the main effect of load was significant, with a longer respond time and lower correct rate under high cognitive load compared with low one, suggesting that the task we used could well distinguish different loads. Further ERP results revealed that the main effect of wave peaks (N1 and P2) between groups was significant. Experimental pain subjects responded to all word interferences with a smaller amplitude than that of the normal group. A significantly synergistic effect of interference word * load, with a significantly smaller amplitude induced by pain words and negative words of early components P2 and N3 under the condition of high cognitive load, and interference word*group, with a smaller amplitude of N1 and N3 elicited by various interference words, were found.

Conclusion: Experimental pain subjects' response to the words of external stimulus was weakened as a result of the disturbance of pain. We believed that cognitive load mainly affected and regulated the early components of attention, that the processing mode of interference words (especially pain words and negative words) was different under high cognitive load compared with low one, which could provid electrophysiological evidence for cognitive load theory.

IRB/IACUC/IBC#: 2018-KFLLK-004 - China

Faculty Reception 10 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Stephen T. Curry, M.S.
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Stephen T Curry; Ina Mishra; Michail Kastellorizios

3D-Printed Insert for Visualization of Liposomal Interactions with Collagen Fibers

Purpose: Nanoparticles, such as liposome, are commonly used as vehicles for drug delivery to target tissues such as tumors. However, relatively little research has focused on liposomal interactions with the tumor extracellular matrix (ECM), a huge hurdle in the process of perfecting dosage. To our knowledge, there is no method available that allows the observation liposomes against a whole collagen fiber. In order to better study these interactions, we have designed a 3D-printed frame that helps in visualizing liposome transport around a collagen fiber. Observation of our replicated microenvironment will allow us to shed more light on the movements of liposomes within the ECM of tumor cells.

Methods: Collagen fiber was removed from adult rat tail and allowed to soak in phosphate-buffered saline (PBS) overnight. Primary design of the frame was done using SketchUp software. Printing of 12mm frame design was done using a Form 2 3D printer (Formlabs). Fiber-in-frame was placed in a glass bottom microwell dish (MatTek Corp.). Research-grade liposomes that mimic the clinical product Doxil (Doxom™, Liposomics) were used in a background of 0.07mg/ml BSA solution, and added to the channel. Visualization of the interaction was done using confocal microscope (Nikon A1R-MP+ Multiphoton System).

Results: As a proof-of-concept, we mounted a collagen fiber into our frame and filled channel with BSA solution. Observation indicates that liposomes prefer to accumulate on the collagen fiber surface. Multiple trial frames were needed to account for height requirements necessary for confocal microscopy. Our built-in sample well allowed for a maximum 20 uL of formulation to be added into the channel environment from one end of the fiber. Our next steps will focus on reducing height and volume of background and sample needed as well as removing the need for a dish or slide altogether. Future studies will focus on kinetic phenomena in this microenvironment.

Conclusions: Using the methods described above, we observed that Doxom liposomes accumulated near the fiber surface. This suggests that liposomes can use collagen as a route of travel in the extracellular environment. Future experiments with this frame design and others will be used to study the liposomal interactions with collagen and other ECM components. In addition to new frame designs, instruments with higher intensity and resolution will provide more accurate data.

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Faculty Reception 11 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Jennifer Fix
Department: UNT System College of Pharmacy: Pharmacotherapy
Authors: Jennifer Fix; Nasrin Taei

Making the Patient Safety Connection Between Rx and OTC: Assessment of an Active Learning Activity

Purpose: This active learning activity exercise allows the student to:
1) Use available resources to learn information about prescription (Rx) and over-the-counter (OTC) medications
2) Connect OTC product concerns with prescription medications
3) Connect OTC products that support or complement the use of prescription medications
4) Consider self-care options for patients when they are unable to afford going to the doctor
5) Consider the dangers of OTC medication use
6) Consider patient safety concerns

Method: Using Qualtrix, a survey will be completed before beginning the session which included the activity. One week later, the same survey will be administered. Results will be tabulated to compare before and after entries with the anticipation that the activity developed their confidence in the material.

Description of the Active Learning Exercise: Each student randomly selected an empty prescription stock bottle before being seated for class. Once class began, the before survey was administered. All students logged into to Qualtrix to complete the before survey. A questionnaire was provided that the allowed the student to use available drug databases and answer questions related to the prescription product they selected. A follow up survey will be administered one week later to observe any changes in student perception after having completed the exercise.

Results: The data and results are available through Qualtrix. 113 students participated in the activity and the before and after surveys.

Conclusions: The expected outcome is that students will have improved impressions regarding lessons learned. Results will be published and will potentially motivate faculty in other schools of pharmacy to adopt such an activity.

Sponsor: N/A
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Faculty Reception 12 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Maya Nair
Department: Other
Authors: Maya Nair; Harlan P Jones; Riyaz Basha; Jamboor Vishwanatha

A Robust Model for A Sustainable Diverse Healthcare Community - The Center for Diversity and International Programs, UNT Health Science Center

About CDIP: The Center for Diversity and International Program's (CDIP) objectives are to broaden partnerships (local, national and international), unify institutional pipeline programs, innovate education and training, and lead diverse constituencies to opportunities in biomedical/behavioral science research and Health Professional career paths.

CDIP'S programs: A pipe line of programs from "K-12" to "healthcare professionals" are offered by CDIP K – 12 Outreach Stimulate and broaden student's awareness of biomedical and health professional careers paths by exposing students to clinical and laboratory research environments at UNTHSC. Undergraduate Summer Research Internships Various undergraduate summer research programs at UNTHSC are funded through numerous sources. Participants are created with minority and non-minority-serving institution partners across USA. Graduate and Health Professional Student Training Programs Supports short term and dual degree research training for underrepresented students in health professions. Faculty Grant Writing and Professional Development Provide research and mentoring to underrepresented graduate and heath professional students, post-docs and junior faculty.

CDIP'S structure: The main pillars of CDIP are constituted with
1) Texas Center for Health Disparities (TCHD): A National Institute of Minority Health and Health Disparities (specialized Center of Excellence in Health Disparities (U54) was announced in 2017. (1) Research (2) Education and Training and (3) Outreach
2) National Research Mentoring Network (NRMN): Develop a culture of mentoring relationships, and more broadly the research workforce.
3) Diversity Training Programs: The plan includes a variety of programs that reach out to students from K-12, through college, and into graduate school and health care professions.
4) Texas Minority Health, Education Research and Outreach: Supports PhD scholars, junior faculty development and scholarship for senior faculty.

Impact of CDIP: CDIP has pioneered inter professional collaboration at institutional and national levels. 801 students and 201 faculty members from various colleges/schools at UNT Health Science Center and partnering institutions across the nation participated in various programs offered by CDIP and benefiting their educational or professional career. Such collaboration resulted in more than 200 publications and $24.76 Million in research funding. In summary, CDIP functions are in full alignment with the mission of 'One University'.

Faculty Reception 13 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Leah Johnston
Department: TCOM: Internal Medicine & Geriatrics
Authors: Leah Johnston; Jennifer Severance; Neika Saville; Diane Hawley; Janice Knebl

Developing Interprofessional Collaboration to Advance Innovative Service Delivery in Geriatric Health Settings

Purpose: Interprofessional collaboration is essential in geriatric healthcare settings due to the complex needs of older adults. The University of North Texas Health Science Center and Texas Christian University's Harris College of Nursing partnered together to design the Geriatric Practice Leadership Institute (GPLI) ten-month training program with an aim of cultivating interprofessional team development and growth in order to enhance value-based patient-focused care to older adults in the developing primary healthcare systems.

Methods: Leadership training and quality improvement strategies were integrated into curricula for health professionals (n=33) attending four one-day sessions held between September-December 2018. Content focused on 4 domains: 1) Leading Self and Interprofessional Teams to Drive Patient Outcomes; 2) Leading Organizational Change Toward Quality Outcomes; and 3) the Aging Network and Safe Healthcare Delivery for Older Adults. Teams developed a geriatrics-related quality improvement project in their area of practice with support from faculty and an assigned Coach. Evaluation surveys using Likert scale items were administered after each session. Open-ended responses were examined using qualitative thematic analysis.

Results: Trainee feedback shows improved knowledge and skills in collaborating as a health care team to improve patient care and safety, and improved understanding of unique and shared roles and responsibilities and of ways to work collaboratively in patient care. Ninety-six percent better understand the need for a common language for team discussion and assessment, and 92% would recommend the training. Qualitative responses indicated the trainees intended to modify their professional practice as a leader and team member; and in the development, implementation, or evaluation of their project. Perceived challenges to meeting team goals include time restraints, coordinating schedules for group meetings, and stakeholder engagement within their organizations.

Conclusion: Focusing on the development of interprofessional team collaboration and communication can foster development of interventions that improve geriatrics care in health systems. Interprofessional teamwork in conjunction with leadership training can produce rapid change in health practices. Projects developed within the GPLI are sustainable, providing continuous data collection for future use.

Sponsor: HRSA Geriatric Workforce Enhancement Program
IRB/IACUC/IBC#: N/A

Faculty Reception 14 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Xiangrong Shi
Department: GSBS: Pharmacology & Neuroscience
Authors: Xiangrong Shi; Hong Wang; Hannah Schenck; James R Hall; Sarah E Ross; Geoffrey P Kline; Shande Chen; Robert T Mallet

Intermittent hypoxia training: novel intervention for treating mild cognitive impairment

Purpose: Although intermittent hypoxic training (IHT) has proven effective against various clinical disorders, its impact on mild cognitive impairment (MCI) is unknown. This study was to test if IHT was safe as a novel intervention for treating patients with MCI.

Methods: MCI patients (age 69±3) alternately breathed 10% O_2 and room-air (each 5 min) for 8 cycles/session, 3 sessions/week for 8 weeks. Before and after IHT, mean arterial pressure (MAP), arterial-O_2 saturation (SaO$_2$), cerebral tissue oxygenation (ScO$_2$) and middle cerebral artery flow velocity (V_{MCA}) were assessed, and cognitive performance was tested by mini-mental status exam (MMSE), California verbal learning test-II (CVLT-II), digit span, trail making test-B (TMT-B), and controlled oral word association test (COWAT).

Results: Resting MAP fell from 101±3 to 95±3 mmHg (P2increased from 67.9±1.2 to 70.7±1.6% (PMCA(pre vs post: 46.8±3.0 vs 44.2±1.9 cm/s, P=0.21). During the 5th min of hypoxic challenge, SaO$_2$ similarly fell to 70.3±2.9 and 73.8±1.4% pre- and post-IHT, respectively. The hypoxia-induced V_{MCA} increase doubled from 4.5±2.2 before to 9.2±1.8 cm/s after IHT (P2 during 5-min hypoxia remained greater post- vspre-IHT (P

Conclusions: IHT can be safely applied to enhance ScO$_2$ and cerebral vasodilation during hypoxia, and potentially to improve short-term memory and concentration ability in MCI patients.

Faculty Reception 15 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Srikantha Thyagarajan
Department: GSBS: Microbiology, Immunology & Genetics
Authors: srikantha thyagarajan, Dr.; Santosh Thapa, Dr.; Jamboor K Vishwanatha, Dr.

Comparative Microbiome Analysis of Breast Cancer Tissue in Black Non-Hispanic and White Non-Hispanic women.

Background: Triple negative breast cancer (TNBC), abreast cancer disparity (BCD) with an especially aggressive subtype, is more prevalent among Black Non-Hispanic (BNH) women as compared to White Non-Hispanic (WNH) women.BNH women exhibit BCD as shown by higher level of mortality rate than WNH women. Studies have shown that the breast microbiota may have a major influence on breast carcinogenesis.

Methods: We have characterized the microbiome of breast cancer and normal tissue samples from the same patients using 16S rRNA gene targeted sequencing. Two distinct breast tumor types were included in the study: TNBC and triple positive breast cancer (TPBC). The data were analyzed for microbiota composition, abundance, and diversity.

Results:Our preliminary analysis revealed that both richness and evenness of the microbial community (as measured by alpha diversity metrics), of normal breast tissue was significantly different in comparison to the matched tumor breast tissue. The microbiota richness in BNH TNBC tumor was lower when compared to that of the matched normal breast tissue. In contrast, the microbial richness in WNH TNBC tumor was higher when compared to that of the matched normal breast tissue. The multivariate analysis of beta diversity revealed adistinct clustering of the microbial communities between BNH TNBC tumor and the matched normal tissue.

Conclusions:Our findings demonstrated that BNH and WNH racial groups exhibit distinct alpha and beta microbial diversity patterns in normal and cancer breast tissue.

IRB/IACUC/IBC#: IRB Project #: 2009-001 IBC/p/JV-2017-1

Faculty Reception 16 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Kathryn J. Dolan
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Kathryn J Dolan, Ph.D.

Role of Service Learning in Medical Students' Acquisition of EPAs

Purpose: Service learning is designed to provide opportunities to engage in experiential learning which is task and problem specific, improves clinical skills, and facilitates experiencing the benefits of altruistic behavior. Students self reported ratings of various service activities shed light on the activities value in learning clinical skills and professionalism, as reflected in EPAs 1, 6, 7, and 9. The model of learning that is applied here has its origin in the work of John Dewey (1938) and more recent elaboration by Kolb and Boyatzis (2000) who addresses issues of emotional intelligence in professional competencies.

Methods: Osteopathic medical students perform service during the first two years as one of the required elements of their 'doctoring' course. Service learning meets various learning objectives, including exercising clinical skills for EPAs 1, 6, 7, and 9.

Students' self-report data from their service learning activities is captured electronically. Learning objectives for each service activity are rated by student using a Likert scale. Each semester, approximately 1425 service learning reports are available for preliminary analysis and pilot testing. A total of 7 semesters of data will be available for analysis. For significant differences among the various types of services exercising EPAs 1, 6, 7 and 9, two-sided t-tests using z scores and the Bonferroni correction are applied.

Results: Initial results show students overall agreement that homeless services and school and sports physicals meet the learning objectives associated with EPA1, again homeless services for EPA6, indigent clinics and sporting events for EPA7, health and safety education and health fairs and screening the highest for EPA9.

Conclusion: Despite skewedness in the self-reported data, discernable differences exist between types of activities meeting various learning objectives and furthermore ratings ran in expected directions. Students' comments offer insights into their professional values and empathy.

Sponsor: N/A
IRB/IACUC/IBC#: #2015-159

Faculty Reception 17 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Mingming Zhao
Department: School of Health Professions: Physical Therapy
Authors: Mingming Zhao; Myla Quiben; Howe Liu

Effect of Enhanced External Counter pulsation on Exercise Endurance of Different Populations

Background and Purpose: Enhanced external counter pulsation (EECP)is a beneficial adjunct therapy used widely according to Cardiac rehabilitation guideline. However, the relationship between EECP and exercise endurance in non-cardiac disease people is still unknown. So, we design this study to explore the effect of EECP on exercise endurance of normal people, athlete, and chronic obstructive disease (COPD) patients, for providing potential intervention approach to improve the exercise endurance of these people.

Methods: All volunteers (24 normal people, 24 sprinter athlete,24 COPD patients, 72 subjects totally enrolled) who referred for EECP therapy (i.e., 35–36 one-hour sessions within a seven-week period) to Jiangbin Hospital, Guangxi, China from June 1st to Sept 1ST, 2018 were included. Demographic data, vital signs, quadriceps femoris muscle strength (QFMS) and baseline cardiopulmonary exercise test (CPET) data were collected. Exercise endurance and MS data before and after the treatment were compared.

Results: All subjects in this study who had under-gone EECP had a positive clinical response. QFMS of normal group, athlete group and COPD group improved (p2), metabolic equivalent (Mets), oxygen pulse (O_2-Pulse) at anaerobic threshold significantly increased in all three groups (p2, O_2puls, Mets were increased after EECP (p＜0.05).

Conclusions: Enhanced external counter pulsation significantly improved QFMS and the exercise endurance of normal people, athletes and COPD patients.This study's findings support the continued use of EECP therapy in these three kinds of people and provide one putative physiological mechanism to help explain the improvements in muscle and exercise endurance.

Key Words: enhanced external counter pulsation; normal people; low endurance athletes; COPD; exercise endurance

Faculty Reception 18 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Mingming Zhao
Department: School of Health Professions: Physical Therapy
Authors: Mingming Zhao; Howe Liu; Myla Claire Quiben

Role of the physical fitness test in risk predication of Osteoporosis among municipal in-service personnel in Guangxi

Objective: To explore the relationship between risk prediction of osteoporosis (OP) and different physical fitness parameters in municipal in-service personnel in Guangxi.

Methods: Cross-sectional study was conducted from July 2015 to December 2016 in China. 7082 (Age from 20-65) subjects from public institutions were enrolled. All subjects underwent national physical fitness test (NPFT) and calcaneal ultrasound screening.

Results: Totally 5668 (80.64% of enrollment) subjects' data were analyzed. Which were 42.9±12.3 years; 2984((52.6%) were male; 3998 (70.5%), 1579 (27.9%) and 85 (1.6%) were Han, Zhuang, and other ethnicities, respectively. The multivariable analysis showed that systolic blood pressure (OR=0.974, 95%CI:0.962-0.985, P

Conclusion: The OP risk could be prevented and warned by NPFT and Calcaneus ultrasound test, preventive actions could be adopted in advance.

Keywords: National Physical Fitness Test; physical function; physical fitness; osteoporosis; risk.

Faculty Reception 19 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Vivian K Rojas
Department: GSBS: Microbiology, Immunology & Genetics
Authors: INWOO PARK

Impairment of HIV-1 replication by UBE3A- and HIV-1 Nef-mediated regulation of proteasomal degradation.

To date, regulation of HIV-1 life cycle has been mainly explained by the stage-specific expression of HIV-1 viral genes, even if elimination processes of the synthesized proteins after completion of their duties in the infected cells were quintessential for understanding of the molecular processes of the virus life cycle and thereby HIV-1 pathogenesis.

Several lines of our experiments demonstrated that a key pathogenic HIV-1 viral protein, Nef, interacted with ubiquitin (Ub)-protein ligase E3A (UBE3A/E6AP), an important E3 Ub ligase in the proteasomal degradation processes, suggesting that interaction between Nef and UBE3A is integral in regulation of viral and cellular protein decay and thereby competition for survival between the entered HIV-1 and the infected host cells. In fact, Nef and UBE3A degraded reciprocally, and UBE3A-mediated degradation of Nef was significantly more potent than Nef-triggered degradation of UBE3A. Further, UBE3A degraded not only Nef but also HIV-1 structural proteins, Gag, thereby significantly inhibited HIV-1 replication in Jurkat T cells. However, UBE3A failed to induce decay of Gag in Δnef-HIV-1 replicating cells, indicating that interaction between Nef and UBE3Awas pivotal for UBE3A-mediated degradation of the viral proteins. In contrast, Gag and Env did not degrade UBE3A. Mechanistic study showed that Nef and UBE3A were specific and antagonistic each other in regulating proteasome activity and ubiquitination of cellular proteins in general. Further, excess, not stoichiometric, amount of Nef reduced the amount of intracellular Gag as well as degraded a cardinal transcription regulator, Tat, demonstrating a broad role of Nef in regulation of HIV-1 life cycle. Structure and function analysis of Nef indicated that specific domains of Nef overlapping with LTR were essential for the observed actions. Taken together, these data indicated that the Nef and UBE3A complex play a pivotal role in coordinating viral protein degradation and hence HIV-1 replication, providing insights as to the nature of pathobiologic and defense strategies of HIV-1 and HIV-infected host cells and major clues for physical knockout of key viral pathogenic element, Nef, using UBE3A by the ubiquitin proteasome system.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

Faculty Reception 20 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Riyaz Basha, PhD
Department: TCOM: Pediatrics
Authors: Riyaz Basha, PhD; Tyler Hamby, PhD; Don P Wilson, MD; W. Paul Bowman, MD

The Pediatric Research Program: A Sustainable Voluntary Experience for Students of the Texas College of Osteopathic Medicine

Purpose: A knowledge of research is an essential part of medical education. While introducing medical students to the basic concepts of research is vitally important in encouraging trainees to consider academic careers, inclusion in a crowded academic curriculum and the availability of research mentors is challenging. To address this need, in 2013 the Department of Pediatrics and Women's Health, Texas College of Osteopathic Medicine (TCOM), initiated the Pediatric Research Program (PRP) in collaboration with Cook Children's Health Care System to provide mentored research experience to enhance research awareness and knowledge among interested TCOM students.

Methods: PRP Administrative Team recruited interested academic/community physicians, medical staff and researchers to mentor students. In early spring, interested first year TCOM students complete an application indicating their area of interest. Following a screening interview, those accepted for the PRP are assigned a mentor(s). PRP students conduct research in the summer after the completion of their first year. Participants are provided with a structured on-line curriculum and timeline. Expectations include required training, didactic education covering the topics related to research design, data analysis and preparing research presentations and poster presentations for scientific meetings. A measure of the PRP's success was determined by surveying participants' satisfaction and research productivity (number of presentations/publications).

Results: PRP trained 180 students between 2013-2018. The number of applicants has more than tripled in 5 years, reaching approximately 40% of the students in TCOM class of 2022. Participation of mentees and mentors was entirely voluntary. PRP assessment through surveys showed a steady improvement in satisfaction and productivity. In 2018, CANVAS platform was exploited for offering the program which was more convenient and became preferred by the participants.

Conclusion: PRP demonstrated a successful model for designing a cost-effective, sustainable and productive program for medical students. This program provides research experience with structured training without affecting the regular curriculum. Timely program assessment through surveys and adopting required changes has improved the experience of participants and proven crucial for the success of this program.

Faculty Reception 21 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Andras G. Lacko
Department: GSBS: Physiology & Anatomy
Authors: Andras Lacko; Sangram Lacko; Nirupama Sabnis; Linda Mooberry; Maya Nair; Akpedje Dossou; Alan Remaley; Akpedje Dossou; Anil Sood; Walter McConathy

Translational research program utilizing the rHDL drug delivery platform.

Purpose: Due to the off-target effects, frequently observed with cancer chemotherapy, we established the Lipoprotein Drug Delivery Research Laboratory nearly 20 years ago, to develop a tumor selective drug delivery model, applicable to the transport of drugs with poor solubility and bio-availability. Our purpose was to produce drug formulations with increased therapeutic efficacy, including low off target toxicity

Methods: We employed two formulations:
1) Synthetic/reconstituted high density lipoprotein formulation (rHDL), resembling native (circulating) HDL, containing the main protein component of HDL, apolipoprotein A-I (apo A-I).
2) rHDL formulation using a 37 amino acid peptide (a mimetic of apo A-I), conjugated to Myristic acid (MYR-5A).

Results: We developed nano-formulations containing drugs, including paclitaxel, valrubicin, fenretinide, and doxorubicin as well as as well as polynucleotide formulations containing siRNA, pDNA and morpholinos that have been found to be effective against several pre-clinical models of breast cancer, ovarian cancer, prostate cancer, neuroblastoma, Ewing sarcoma and other cancers. Currently we are working on developing novel rHDL formulations for immunotherapy. Our work resulted in over 30 publications in refereed journals, Funding, in excess of $1.5 million from Federal State and private sources, two issued and two pending patents and students graduating with here PhDs and four MSc degrees.

Conclusions: Currently, both our issued patents are licensed to biotech companies who are actively pursuing the development of our technology. We look forward to and accelerated pace of translating our pre-clinical findings toward commercial and clinical applications.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

Faculty Reception 22 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Rachel E. Engelland
Department: GSBS: Physiology & Anatomy
Authors: Rachel E. Engelland; Steven A. Romero

Acute Leg Heating Protects Against Vascular Ischemia-Reperfusion Injury in Humans

Purpose: Reperfusion that follows a period of ischemia paradoxically reduces vasodilator function in humans, a phenomenon referred to as vascular ischemia-reperfusion (I/R) injury. Acute whole-body hot water immersion protects against vascular I/R injury in young healthy humans. However, the effect of acute leg heating on I/R injury is unclear. Therefore, the purpose of this study was to test the hypothesis that acute lower leg heating prevents the attenuation in macro- and microvascular dilator function following I/R injury in young healthy humans.

Methods: Three healthy male subjects (age 25 ± 4 years; height 177 ± 10 cm; weight 86 ± 16 kg; mean ± SD) immersed their lower legs into a circulated water bath for 60 min under two thermal conditions: 1) thermoneutral immersion (~33 °C); 2) hot water immersion (~42 °C). The order of thermal conditions was randomized and counterbalanced. Macrovascular (brachial artery flow-mediated dilation) and microvascular (reactive hyperemia area under the curve) dilator function were assessed using Doppler ultrasound at three time points: 1) pre-immersion; 2) 60 min post-immersion; 3) post-I/R. Vascular I/R injury was induced by occluding brachial artery blood flow for 20 min, followed by 20 min of reperfusion.

Results: Compared with pre-immersion (6.1 ± 0.6%), macrovascular dilator function was decreased 60 min following thermoneutral immersion (4.3 ± 0.6%; $P < 0.05$) and was further reduced following I/R injury (4.1 ± 0.5%; $P < 0.05$). In contrast, macrovascular dilator function was well maintained from pre-immersion (5.8 ± 0.6%) to 60 min post hot water immersion (5.3 ± 0.6%; $P = 0.4$) and following I/R injury (5.3 ± 0.6%; $P = 0.4$ vs. pre-immersion). Microvascular dilator function was decreased 60 min following thermoneutral immersion (pre-immersion 3.3 ± 0.1 mL mmHg^{-1} vs. 60 min post-immersion 2.5 ± 0.3 mL mmHg^{-1}; $P < 0.05$) and tended to remain decreased following I/R injury (2.7 ± 0.4 mL mmHg^{-1}; $P = 0.1$ vs. pre-immersion). However, microvascular dilator function did not differ from pre-immersion (3.1 ± 0.5 mL mmHg^{-1}) to 60 min post hot water immersion (3.0 ± 0.3 mL mmHg^{-1}; $P = 0.7$), but still tended to decrease following I/R injury (2.5 ± 0.3 mL mmHg^{-1}; $P = 0.1$).

Conclusions: Taken together, acute leg heating appears to prevent the decrease in macrovascular dilator function that occurs following I/R injury in young healthy humans. Further evidence is needed to determine if acute leg heating equally protects the microvasculature following I/R injury.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-135 SR-2018-1

Faculty Reception 23 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Julian Borejdo
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Julian Borejdo; Rafal Fudala; Ignacy Gryczynski, 7352106

Reverse Kretchman Microscope

Purpose: The purpose of this research was to construct the instrument to supplement Total Internal Reflection Microscopy (TIRF) to mage 10-20 nm thick layer of cells such as membrane lipids, membrane receptors and other structures proximal to basal membranes.

Methods: The materials required for constructing such an instrument include inverted microscope, a high refractive index coverslip covered with 50 nm thick layer of gold and an optical fiber coupled laser. A sample is placed on a high refractive index coverslip coated with a metal instead of glass and is illuminated by the laser from the top (through aqueous medium). Fluorophores that are close to the metal surface induce surface plasmons in the metal film. Fluorescence from fluorophores near the metal surface couple with surface plasmons allowing them to penetrate the metal surface and emerge at a Surface Plasmon Coupled Emission (SPCE) angle. Fluorescence is collected by a high NA objective and imaged by EMCCD or converted to a signal by avalanche photodiode fed by a single mode optical fiber inserted in the conjugate image plane of the objective.

Results: With little effort, we were able to image 100 nm fluorescent nanospheres.

Conclusions: Reverse Kretchmann Microscope image was clearer than TIRF image because: 1. Thickness of the detection layer was reduced in comparison with TIRF because metal quenched fluorophores at a close proximity (below 10 nm) to a surface; 2. The system avoided complications of through-the-objective TIRF associated with shared excitation and emission light path; 3. The microscope had excellent background rejection because all far-field radiation is reflected by the mirror-like surface

Sponsor: N/A
IRB/IACUC/IBC#: N/A

Faculty Reception 24 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Eun-Young Mun
Department: School of Public Health: Health Behavior & Health Systems
Authors: Eun_Young Mun; Xiaoyin Li; Zhengyang Zhou; Scott Walters

Project INTEGRATE: A Comprehensive and Systematic Meta-analysis Study of Brief Alcohol Interventions for Young Adults

Purpose: Project INTEGRATE is a large synthesis study of alcohol intervention trials, which has been supported by the National Institute on Alcohol Abuse and Alcoholism since 2010. This multi-site, interdisciplinary project involves experts from a wide range of disciplinary fields (e.g., psychology, sociology, public health, statistics) who come together to help promote public health. Currently, we are conducting a comprehensive meta-analysis to examine the comparative effectiveness of brief alcohol interventions (BAI) for adolescents and young adults (aged 11-25). Through a previous systematic review and data request, we have compiled aggregate data (AD) from 189 studies and individual participant data (IPD) from 24 studies. We are currently reviewing full-text articles from 2013 through 2018 to update AD and IPD.

Methods/Results: To examine the efficacy and mechanisms of BAIs on alcohol outcomes, our work has extended network meta-analysis models and multivariate random-effects meta-analysis models. Using a multilevel Bayesian hurdle model, we demonstrated how IPD from heterogeneous clinical trials with abundant structural and empirical zeros can be modeled in one step analysis. To validly compare individuals across time and studies, we have developed scoring approaches to harmonize and advance item response theory (IRT) models using Markov chain Monte Carlo studies. The goal of our methodological work is to develop tools to provide better clarity for the field by maximizing available data that are most granular and comprehensive. Thus far, we found that an in-person brief motivational intervention (BMI) is efficacious for reducing alcohol-related problems, and the benefit is sustained through 12 months post-intervention. We also found that the implementation and content of intervention makes a difference. When BMIs were highly personalized to participants, it was more beneficial to have a higher number of intervention components; conversely, when interventions have more general content, it was better to cover fewer components.

Conclusions: Project INTEGRATE is developing innovative approaches to synthesizing information that will provide more robust, large-scale evidence of what works well, for whom, and how. The model-based inference derived from this complex synthesis of all available data will provide more contextualized and mechanism-based answers to major stakeholders.

Faculty Reception 25 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: Bhavani Nagarajan
Department: GSBS: Physiology & Anatomy
Authors: Bhavani Saranya Conjeevaram Nagarajan; Sangram Raut; Nirupama Sabnis; Andras Lacko

Optimization of Antisense Oligonucleotides (ASO) Entrapped HDL Mimetic Lipo-peptide Nanoparticles

Purpose: Antisense Oligonucleotides (ASO) are short single stranded DNA oligomers that represent a novel class of Nucleic acid therapeutics with high potential to treat a broad range of disorders including cancer by modulating gene expression. Phosphorodiamidate Morpholinos (PMOs) are third generation ASOs which are chemically modified to possess neutral charge, high stability and resisitivity to nucleases and low toxicity/immunogenicity. Despite the enhanced pharmacokinetics, the cellular internalization of PMO is very poor and necessitates the need for a delivery vehicle. Recently, we have developed a simple formulation using an Apo-A1 mimetic peptide conjugated to myristic acid (Myr5A) that self-assembles into nanoparticles (NP) and has same functional properties as endogenous high density lipoproteins (HDL). Hence, we hypothesize that Myr 5A, an HDL mimetic lipo-peptide can potentially be used as a delivery vehicle to entrap ASO.

Methods: Myr5A PMO NPs were prepared using microfluidics based Nanoassemblr platform with various concentrations of Myr5A peptide (2.5 5,10 mg/ml) and carboxyfluorescein PMO 80µg/ml. Entrapment efficiency of PMO was determined by fluorescence spectrometry. Dynamic Light Scattering (DLS) was used to analyze the size and the zeta potential. Time resolved (TR) anisotropy was measured to confirm the binding of PMO. Additionally, size exclusion chromatography by FPLC was also carried out to determine the entrapment of PMO and the heterogeneity of the population (if any).

Results: Based on our preliminary findings, formulations prepared with 10mg/ml Myr 5A and 80ug/ml PMO resulted in more homogenous particles with entrapment efficiency of 40%. This data was further supported by the TR anisotropy as values for Free PMO and Myr5A PMO NP were 0.09±0.01 and 0.12±0.01 respectively. Furthermore, DLS measurements revealed the presence of homogenous particles with a diameter of 4.98+0.9nm and zeta potential of 0.9mV. Additionally, FPLC has shown distinctive difference in the elution of Free Myr 5A and Myr 5A PMO nanoparticles as they eluted at 12.95 and 17.8 minutes respectively indicating the difference in molecular size.

Conclusion: The studies show that HDL mimetic Myr 5A peptide can be a promising candidate for the entrapment of PMOs. However, our future experiments designed to determine the knockdown efficiency of these nanoparticles in-Vitro and in-vivo would hold definitive answers for determining the efficiency of Myr5A PMO NP.

Faculty Reception 26 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: David Julovich
Department: Institute for Translational Research
Authors: David A Julovich, BS; Tori Conger, BS; James Richard Hall, PhD; Sid O'Bryant, PhD

Automated Diagnostic Testing for Detection of Alzheimer's Disease

Purpose: Alzheimer's disease (AD) historically has been detected with brain imaging scans by magnetic resonance imaging (MRI) or positron emission tomography (PET) and by measurement of protein levels in cerebrospinal fluid (CSF). These tests pose limitations due to high cost and invasiveness of the procedures. Our automated blood-based biomarker screening utilizes ELISA based detection and provides a realistic, cost-effective approach for detection of AD and mild cognitive impairment (MCI).

Methods: MesoScale Discovery (MSD) multiplex biomarker platform, integrated with a Hamilton StarPlus liquid handler and Quanterix single molecule array (Simoa) HD-1 fully automated analyzer are the platforms used to conduct our multiplexed biomarker screening. Several experiments to assess the effectiveness of an automated system were conducted. Precision and accuracy of hand pipetting verses automated pipetting was tested using aliquots of control materials. Assays were conducted over a three-day period by separate individuals and by the automation. Plate washing and ECL addition was held constant and carried out by the automation for both groups. Covered verses uncovered incubation determined if evaporative loss caused differences on biomarker detection levels. Sample incubation times were tested by shortening the interval from the recommended maximum to determine if less time had effect on detection levels. Automation liquid classes were verified using a Mettler Toledo balance and Hamilton software. Gravimetric measurements were made under control conditions (room temperature, humidity and reagent temperature). Different sample volumes were tested to determine the effect of freeze thaw on detection levels.

Results: Although interestingly similar the automation pipetting profile was slightly different than the hand pipetting; automation was more precise. Covered verses uncovered incubation showed virtually no difference in detection levels. Shorting sample incubations times had little effect on detection levels. Gravimetric measurements of liquid classes showed excellent precision and accuracy. Sample volume size did influence detection levels, lower volumes showed a decrease in biomarker levels.

Conclusions: Although differences are seen screening with automation verses hand processing, the significance is negligible. The automated diagnostic screening for detection of AD would be a cost effect, easily implemented solution and could become the first in line test.

Faculty Reception 27 - Poster
Classification: Faculty / Staff (Not for Competition)
Presenter: yu yu
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Yu Yu; Xiao bin Liu; Duen shian Wang; Luis Aguilera Garcia; Frank Ssentamu; Alexander Lou; Hong li Wu

Decoding the anti-cataractogenic mechanism of grapes via a systemic pharmacology approach

Introduction: Our previous study has indicated that grapes may be able to protect against in vivo ultraviolet B (UV-B) radiation-induced cataract. To better understand the mechanism of action of grapes in cataract prevention, this follow-up study was designed to identify the molecular targets of grapes in the lens by using a systemic pharmacology approach.

Methods: As recommended by the California Table Grape Commission (CTGC), we selected four compounds including resveratrol, catechin, quercetin, and anthocyanins as the major phytoconstituents of grapes for target prediction. All genes that can be regulated by grapes were obtained from NCBI (www.pubmed.gov) and TCMSP (http://lsp.nwu.edu.cn/tcmsp.php). Genes that are associated with cataracts were collected from GeneCards (www.GeneCards.org). The comparison between grape-related targets and cataract-associated genes was conducted using Cytoscape 3.2.1 with ClueGo plugin. Gene Ontology (GO) enrichment analysis of grape-regulated genes was conducted using Database for Annotation, Visualization, and Integrated Discovery (www.david.ncifcrf.gov).

Results: A total of 332 targets that are grape regulated were identified and visualized by protein network. Subsequently, 147 GO functional pathways were clustered, including anti-apoptotic, anti-inflammation, PI3K-Akt signaling, ATP binding, and FOXO pathways. Among these protein targets, X-linked inhibitor of apoptosis (XIAP), heat shock protein (HSP) 90, and prostaglandin-endoperoxide synthase (PTGS) were correlated with all of the active ingredients of grapes. Comparison between grape targets and cataract disease genes showed that thirteen grape targets overlapped with cataract associated genes, including PTGS2, HSP90AA1, HSP90AA2P, mitogen-activated protein kinase 1 (MAPK1), MAPK14, MAPK3, amyloid precursor protein (APP), glycogen synthase kinase 3B (GSK3B), protein kinase α (PRKCA), protein kinase C delta (PRKCD), B-cell lymphoma 2 (BCL2), BCL2L1, and K-ras (KRAS).

Conclusions: The anticataractogenesis effects of grapes may involve not only directly scavenging free radicals but also activating the antiapoptotic pathway.

Posters

Aging/Alzheimer's Disease (Abstracts in the 100s)

101 - Poster

Classification: School of Health Professions Student
Presenter: Mary-Catherine Wilson
Department: School of Health Professions: Physical Therapy
Authors: Mary-Catherine Wilson; Taylin Watson; Michael Salvatore; Nicoleta Bugnariu

The Impact of High Intensity Aerobic Exercise on Cardiovascular Function in Older Adults

Purpose: Cardiovascular disease (CVD) is a leading cause of mortality in the United States, and age alone is a risk factor for developing CVD. Regular aerobic exercise can help prevent arterial stiffening that occurs with age, thus decreasing the risk of CVD. Regular exercise has also been found to reduce resting pulse rate, another risk factor for CVD and adverse outcomes. This study investigated the impact of a 3-4 month high intensity aerobic exercise regimen upon baseline cardiovascular function in sedentary middle age adults.

Methods: Subjects were randomly assigned to an exercise or non-exercise group. The exercise group completed 36, 1-hour exercise sessions, 3 times a week over 3-4 months. Exercise was standardized for each subject and consisted of a 10-minute warm-up (range of motion exercise, walking, stretching), followed by a fast pace walk/jog on a treadmill for 40 minutes, and concluded with a 10-minute cooldown. A high intensity exercise at minimum 80% max heart rate was aimed for as long as possible in each session. Exercise intensity was progressively increased over the weeks of training. Heart rate, blood pressure and oxygen levels were monitored throughout the exercise sessions. Data was analyzed and compared between pre- and post-intervention with T-tests.

Results: Preliminary results from the exercise group show normalization of the cardiovascular function during exercise as measured by heart rate, blood pressure, and oxygen saturation. Compared to baseline values, after the exercise training, average resting heart rate measurement decreased significantly from 88 bpm to 75 bpm. The maximum blood pressure values at the highest exercise intensity also decreased significantly between the first and last session of exercise, from 248/180 to 189/145. The oxygen saturation at the highest exercise intensity increased from 91 in the first exercise session to 96 in the last exercise session. No changes in HR, BP or SpO_2 were observed in the non-exercise group

Conclusion: A program of sustained, high intensity aerobic exercise, at the upper limits of currently prescribed maximum heart rate is feasible in middle age and older sedentary individuals without adverse effects. Total exercise time and maximum exercise intensity increased for all subjects in the experimental group.

102 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Kristen Reuter
Department: Institute for Healthy Aging
Authors: Mary Quiceno; Kristen Reuter; Lilly Hammack

Scripted Improvisation and Effects on Emotional Resiliency, Stress, and Positive Aspects of Caregiving

Background: As the United States population continues to age, more people will be diagnosed with Alzheimer's Disease (AD) and dementia. Along with this increase in diagnosis comes an increase in the need for people to serve as caregivers for these individuals. Caregivers play a crucial role in the health and wellbeing of the people they care for, and there is incomplete research on techniques that can help caregivers handle challenges, avoid burnout, and come up with novel ways to approach problems they may face. Improvisation techniques are one avenue that may provide caregivers with solutions to these issues.

Purpose: the purpose of this research is to study the effects of scripted improvisation on caregivers of people who have AD and/or dementia, and to see if improvisation increases emotional resiliency, reduces stress, and increases positive attitudes toward caregiving.

Methods: 6 participants, aged 18 and older, who are caregivers for people with AD and/or dementia participated in a one-hour scripted improvisation workshop. Questionnaires (the Short Form Zarit Burden Interview (ZBI-12), The Resilience Scale™ (RS™), My Stress Thermometer, and Positive Aspects of Caregiving assessments) were completed beforehand to obtain baseline data regarding stress, depression, and positive affect towards caregiving. Techniques include paired improvisation and group techniques, with discussion afterward about how to apply techniques to their interactions with people who have AD and/or dementia. Two weeks later, these same questionnaires were completed by the participants and the data was analyzed to determine any effects from the improvisation workshop.

Results: The improvisation session was completed on February 13, 2019. We anticipate analyses of the data to show an increased score on the positive aspects of caregiving after the scripted improvisation session, and decreased self-reported levels of stress and depression from the caregivers. Results are still pending acquisition of follow-up data from the participants.

Conclusions: Scripted improvisation is an avenue that can be used to increase caregiver fulfillment and decrease stress caused by caregiving for a person with AD or dementia. Further research is needed to explain the impact of this techniques, as well as apply the techniques to caregivers for people with other chronic conditions.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-158

103 - Poster
Classification: GSBS Student
Presenter: Lillian Wong
Department: Institute for Translational Research
Authors: Raul Vintimilla; Lillian Wong; Haydee Izurieta; Stephanie Large; Daisy Ruiz; James Hall, PhD; Sid O'Bryant, PhD; Leigh Johnson

Recruiting elders into research

Hypothesis/Objective: Recruiting older adults into research is a complex task and utilizing ineffective recruitment methods is a waste of research grant money and researcher time. Research in aging and Alzheimer's disease is particularly sensitive to low levels of enrollment and study completion, as it tends to have a higher participant burden (several study visits, time-consuming appointments and transportation issues). Enrolling sufficient participants is vital for the results of the study to be significant and representative of the population. The purpose of this study was to examine the most effective methods of recruitment in a cohort of adults 50 years or older.

Methods: The Health and Aging Brain Study among Latino Elders (HABLE) Study is a community based, epidemiological study of cognitive aging among Mexican American and non-Hispanic White elders. The study will recruit 1,000 Mexican Americans and 1,000 Non-Hispanic Whites. The HABLE study uses a combination of community based participatory research methods and targeted marketing for recruitment. On first contact, all participants are asked, "how did you hear about us?"; this information was compared with data from our outreach and advertising tracking system which includes information on the number and type of recruitment events (such as conferences, community talks, etc.), and marketing materials (such as postcards, paid advertisements, etc).

Results: The total number of new potential participant contacts was 2,136. Of that, 1038 (49%) were scheduled for a study visit; of those scheduled, 856 (82%) completed the study. The majority of participants reporting hearing about the study via: word of mouth (29%), print advertisement (19%) and community outreach at senior centers and churches (16%). Only a small fraction of participants heard about the research through free social media recruitment (1%) and health fair/conference/sponsorship (7%).

Conclusions: Out of all our recruitment strategies, word of mouth was the most effective. Additionally, print advertising (brochures, postcards and newspaper advertisements placed in various locations in the community) and community outreach in local senior centers or churches were highly successful. The data shows that a combination of mass advertising (print) and face-to-face recruitment (being present in community outreach events) is crucial in getting adults 50 years or older to enroll in aging research.

Sponsor: N/A
IRB/IACUC/IBC#: 2016-128

104 - Poster
Classification: GSBS Student
Presenter: Gita Pathak
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Gita Pathak; Nicole R Phillips, Ph.D.

Genome-wide study highlights novel genes associated with Alzheimer's-Hypertension comorbidity showing utility over CSF biomarkers

Purpose: The aging population (65 and older) is heavily burdened with comorbidities. As the incidence of Alzheimer's continues to rise in the aging demographic, understanding underlying causes of prevalent comorbid patterns in Alzheimer's (AD) is crucial for early diagnosis and treatment. According to the 2011 Alzheimer's association report, hypertension is the most prevalent comorbid condition affecting 60% of the Alzheimer's population. However, there are no known biomarkers or risk scores associated with the AD-hypertension comorbidity; additionally, the genetic underpinnings of hypertension as a comorbidity to AD remains understudied.

Hypothesis: We hypothesize that genetic variants underlie comorbidity patterns of Alzheimer's disease and hypertension, which are distinct from genetic risk factors of Alzheimer's disease alone.

Methods: Leveraging the data from the Alzheimer's Disease Neuroimaging Initiative (ADNI), we conducted comorbidity analyses comparing healthy cohort (controls) vs Alz+/Hyp- vs Alz+/Hyp+. We compared CSF biomarkers – amyloid β, tau and p-tau in three cohorts using one-way ANOVA. We, then evaluated genome wide profiles in three groups using 535,762 SNP markers in 677 individuals (after QC). SNPs were clumped into genes based on position ± 50kb and p-value, followed by mining their role in gene-expression pathways.

Results: The CSF biomarkers were not significantly different in the disease groups, indicating that these biomarkers are not able to discriminate between comorbid AD-hypertension pathology. When comparing the control with Alzheimer's individuals, genome-wide study identifies known - TOMM40 and novel genes -PML and KMO which are known to have role in multiple CNS disorders. Interestingly, when comparing controls vs Alz+Hyp+, we observe several genes in the chromosome 16 region, including SLC9A3R2 - a known hypertension gene. This gene-cluster was also found to be co-expressed via other intermediate genes, underscoring their involvement in mitochondrial pathways.

Conclusion: While the CSF biomarkers- amyloid β, tau and p-tau are known for their diagnostic contribution in vascular dementia, their profile is unaltered in Alzheimer's-hypertension comorbidity, requiring investigation of other possible pathogenic causes. This study replicates genes known for Alzheimer's, along with identifying possible risk loci to the developing Alzheimer's and hypertension, thus showing potential utility over CSF profiles.

IRB/IACUC/IBC#: 2016-090

Biochemisty (Astracts in the 200s)

200 - Poster
Classification: Postdoctoral Fellow
Presenter: Zhicheng Zuo
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Zhicheng Zuo; Jin Liu

Structural and Functional Insights Into CRISPR-CAS9 Catalytic Activation and Specificity Enhancement

CRISPR/Cas9 has been repurposed as a powerful genome editing tool, with immense potential toward therapeutic applications. Despite recent advances in understanding DNA recognition and cleavage by Cas9, consistent structural and functional information about the catalytic state of the HNH nuclease domain remains to be elucidated. On the basis of our recent work (Nature Scientific Reports, 7:17271), we here report a new Cas9 active state complex structure discovered by molecular dynamics simulations and validated by site-directed mutagenesis experiments. In this structure, the HNH domain is poised for cleaving the target DNA strand using a canonical catalytic triad as seen in phage T4 Endonuclease VII. Guided by the derived new structural information, we rationally designed and tested a library of new Cas9 variants to improve Cas9 specificities. Our ultimate goal is to offer several high-fidelity Cas9 enzymes that can be broadly used in basic research and medical therapy.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

Cancer (Abstracts in the 300s)

300 - Poster
Classification: GSBS Student
Presenter: Jana B. Lampe
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Jana B. Lampe; Amalendu P. Ranjan, Dr.; Rohan P. Joshi; Jamboor K. Vishwanatha, Dr.

A Liposomal Platform Using a Microfluidic Mixing Method for Drug Delivery and Targeting of Metastatic Prostate Cancer

Purpose: The success rate for the treatment of localized prostate cancer (PCa) is very high. However, the overall survival rate for patients with metastatic PCa drops to 28%. Bone is the primary metastatic site in 90% of PCa patients, which not only shortens survival, but also causes a significant decrease in the quality of life. The objective of the project is to develop a dual-targeted nanotherapeutic for bone metastatic PCa. We will engineer liposomes composed of two lipids, DOPE and DOTAP. A bone-targeting moiety with a high affinity to the Ca^{2+} in bone will be conjugated to the outside of the liposome. This liposome will be loaded with a cabazitaxel-ligand conjugate that has a high affinity for the receptors that are upregulated in 95% of PCa cells.

Methods: In this formulation we have used a lipid ratio between 40% and 60%. Then the size and polydispersity were optimized by selecting the best Flow Ratio (FR) and Total Flow Rate (TFR) settings in the NanoAssemblr. We also measured the zeta potential (ZP). Cellular uptake studies were performed using the PC3 cell line and DID dye-loaded, DOPE-DOTAP liposomes, then imaged with a Zeiss LSM 510 confocal microscope. Additionally, liposomes were loaded with curcumin to determine their % drug loading (DL) and encapsulation efficiency (EE).

Results: The liposomes were optimized with a 50:50 mol% ratio, a 1:1 FR, and a 6 ml/min TFR. Size (~150 nm) and polydispersity index (0.2), were measured and found to be consistent over a 7-day period to show stability. The ZP (~$^+$40 mV) was also measured. The cellular uptake studies showed that the liposomes were increasingly taken up by the cells over time. The EE was ~93% and DL was ~5%.

Conclusion: By finding a desirable ratio of lipids, FR and TFR, we have optimized our liposomal formulation based on size, PDI, and ZP. Also, we have demonstrated that our liposome can easily be taken up by cancer cells and have shown excellent DL and EE. As a result, we are prepared to continue with the next steps of the project. In the next step we will attach the bone-targeting moiety to the liposome, conjugate cabazitaxel with the targeting ligand, and load the liposomes with the cabazitaxel-ligand. Fully functional liposomes will be tested for in vitro and in vivo functionality.

301 - Poster
Classification: GSBS Student
Presenter: Charlene Norgan Radler
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Charlene Radler; Jin Liu, Ph.D.; Hamed Hayatshahi, Ph.D.; Mohammad Amin Morid, Ph.D; Amyia Green; Kenneth Fluker, Jr.; Emilio Ahuactzin

Identifying Top Gene Contributors to Triple Negative Breast Cancer Health Disparities Among African American Women: A Machine Learning Approach

Purpose: Triple Negative Breast Cancer (TNBC) is a breast cancer subtype which multiple studies have shown to be disproportionately prevalent among premenopausal African American women. The factors contributing to the TNBC health disparities remain unclear.

Methods: Here, we developed a highly accurate, reproducible machine learning classification model that used patient gene expression values as predictor attributes to classify 100 TNBC patients as either African American or non-African American.

Results: By using weighting methods and comparison of classification performance at varying levels of attributes, our study identified a subset of genes able to accurately classify TNBC patients by race. Intriguingly, the top genes of this subset are linked to diabetes, indicating that diabetes may associate with the TNBC health disparities.

Conclusions: Our study demonstrated the factors contributing the TNBC health disparities and provided a subset of genes that may be targetable for precision medicine development to address disparity of TNBC among the African American female population.

Sponsor: National Institutes of Health
IRB/IACUC/IBC#: N/A

302 - Poster
Classification: GSBS Student
Presenter: Nana Yaa Nsiah
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Nana Yaa Nsiah; Pankaj Chaudhary; Jamboor K Vishwanatha

High Expression of MIEN1 in Breast Cancer Correlates with Poor Survival Outcome

Purpoase: Breast cancer is the second leading cause of cancer-related deaths in women. Metastasis accounts for majority of breast cancer deaths. It remains a major barrier to cancer treatment due to limitations in diagnosis and lack of effective therapy. Understanding the role of underlying molecular mechanisms involved in metastasis could lead to effective therapy to prevent and treat breast cancer. Migration and Invasion Enhancer 1 (MIEN1), is a novel gene abundantly expressed in different tumors compared to normal cells. Our previous studies have shown it plays a critical role in regulating cell migration and invasion to promote metastases. It is located on chromosome 17q12 near the Her 2/neu oncogene. MIEN1 protein is a membrane-anchored signal protein, with important structural motifs such as the Immunoreceptor tyrosine-based activation motif (ITAM), a redox active motif and a prenylation sequence at the carboxyl terminal. Here, we evaluated the expression of MIEN1 in breast cancer patients with clinical outcome.

Methods: We analyzed The Cancer Genome Atlas (TCGA) Breast Invasive Carcinoma (BRCA) database to observe MIEN1 mRNA expression in breast cancer subtypes and its correlation with survival. Also, we assessed MIEN1 expression in a panel of normal and breast cancer cell lines using Western blot.

Results: MIEN1 gene expression was significantly increased in different subtypes of breast carcinomas (Invasive ductal carcinoma, Invasive lobular carcinoma, Mixed Ductal and Lobular, and Mucinous) compared to normal tissues. Moreover, MIEN1 is predominantly overexpressed in HER2+ breast cancer patients compared to other subtypes. However, MIEN1 expression in luminal A, luminal B and basal-like subtypes were also high in comparison to normal breast tissues. High expression levels of MIEN1 was associated with reduced overall survival (HR = 1.61; 95% CI = 1.34-1.94, P = 0.0001). Screening of MIEN1 expression in various breast cancer cell lines suggest that expression of MIEN1 is high in majority of them compared to immortalized normal mammary epithelial cell line.

Conclusion: Our findings confirm that MIEN1 is an important oncogene, and its increased expression in breast cancer contributes towards an aggressive disease with poor survival.

IRB/IACUC/IBC#: IBC/p/JV-2017-1

303 - Poster
Classification: GSBS Student
Presenter: Akpedje Serena Dossou
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Akpedje S Dossou; Nirupama Sabnis; Sangram G. Raut; Andras Lacko

Reconstituted high-density lipoprotein as a potential delivery vehicle for TAMs re-polarization agents

Purpose: As part of the tumor microenvironment, tumor-associated macrophages (TAMs) form a functionally heterogeneous population where the pro-inflammatory M1 type macrophages exert anti-tumoral function by enabling the activation of cytotoxic immune cells while immunosuppressive M2 type macrophages support tumor progression, angiogenesis, immune system evasion and metastasis. However, TAMs display a high ratio of M2 to M1 macrophages, and this polarization is promoted by tumor secretions. Thus, their presence in tumor microenvironment is associated with poor prognosis. Because the reversal from M2 to M1 constitutes an attractive cancer immunotherapy strategy, there is a need for targeted selective delivery carriers for reversal agents to avoid off-target effects. Reconstituted high density lipoprotein (rHDL) nanoparticles (NPs) are biocompatible with various administration routes, and they have been confirmed to deliver their cargo to targeted cells via a scavenger receptor class B type 1 (SR-B1)-mediated uptake. In addition, Apolipoprotein A1 (ApoA1), one of the components of the rHDL NP, has been shown to promote a M2 to M1 reversal of TAMs. Hence, we propose that rHDL NPs are particularly appropriate to deliver specific re-polarizing agents to TAMS to achieve a predominately M1 type TAM population, and thus enhance the effectiveness of tumor immunotherapy.

Methods: The rHDL NPs were prepared using egg yolk phosphatidylcholine, free cholesterol, cholesterol oleate and the ApoA1 protein. The size, polydispersity index and zeta potential of the NPs were assessed by dynamic light scattering. Transmission electron microscopy confirmed size and uniformity of the rHDL NP preparation. Raw 264.7 macrophages were polarized to M1, M2a and M2c by using respectively lipopolysaccharide + interferon-gamma, interleukin-4, and interleukin-10. Protein expression was confirmed via immunoblot.

Results: The rHDL NPs show a sub-50 nm size and form a fairly homogeneous preparation. M2 type macrophages display a higher SR-B1 expression than the M1 type (Raw 264.7 macrophages).

Conclusions: Findings of these and earlier studies show that the rHDL NPs may be particularly suited to deliver reversal (re-polarizing) agents to M2 macrophages.

Sponsor: Cerenis Therapeutics
IRB/IACUC/IBC#: N/A

304 - Poster
Classification: GSBS Student
Presenter: Priyanka Desai
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Priyanka Desai; Pankaj Chaudhary; Xiangle Sun; Jamboor Vishwanatha

Phosphorylation of Annexin A2 is Essential for its Association with Exosomes in Triple Negative Breast Cancer

Introduction: Studying triple negative breast cancer (TNBC) is the utmost importance as treatment lacks targeted-based therapies. High expression of exosomal Annexin A2 (AnxA2), a Ca^{+2}-dependent phospholipid binding protein, plays an important role in pre-metastatic niche formation and promoting cancer metastasis in TNBC. Also, N-terminal phosphorylation of AnxA2 at Tyrosine (Tyr) 23 has been implicated in several cancer progression. However, the mechanism through which AnxA2 enters into the exosomes has not been elucidated in TNBC.

Methods: Plasmids expressing constitutive phosphomimetic AnxA2 (AnxA2-Y23E) and non-phosphomimetic AnxA2 (AnxA2-Y23F) mutant gene were transfected in MDA-MB-231 cells. Transfected cells were functionally validated for AnxA2 specific functions like migration, invasion and proliferation. Exosomes isolated from AnxA2-Y23E (exo-AnxA2-Y23E) and AnxA2-Y23F (exo-AnxA2-Y23F) mutant cells were analyzed for surface expression of AnxA2. Effect of exosomes containing AnxA2-Y23E and AnxA2-Y23F mutant proteins was analyzed on invasiveness and proliferation in cancer cells.

Results: Our results showed that MDA-MB-231 TNBC cells expressing phosphomimetic AnxA2 showed increased migratory, invasive and proliferative capacity compared to cells expressing non-phosphomimetic AnxA2. Exosomes derived from phosphomimetic cells had increased AnxA2 expression at surface compared to exosomes derived from non-phosphomimetic cells. In addition, high surface expression of AnxA2 in exosomes derived from phosphomimetic cells induced invasive and proliferative characteristics in CAL-148 breast adenocarcinoma cells compared to exosomes derived from non-phosphomimetic cells (exo-AnxA2-Y23F).

Conclusion: Phosphorylation of AnxA2 at Tyr23 plays an important role in imparting metastatic phenotype to the TNBC cells. In addition, the phosphorylation of AnxA2 at Tyr23 is an important event for its entry into the exosomes that promotes invasion and proliferation in cancer cells.

IRB/IACUC/IBC#: IBC/p/JV-2017-1

305 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Rachel Blaydes
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Rachel Blaydes; Alakananda Basu

Contrasting effects of protein kinase C-eta on apoptosis versus senescence

Purpose: Breast cancer is the most commonly diagnosed cancer in women with over 252,000 women in the United states getting diagnosed and more than 40,000 dying each year. Lack of cell death by apoptosis can cause cancer and contributes to chemoresistance. Protein kinase C (PKC) plays critical roles in cell survival and cell death. PKCη ,a member of the PKC family, is considered an anti-apoptotic kinase. We, therefore, examined if depletion of PKCη would enhance cellular sensitivity to chemotherapeutic agents by inducing apoptosis.

Methods: Established breast cancer cell lines, such as MCF-7 cells (ATCC) were used in this study. Cells were transfected with non-targeting or target-specific siRNAs. The extent of gene knockdown was determined by Western blot analysis. The proteins from the cell extract were separated by SDS-PAGE and visualized using enhanced chemiluminescence detection kit. Cell proliferation was assessed using a clonogenic assay. The DNA damaging agent doxorubicin was used to induce apoptosis. The cleavage of PARP was used to monitor apoptosis. Cellular senescence was detected using SA-b-gal staining kit from Cell Signaling Technology.

Results: Depletion of PKCη by siRNA decreased doxorubicin-induced apoptosis. PKCη knockdown increased the levels of the cell cycle inhibitor p27 and decreased the clonogenic survival of MCF-7 cells. Knockdown of PKCη caused upregulation of the cyclin-dependent kinase inhibitor p27. Depletion of p27 inhibited senescence and restored apoptosis in PKCη-depleted cells.

Conclusion: Our results suggest that PKCη knockdown inhibits apoptosis by inducing p27-mediated senescence.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

306 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Anna Claire Cooke
Department: TCOM: Pediatrics
Authors: Anna Cooke; Mayme Richie-Gillespie, M.D.; W. Paul Bowman, M.D.

Delayed Diagnosis of Langerhans Cell Histiocytosis: A Case Series

Background: Langerhans Cell Histiocytosis (LCH) is a rare clonal proliferative disease affecting the dendritic-derived, antigen-presenting Langerhans cells. Formerly termed Histiocytosis X, LCH encompasses a wide constellation of symptoms that range from solitary bone lesions to multi-system involvement. Because of the variable presentation of LCH, the path to diagnosis can be delayed as this disorder is potentially confused with other disease processes. Definitive diagnosis of the disease is made histologically with positive staining of CD1a or Langerin, which are proteins specific to the aberrant cells. This case series considers LCH in the setting of pediatric patients with solitary bone lesions.

Case Information: Three pre-teen patients initially presented to primary care with long-term pain and decreased activity in the absence of other systemic symptoms or trauma. Single, well circumscribed lucent lesions were subsequently identified via radiograph. Following surgery, pathology reports did not initially indicate the presence of LCH, and all cultures were negative. In each case, initial diagnoses of chronic osteomyelitis were given. When CD1a and Langerin staining were applied in retrospect, staining for all three patients was positive in small clusters of cells. Final diagnoses of LCH, fibrosing phase, were eventually assigned and the prolonged clinical history accounted for the amount of fibrosis present in the tissue samples.

Conclusions: Because of the variable presentation of LCH, diagnosis can be potentially be delayed. These cases are important because they bring attention to a potential presentation of LCH as gradually occurring bone pain caused by solitary bone lesions. In such cases, surgery can be curative and often no further treatment will be required. It is important to distinguish LCH from chronic osteomyelitis, especially in pediatric patients, as correct and early identification of the disease prevents the hassle, expense, and danger of unnecessary treatment. Staining with CD1a and Langerin aids in differentiating these diagnoses and should be included in the work up for solitary lucent lesions.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

307 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: John Kolton Smith
Department: TCOM: Pediatrics
Authors: john smith; Riyaz Basha; Paul Bowman MD; Tyler Hamby

Diffuse Cutaneous Mastocytosis and its potential comorbidities in pediatric patients – a case study.

Background: Mastocytosis is the pathologic proliferation and accumulation of mast cells in various tissues of the body. There are different forms of mastocytosis that can present in pediatric patients including systemic (SM), cutaneous (CM) and diffuse cutaneous mastocytosis (DCM). Both the CM and DCM forms have the potential to progress into SM as the patient reaches adulthood. Mastocytosis has been shown to be comorbid with joint pathologies including Ehlers-Danlos syndrome and inflammatory gastrointestinal conditions such as eosinophilic esophagitis. The greatest risk among patients with mastocytosis is anaphylaxis.

Case information: A 13-week-old male presented to his primary care physician with erythematous spots on his torso and arms, and was diagnosed with eczema. The spots grew and transformed morphologically over the next month and a referral to dermatology was made. Upon biopsy of the original lesion (on the torso), the diagnosis of DCM was made. Over the coming months, symptoms progressed and comorbidities—including joint hypermobility (diagnosed with Ehlers-Danlos syndrome), dysphagia and diarrhea—arose. The patient broke his distal radius while crawling, due to his mast cell disorder and severe vitamin D deficiency.

Conclusions: In most children with DCM, symptoms will partially or fully resolve by adolescence. But for some patients, the disease can progress to SM. Numerous comorbidities can occur, as did in this case. Current treatment strategies are wide ranging, from topical glucocorticoids to specialized UV radiating therapy. The specific approaches to this disease are still being understood, with recent investigations into immunological treatment modalities. The individuality of each case is crucial for health care professionals to recognize.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

308 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Sara Vivatson
Department: TCOM: Pediatrics
Authors: Sara Vivatson; Paul Bowman, MD; Tyler Hamby, PhD

Bone Pain as a Clinical Presentation of Acute Lymphoblastic Leukemia

Introduction: Acute lymphoblastic leukemia (ALL) is the most common malignancy in children, accounting for approximately 1/3 of pediatric cancers. Treatment of ALL has progressed extensively over the years, and approximately 85% of pediatric ALL cases achieve remission. Many factors are used in determining the treatment for individuals, including central nervous system infiltration, chromosomal abnormalities, and various mutations. Most patients present with systemic signs and symptoms that lead the pediatrician towards the diagnosis of ALL, but some present with the chief complaint of bone pain.

Case Information:

Case 1: A 5-year-old female presented to an urgent care clinic complaining of low back pain for the past 2 weeks. Initially, an X-ray was performed which showed anterolisthesis and diminished vertebral height. Following the X-ray, she was evaluated and found to have additional symptoms including a low-grade fever, headache, nasal discharge, and cough. Labs drawn revealed pancytopenia and an MRI scan revealed an infiltrative process of the L3 vertebral body. Bone marrow biopsy confirmed the diagnosis of B-cell ALL. The patient was started on standard risk therapy, but had positive minimal residual disease (MRD) at day 29 of treatment. Patient was then placed on the high risk treatment protocol. Patient is now in maintenance therapy.

Case 2: A 4-year-old female presented to an emergency department with left upper arm pain and a recent episode of strep throat. Exam showed some lymphadenopathy and painful range of motion testing in the left arm. X-ray was unremarkable. Labs showed the patient to be anemic. White blood cell numbers were within normal range, however the differential count identified abnormal lymphocytes to be present. Bone marrow biopsy confirmed diagnosis of B-cell ALL. Patient was started on standard risk therapy, achieved MRD negative remission, and is currently in maintenance therapy.

Conclusions: This case study reviews 2 cases out of many that presented with similar complaints of bone pain. Often children experience minor trauma, such as falling out of a chair, which may cause pain. Pediatricians may see many such cases, but sometimes the bone pain is a manifestation of something more serious. Lack of awareness can lead to a delay in diagnosis of ALL. Therefore, ALL should always be considered when evaluating a child for bone pain.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

309 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Nidhi Patel
Department: TCOM: Pediatrics
Authors: Nidhi Patel; William Paul Bowman; Yvette Dzurik

Long Term Survival in Pediatric Renal Cell Carcinoma despite multiple relapses: A Case Study

Background: Although common in adults, renal cell carcinoma (RCC) is extremely rare in pediatric populations, comprising of less than 5% of malignant renal tumors. Literature on the topic is scarce, and there currently is no protocol for the treatment of pediatric RCC. This study focuses on a pediatric RCC patient who experienced multiple relapses of the disease, and aims to highlight the multifocal approach taken to care for the patient.

Case History: A 6 year old male presented in 2006 with a chief complaint of 1 week of painless hematuria, and was found to have a renal mass by abdominal examination. He was diagnosed with type II papillary RCC based on pathological examination of tissue following radical nephroureterectomy and regional lymph node excision. Over the next 7 years the patient had several regional and distal metastases of the disease, which required different approaches including a right pneumonectomy, stereotactic spinal radiosurgery, external beam radiotherapy, and chemotherapy with Sunitinib. In addition, patient developed posterolateral right sided rotation of his heart (iatrogenic retrodextrocardia) after the pneumonectomy. Despite several relapses, the patient has done well with treatment, and has not shown any evidence of metastasis or active disease in the last five years, with the most recent follow up being in 2018.

Conclusion: Renal cell carcinoma is an extremely rare malignancy in pediatric populations, and research on it is sparse. Studies for the development of appropriate treatment protocols are being explored currently, however, nothing concrete exists currently. The patient in our case study portrays the success of an individualized approach, and calls for attention to the need for further research in treatment options, and the development of a standardized protocol. We hope that this case report serves as a source of optimism, and increases clinicians' knowledge of treatment approaches that have shown positive results for this rare pediatric neoplasm.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

310 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Blair Levesque
Department: TCOM: Medical Education
Authors: Blair Levesque; Laszlo Prokai, PhD; Sankpal T Umesh; Riyaz Basha; Myrna Hurtado

Understanding the Mechanism of Action of Copper-Tolfenamic Acid's Anti-cancer Activity in Pancreatic Cancer Cells

Purpose: Non-steroidal anti-inflammatory (NSAID) agents have been proven to have anti-cancer activity. Our group is investigating the use of NSAIDs as sensitizing agents to use alongside standard chemotherapy. This combination increases the efficacy of chemotherapy to accomplish higher anti-cancer activity at relatively low doses, thereby reducing the side effects. It is desirable to find anti-cancer NSAIDs with low Inhibitory concentration (IC50) values. The NSAID, tolfenamic acid (TA), has been tested in preclinical studies for anti-cancer activity against pancreatic cancer (PaCa). Recently, it is shown that metal complexes of NSAIDs enhances the efficacy.

Methods: We investigated the anti-proliferative activity of copper-tolfenamic acid (Cu-TA) using 12 cancer cells and reported that the Cu-TA complex had a stronger therapeutic response and lower IC50 values by 30-80% compared to TA. The goal of this investigation is to determine the mechanism by which Cu-TA induces anti-cancer activity in PaCa cell lines. MIAPaCa2 cells were treated with vehicle or Cu-TA (IC50 value) and processed by Next Generation Sequencing (NGS). Ingenuity Pathway Analysis was used to determine the functional significance of the altered gene expression. The top upstream regulators were confirmed by Western blot analysis.

Results: Several networks, regulators, and molecular and cellular functions were found to be affected by the Cu-TA treatment. qPCR and Western blot analysis were used to assess and confirm the alterations in the expression of the candidate markers in PaCa cells. Previously, confirmatory studies were performed using MIAPaCa2 cells. Due to the heterogeneity of PaCa, in this study we used a second cell line PANC1 for similar experiments. Tumor protein p53, human epidermal receptor growth factor 2, Specificity protein 1 and signal transducer and activator of transcription 3 were the top upstream regulators confirmed by Western blot analysis. It was demonstrated by qPCR of selected genes, Centromere protein F, DNA damage inducible transcript 3 and S-phase kinase associated protein 2 that Cu-TA is efficacious at a lower dose than TA.

Conclusion: NGS and Ingenuity Pathway analysis identified important pathways and genes effected by Cu-TA. In this investigation, PANC1 showed similar results as MIAPaCa2 cells. The genes and pathways that were altered by treatment with Cu-TA involved cell survival or apoptosis demonstrating that Cu-TA is modulating genes associated with cancer. This identifies the potential of Cu-TA as an effective anti-cancer agent.

311 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Melissa Schullek
Department: TCOM: Pediatrics
Authors: Melissa Schullek, OMS-II; Kolton Smith, OMS-II; Sarah Grebennikov, OMS-II; Umesh Sankpal, PhD; W. Paul Bowman, MD; Riyaz Basha, PhD

Exploring Less Toxic Combination Treatment Options for Inducing Anti-Cancer Activity in Medulloblastoma Cells

Purpose.Medulloblastoma (MB) is the most common type of malignant pediatric brain cancer and is typically located in the posterior fossa. There are four subgroups within MB: Wnt, Sonic-Hedgehog, Group 3, and Group 4. Due to differences in pathology, signaling pathways, and gene expression, each subgroup is approached differently with respect to treatment, based upon differences in prognosis. Currently, the standard treatment approaches include surgical resection, radiotherapy, and chemotherapeutic agents such as etoposide, vincristine, and cisplatin. Survivors often suffer from severe long-term side effects including neurocognitive deficits and the potential for a future second neoplasm due to the tumorigenic potential of aggressive combination therapies. Because of these side-effects, there is an urgent need for effective and less toxic therapeutic strategies for the treatment of MB. Through prior research we have demonstrated the combination of etoposide alongside less toxic anti-cancer agents potentially increases anti-cancer activity in Ewing Sarcoma. We hypothesize that using a combination of etoposide with other sensitizing agents can also enhance the anti-cancer activity in MB cell lines.

Methods. DAOY cells were cultured with increasing concentrations of Etoposide (ETO), Mithramycin-A (MIT), BNS-22 and Tolfenamic acid (TA) and the cell growth was monitored at 48 hours using CellTiter-Glo kit (luminescence cell viability assay). Dose-curves were then generated using sigma-plot software. After calculating the IC50 values for each agent, low dose of ETO (half of IC50 value) and IC50 value of other agents were tested for the combination treatment.

Results. Overall, we observed decreased cell viability in a dose and time dependent manner for all tested agents. The IC50 values derived from the dose curves were 1 µg/ml for ETO, 33.3 nM for MIT, 15 µg/ml for TA, and 14.5 µM for BNS. The combination treatment using 0.5 µg/ml ETO and other agents (IC50 values) showed cell growth inhibition greater than any single agent in DAOY cells. The analysis revealed that the combination of ETO (0.5 µg/ml) plus BNS-22 was very effective.

Conclusions: These preliminary data demonstrate promise in creating combination therapy of ETO with BNS-22 to treat DAOY cell lines. For better applications, similar experiments should be done with more cell lines representing various sub-groups of MB and to be confirmed by in vivoassays.

Sponsor: N/A
IRB/IACUC/IBC#: 2016-0038

312 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Tu Mai
Department: GSBS: Physiology & Anatomy
Authors: Tu Mai; Sangram Raut; Nirupama Sabnis; Andras Lacko

Lipoprotein Based Targeted Therapy for AML

Background: Acute myeloid leukemia (AML) is the most common acute leukemia in adults; it is only cured in less than 50% of the patients that are diagnosed with the disease. A new approach to the AML treatment is proposed using a nanoparticle system (rHDL) that mimics the structure and function of endogenous high density lipoproteins (HDL) specifically targeting the scavenger receptor type B1 [SR-B1] that is overexpressed in cancer cells. The drug-rHDL complex would be more efficient in specifically delivering the anti-cancer drugs to its target.

Objective: Create a new drug delivery system for AML chemotherapy by formulating rHDL nanoparticles with current AML pharmaceutical drugs (e.g. etoposide and azacitadine) for preclinical studies.
Method: Revising the existing protocol for rHDL nanoparticle synthesis from Lipoprotein Drug Delivery Research Laboratory at UNTHSC, etoposide was encapsulated in rHDL nanoparticles and left to be characterized. Characterization involved using the high performance liquid chromatography (HPLC) instrument to analyze the compound and the drug content within the nanoparticles. Nanoparticle size, zeta potential and composition will be determined using established methods in the lab. Revisions to the synthesis protocol will be made accordingly in order to maximize the amount of drug encapsulated.

Conclusions: A standard curve has been established to characterize the nanoparticle-drug loading created by utilizing high performance liquid chromatography (HPLC). Current work involves characterizing the rHDL nanoparticles for drug loading and physical attributes such as size, zeta potential and chemical composition. After characterization and revising the protocol to maximize the drug content within the nanoparticles, the next step in the process would involve evaluating cytotoxicity in SR-B1 positive AML cells before moving to animal models. The long term goal of the project is to create a new delivery method for AML in order to minimize the side effects and enhance the therapeutic index of multiple AML drugs used in management of AML.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

313 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Madeline Nash
Department: TCOM: Pediatrics
Authors: Christine Lin; Madeline Nash; Ashwin Chandra; Maya Nair; Jamboor Vishwantha; Riyaz Basha

The role of Specificity Protein 1 and downstream target Survivin in Ovarian Adenocarcinoma Survival and Prognosis

Purpose: Ovarian adenocarcinoma is a solid proliferation of ovarian glandular epithelium. These are the most threatening types of gynecologic malignancies. Although many risk factors are involved in determining prognosis, the study of germline mutations related to tumorigenesis is the focus of this study. It is well established that Specificity protein 1 (Sp1), a transcription factor regulates key genes associated with cancer including survivin (baculoviral inhibitor of apoptosis repeat-containing 5 or BIRC5). Survivin is an anti-apoptotic protein which is known to be associated with poor prognosis in multiple cancers and displays therapy-resistant tumor characteristics. Sp1 has also been associated with poor prognosis in several different types of cancers. The role of these two proteins in the development of ovarian adenocarcinoma and their impact on prognosis remains unclear.

Methods: The R2 genomics visualization platform was used to generate Kaplan-Meier curves for survival probabilities in patients with ovarian adenocarcinoma who express high and low levels of Sp1 and Survivin. Both curves were generated using data from 107 patients. There were 38 patients in the high Sp1 expression group and 69 patients in the low Sp1 expression group. In the Survivin (BIRC5) group there were 70 patients with high expression and 37 patients in the low expression group.

Results: The survival curves show that patients with ovarian adenocarcinoma who express higher levels of Sp1 had a significantly poorer prognosis compared to patients with lower levels of Sp1 expression (p = 0.023). Similarly, patients with high levels of survivin protein expression were found to have a significant decrease in overall survival probability compared to patients who had low levels of survivin expression (p = 0.049).

Conclusion: There is a strong association with high expression of either Sp1 or survivin with poor prognosis in patients with ovarian adenocarcinoma. Moving forward, studies are in development to elucidate the roles that Sp1 and survivin play, individually and together, in the evolution of ovarian adenocarcinoma. We are also interested in exploring the relationship of differential expressivity of Sp1 and survivin in association with age, race and ethnicity among patients with ovarian cancer.

IRB/IACUC/IBC#: N/A

314 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Emily Zakhary
Department: TCOM: Pediatrics
Authors: Emily Zakhary; Riyaz Basha; Sankpal T Umesh; Yazmin Hernandez

Survivin as a New Target for Neuroblastoma

Background: Neuroblastoma is the most common solid peripheral nervous system pediatric tumor found in pediatrics. Neuroblastoma (NB) commonly metastasizes through the lymphatic system and bone marrow, and has a particularly poor prognosis in children older than 18 months, with five-year survival rates typically around 40-50%. Our group is investigating for less toxic agents against NB cells. We found that Tolfenamic acid (TA), a small molecule had anti-cancer effects in high risk neuroblastoma (HRNB) cell lines. Survivin has been associated with poor prognosis in several types of cancers. Survivin is a protein that specifically inhibits the caspase apoptotic proteins thus negatively regulating apoptosis. We conducted a search of various databases in order to investigate the association of Survivin with the survival of NB patients. The other objective was to test an agent that could target Survivin an inhibit NB cell growth.

Materials: We utilized R2 genomics and visualization platform to generate survival curves, looking specifically at overall and relapse-free survival probabilities in NB patients. The graphs were made using the data from 88 patients. We also used NB cell line for in vitro testing. SH-SY 5Y cells were cultured it in the presence of copper TA and cell viability was assessed at 24 and 48 hours. Protein extracts were prepared and analyzed for the expression of Survivin using Western blot analysis.
Results: We found that the overall survival probability for NB patients with high expression of Survivin had a significantly poorer prognosis (p: 8.5e-9), than those with lower expression of Survivin. Similarly, the relapse-free survival probability curve also demonstrated that high expression of Survivin was associated with a poorer prognosis (p: 1.9e-6) than patients who had lower expression levels. Thus demonstrating that there is a strong association with high Survivin expression and poor prognosis. We also found that Cu-TA acted as an effective inhibitor to Survivin in our laboratory research with the SHSY-5Y cell line.

Conclusion: The survival curves showed a strong association of Survivin with poor prognosis. The complexed agent, Cu-TA acts as an efficacious inhibitor of the HRNB cell line SHSY-5Y potentially inhibiting Survivin. Going forward, further research should be done to identify novel less toxic therapeutic agents to target Survivin, in hopes of better treating HRNB cell lines.

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315 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Kunal Elete
Department: TCOM: Pediatrics
Authors: Kunal Elete; Karen Albritton; Lauren Akers; Anish Ray; Riyaz Basha

Trial of Pazopanib in a Multiply Relapsed Osteosarcoma Patient

Background: Osteosarcomas (OS) are typically found among adolescents and young adults and usually affect the long bones around the knee. The current treatment options for relapsed OS include surgery, chemotherapy, targeted therapy, or some combination of these modalities. Constitutive activation of tyrosine kinase mediated pathways leading to up-regulation of cell division and growth have been implicated in OS. This study identifies a patient at Cook Children's Medical Center (CCMC) who, upon relapse, was treated with pazopanib, a multi-tyrosine kinase inhibitor, on compassionate basis, which led to stability of disease, along with treatment related toxicities.

Case Information: A 25-year-old female initially presented with left femur osteosarcoma and was treated with chemotherapy consisting of methotrexate, doxorubicin and cisplatin followed by amputation and neo-adjuvant chemotherapy. Following 6 years of remission, she presented with two lung masses that were resected along with chemotherapy and radiation. After almost 2.5 years, she presented with progressive tumor in the right pleural base for which she was treated with pazopanib. She demonstrated positive response with stable size of tumor and increased homogeneity (suggestive of tumor necrosis) but ended treatment after 3 months due to hypothyroidism and GI toxicity, namely diarrhea. Within just 1 week of discontinuation, she had a concerning increase of 17% in her lesion. Thereafter, she has relapsed multiply but remains alive 18 months after discontinuing pazopanib.

Conclusion: Despite the positive response seen to pazopanib, it's toxicity profile can be over bearing for patients. In a retrospective analysis by Velho et al, a study involving 113 patients treated with pazopanib resulted in about 12% of those discontinuing treatment due to fatigue, diarrhea, and nausea/vomiting. In another study, described by Umeda et al, 3 patients with relapsed osteosarcoma who were treated with pazopanib were all alive at 21 months or longer. Of those, two discontinued treatment despite positive response due to nausea/fatigue, lymphopenia, anemia, hypothyroidism, and elevated alkaline phosphatase. Our experience as well of those as others suggests that pazopanib may have a role in prolonging survival among patients with osteosarcoma, however the extent of the side effects has clearly contributed to a lesser than optimal length of treatment.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

316 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Blake St. Louis
Department: TCOM: Pediatrics
Authors: Blake St. Louis; Paul Bowman, MD; Tyler Hamby, PhD; Mayme Richie-Gillespie, MD

Delayed Diagnosis of Ewing Sarcoma: A Case Series

Background: Ewing Sarcoma, the second most common bone cancer in adolescents, affects young adults between the ages of 15 to 24. Ewing Sarcoma presents with a variety of non-specific symptoms, including pain and possible mass; the average delay in diagnosis is 6 months. Physician-related delays, defined as the time when a patient first presents to a physician to the time of diagnosis, account for 63.6% of delays. Adolescent (15-19 years old) patients have a notably longer patient-related delay, defined as the time when a patient first notices a symptom to the time they present to a physician, contributing to an overall longer delay in diagnosis. Patients diagnosed without metastasis have a 70% survival rate, whereas patients with metastasis present have only a 20% survival rate. By reviewing three cases of delayed diagnosis in Ewing Sarcoma, we aim to increase awareness of providers to improve earlier diagnosis of Ewing Sarcoma.

Methods: Electronic medical records of three patients were reviewed at Cook Children's Medical Center.

Case Information: Three cases of adolescent Ewing Sarcoma diagnosed between 2010-2018 were evaluated. One patient was diagnosed with sciatica followed by a herniated disc after a car accident and had a six-month delay. The patient did not respond to treatment and was referred to a pain management specialist. At diagnosis, the patient had metastasis to multiple areas and is currently undergoing treatment. The other two patients had delays of approximately 12 months and were being treated by either a chiropractor or physical therapist. Both patients associated their pain to the musculoskeletal system and delayed going to a physician. One patient had metastasis to multiple sites at diagnosis, while the other patient had no metastasis. Both patients are currently in remission.

Conclusions: Ewing Sarcoma presents with nonspecific symptoms and can have lengthy delays in diagnosis. Timely diagnosis is important because longer delays can result in metastasis, a need for more intensive therapy, and a worse prognosis. As demonstrated by these cases, pain onset, proper imaging guidelines, age-specific statistics, avoiding specialty bias, and enhanced provider awareness are important considerations in developing an appropriate differential diagnosis and earlier recognition of Ewing Sarcoma. In presenting these cases we seek to improve awareness and suspicion of Ewing Sarcoma among practitioners evaluating patients such as we have described.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

317 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Sarah Grebennikov
Department: TCOM: Pediatrics
Authors: Sarah Grebennikov; Riyaz Basha; Umesh Sankpal; Rajasekhar Maram

Anti-Proliferative Effect of Copper Tolfenamic Acid in Neuroblastoma Cell Lines

Background: Neuroblastoma (NB) is a neuroendocrine tumor of the sympathetic nervous system most commonly found in the adrenal medulla. It is the most common extracranial tumor in infants with an average age of onset of 1 year. While presentation in children over the age of 5 is rare, the prognosis is markedly worse due to the higher likelihood of an aggressive malignancy with metastasis to lymph nodes and bone marrow. Current treatment modalities include surgical resection, chemotherapy, radiotherapy, and autologous stem cell transplant. These treatments are highly efficacious, however there are several associated side effects. Specifically, chemotherapeutic side effects are dose dependent and can range from mild stomach pain to more severe and serious complications including hearing loss, myelosuppression, and neurotoxicity. To limit these side effects, we are investigating anti-cancer agents with limited side-effects. Copper Tolfenamic Acid (Cu-TA) is metallic complex of an anti-cancer Non-Steroidal Anti-inflammatory Drug, Tolfenamic acid which is known to inhibit anti-apoptotic protein, Survivin and inhibits cancer cell growth.

Hypothesis: We hypothesize that Cu-TA down-regulates survivin and inhibits neuroblastoma cell growth more effectively than TA.

Methods: NB cell lines, SMS-KCNR and LA155n cell lines (from ATCC) were treated with increasing concentrations of Cu-TA or TA (0, 5, 10, 20, 40 and 80 µM). CellTiter-Glo reagent was added to the 96-well plate, and readings were taken at 24 and 48 hours. Using this data, IC50 values were calculated using SigmaPlot software. The effect of Cu-TA on Survivin protein expression was measured using western blot analysis.

Results: Cell viability data showed a dose dependent decrease due to Cu-TA treatment in both cell lines. Analysis of the Western Blot confirms that there was a decrease in the survivin protein in the cells treated with Cu-TA.

Conclusion:These results demonstrate that Cu-TA is an inhibitor of survivin and more effective at inhibiting NB cancer cells than TA alone. Since survivin is associated with resistance to chemotherapy, if Cu-TA sensitizes NB cells to chemotherapy, it will help reduce the side effects of chemotherapy while maintaining the efficacy of treatment.

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IRB/IACUC/IBC#: IBC-2016-0038

318 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Julie Hong
Department: TCOM: Pediatrics
Authors: Julie Hong; Riyaz Basha, PhD; Paul W Bowman, MD; Umesh T Sankpal, PhD

Metformin inhibits medulloblastoma cell growth and increases sensitivity to chemotherapy drugs

Purpose: Medulloblastoma (MB) is the most common malignant pediatric brain tumor. Standard treatment is chemotherapy and radiation, both of which can be associated with long-term toxicity for pediatric patients. This project is focused on the use of metformin in the treatment of medulloblastoma. Metformin (MET) is an anti-diabetic drug with low toxicity that has been shown to have anti-cancer properties. We hypothesize that MET will inhibit MB cell growth and enhance the effect of chemotherapy and anti-cancer agents such as vincristine (VCR) and valproic acid (VPA) when used in combination, possibly by inhibiting the expression of survivin protein.

Methods: MB cells (DAOY) were treated with increasing doses of MET (1-30 mM), VCR (1-16 nM), and VPA (1-30 mM). For combination treatment, DAOY cells were treated with selected doses of VCR (1, 2, 4 nM) and VPA (0.9, 1.8, 3.5 mM) alone or in the presence of MET (10 and 20 mM). Cell viability was assessed at 48 h post-treatment using the CellTiter-Glo cell viability assay kit. For western blot analysis, DAOY cells were treated with increasing doses of MET (0, 5, 10, 20 mM) for 24 and 48 h. Cells were harvested and protein extracts were prepared and used for determining survivin expression.

Results: Treatment with MET, VCR, and VPA alone resulted in a decrease in cell viability in a dose and time dependent manner. The combination of MET+VCR resulted in greater inhibition of cell proliferation with 78.99% inhibition in comparison to MET alone (51.5%) or VCR alone (46.02%). The combination of MET+VPA resulted in greater inhibition of cell proliferation with 84.88% inhibition in comparison to MET alone (52.6%) or VPA alone (47.81%). Western blot analysis of MET treated cells showed a dose and time dependent decrease in survivin expression.

Conclusion: Our experiments demonstrate the potential of MET as a novel therapeutic agent for the treatment of MB based on its ability to inhibit proliferation and enhance the activity of anti-cancer agents. These results also suggest that MET's effect could be partially mediated by the down-regulation of survivin, a protein known to be involved in the inhibition of apoptosis and resistance of cells to chemotherapy. The low toxicity of metformin and its ability to sensitize medulloblastoma cells could potentially result in lowering chemotherapy associated toxicities, leading to improved quality of life for long-term survivors.

Sponsor: N/A
IRB/IACUC/IBC#: 2016-0038

319 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Richard Eames
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Richard Eames; Yohan Kim; Elijah How; Long Wong, M.D.

Anterior Mediastinal Mass

The anterior mediastinum is located behind the sternum and is bordered by the pericardium, diaphragm, and mediastinal pleural. It houses the thymus, parts of the retrosternal thyroid, and various lymph nodes. While masses in the anterior mediastinum are frequently asymptomatic at presentation, many complications may arise as they grow and compress adjacent structures such as the heart, esophagus, trachea and associated neurovascular structures. Some associated symptoms include cough, hoarseness, fever, chills, and chest pain. Compression of critical structures such as the heart, major vessels, and trachea results in a unique state of hemodynamic equilibrium that must be taken into account when performing anesthesia and surgery. The differential diagnosis for anterior mediastinal masses (AMM) includes a wide variety of both benign and malignant disease processes including thymoma, teratoma, thyroid neoplasm, and lymphoma.

In this report we offer a brief overview of the different diagnoses and management of AMM and present a case of a 55 year old female with a previously undiagnosed AMM and the follow up treatment plan.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-199

320 - Poster
Classification: TCOM DO Student (4th Year)
Presenter: Zahra Merchant
Department: TCOM: Pediatrics
Authors: Zahra Merchant; Kenneth M Heym, MD; Lauren Akers, DO; Anish Ray, MD

Trial of Sirolimus in Gorham Disease

Background: Gorham Disease, also known as Gorham-Stout Disease, massive osteomyelitis, or vanishing bone disease, is a rare disorder of poorly understood etiology. Patients undergo bone resorption without proliferation and have significant soft-tissue swelling. No standard treatment is currently available. Novel use of the MTOR inhibitor sirolimus has shown some promise in slowing the progression of this devastating disorder. Immunosuppressant agents such as sirolimus have been used effectively in transplant patients for prophylaxis of organ rejection. We hypothesize that this agent can also successfully slow the progression of bone resorption in patients with Gorham Disease. This case series describes the diagnosis, progression, and therapy of three patients in the Cook Children's Medical Center hematology-oncology department with varying levels of severity of Gorham Disease.

Case Information: Three patients were diagnosed with Gorham Disease between 2011 and 2014 and are now being treated within the Cook Children's Medical Center Hematology-Oncology practice. One patient has involvement of her skull base and ear canals, diagnosed after ear canal abnormalities were detected on CT following meningitis. The second patient has involvement of her posterior ribs and T7-T12 vertebral bodies, with thoracic instability and necessity of either remaining in the supine position or wearing a back brace. The third patient has involvement of his left lower extremity and left hemipelvis, necessitating a left above knee amputation and subsequent disease progression. The first two patients have had radiographic improvement after the addition of twice daily sirolimus, while the third patient has had steadying of his disease.

Conclusions: Gorham Disease is a rare condition with possibly devastating effects. The introduction of sirolimus, in select cases, has appeared to either steady or slowly reverse the progression of the disease. While more studies need to be performed to understand the full effects of sirolimus on this disease, it has the potential to have a significant role in the treatment of Gorham.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

321 - Poster
Classification: TCOM DO Student (4th Year)
Presenter: Zahra Merchant
Department: TCOM: Pediatrics
Authors: Zahra Merchant; Ricardo Guirola, MD; Maria Perez, MD; Anish Ray, MD

Trial of Anakinra in Secondary Hemophagocytic Lymphohystiocytosis

Background: Hemophagocytic lymphohystiocytosis (HLH) is is an uncommon yet potentially devastating systemic disease, arising from uncontrolled activation of the immune system. Secondary HLH can be triggered by malignancy, metabolic disease and infection. Use of the IL-1 receptor antagonist, anakinra, has shown some promise in the treatment of this disorder. Interleukin-1 receptor antagonists such as anakinra have been used effectively in the treatment of pediatric rheumatoid arthritis. We hypothesize that this immunomodulator can also successfully treat patients with secondary HLH. This case series describes the diagnosis, progression, and therapy of three patients at Cook Children's Medical Center with secondary HLH.

Case Information: Three patients within the Cook Children's network were diagnosed with HLH between 2014 and 2016 and treated per HLH-2004 protocol. The 1st patient, diagnosed with HLH at age 10, sustained relapse after five weeks of therapy with etoposide and dexamethasone, requiring reintensification. Thereafter, she developed fever, body aches and cytopenias with eventual diagnosis of juvenile rheumatoid arthritis, treated with prednisone and Anakinra, leading to remission. Thereafter, she was treated with tociluzumab, progressively weaned and now discontinued for several months, given continued remission. The 2nd patient, 16-year-old male, completed treatment for HLH followed by rising levels of ferritin generalized erythematous rash, swollen right elbow with erythema and pain. At that time, he was diagnosed with systemic rheumatoid arthritis and treated with Anakinra daily. He is currently in remission while continuing Anakinra for 10 months. The 3rd patient, 12-year-old female with past medical history of type 1 diabetes and idiopathic juvenile arthritis, was diagnosed with EBV driven HLH, treated with dexamethasone, etoposide, and rituximab. As part of workup, she was found to have depressed NK cell activity. She presented a year later with symptoms concerning for recurrence of HLH. Given her history of juvenile idiopathic arthritis, she was treated with Anakinra with resolution of her symptoms. She remains in remission for over two years.

Conclusions: The diagnosis of HLH can be elusive and is often accompanied with multiple systemic manifestations. For those patients with a concurrent diagnosis of Juvenile Rheumatoid Arthritis, the introduction of anakinra has shown significant improvement in both arthritic symptoms and HLH markers.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

322 - Poster
Classification: Dual Degree Student
Presenter: Rohan Joshi
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Rohan P Joshi; Jana B Lampe; Amalendu Ranjan; Jamboor Vishwanatha

Bioengineered Mesenchymal Stem Cell Exosome-Coated Polymeric Nanoparticles for the Treatment of Triple Negative Breast Cancer

Background: Metastasis is the leading cause of death in breast cancer worldwide. Although there have been many new agents approved for metastatic breast cancer, they are poorly efficacious. Mesenchymal stem cells (MSC) and their exosomes play a role in the tumor microenvironment and they may have tumor homing properties. Our goal is to bioengineer MSC exosome-coated polymeric nanoparticles (BioExoNP) to deliver a chemotherapeutic drug for targeted therapy of TNBC.

Methods: To isolate the MSC exosomes, we grew MSC cells in exosome free media and used ultracentrifugation at 100,000 x g for exosome isolation. We used Dynamic Light Scattering (DLS) for size analysis, polydispersity index (PDI) and zeta potential (ZP). Western blotting was used for exosomal protein identification. PLGA polymeric nanoparticles were formulated using the microfluidic based Nanoassembler. Their size, PDI and ZP were obtained using DLS. To make the coated NP we used an extrusion method. High performance liquid chromatography was used for drug loading and encapsulation efficiency.

Results: The MSC exosomes had a size of 77 nm, ZP of -14 mV, and PDI of 0.24. The NP also have similar results with a size 76 nm, and PDI of 0.2, however the ZP was -38. Our exosome sample was positive for known exosomal proteins and negative for all other extracellular vesicle markers. After extrusion, the ZP of our sample was closer to -14 mV which, tells us that our sample was coated in exosomal membrane. However, after extrusion we did obtain three populations of NPs: bare NPs, coated NPs and just exosomes. Our sample was further purified using centrifugation.

Conclusion: In this study, we have demonstrated that exosome-coated polymeric nanoparticles can be successfully formulated with optimal characteristics. These hybrid nanoparticles were stable and uniform. In future applications, we will use this platform to formulate BioEXoNP and evaluate its therapeutic potential using in vitro and in vivo studies.

Sponsor: CPRIT
IRB/IACUC/IBC#: 2017-0025, 2018-0007

Cardiovascular (Abstracts in the 400s)

400 - Poster
Classification: Dual Degree Student
Presenter: Dianna H. Nguyen
Department: GSBS: Physiology & Anatomy
Authors: Dianna H Nguyen; Sissy Cross; Lei A Wang; Steve Mifflin

Preliminary Findings on Sex Differences in Response to Various Acute Stressors in Male and Female Mice

Purpose: Studies in both humans and animals have shown that pre-menopausal females are protected against the hypertensive and sympatho-excitatory effects of stress. Our goal was to identify whether sex difference exists between male and female mice in response to various acute stressors.

Methods: Adult male (n=4) and female (n=4) C57BL/6J mice underwent telemetry implantation (HD-X10, DSI) surgery and allowed 1-week recovery. Each day the mice were exposed to 1 of 5 acute stressors (acute restraint, hypoxia, new cage, cold, or forced swim). Mice were allowed 1-2 days of recovery between stressors. Acute restraint: placing the mouse in a conical tube for 30 min; hypoxia: exposing the mouse to 20 min of 8% O_2; new cage: placing the mouse in an empty cage with no bedding for 30 min; cold: exposing the mouse to 1-4C for 30 min; forced swim: placing the mouse in a water-filled beaker for 10 min. Mean arterial pressure (MAP), heart rate (HR), and activity were recorded and data analysis (2-way repeated measures ANOVA followed by Holm-Sidak) was performed.

Results: Acute restraint: male mice responded with peak MAP of 135±4, peak HR of 768±21, and peak activity of 0.00±0.0; whereas female mice responded with peak MAP of 131±2, peak HR of 749±21, and peak activity of 0±0.0. Hypoxia: male mice responded with peak MAP of 122±4, peak HR of 780±6, and peak activity of 0.50±0.3; whereas female mice responded with peak MAP of 131±1, peak HR of 784±18, and peak activity of 0.50±0.3. New cage: male mice responded with peak MAP of 137±7, peak HR of 789±8, and peak activity of 1.75±0.5; whereas female mice responded with peak MAP of 137±4, peak HR of 790±3, and peak activity of 1.50±0.3. Cold: male mice responded with peak MAP of 133±4, peak HR of 800±9, and peak activity of 1.00±0.4; whereas female mice responded with peak MAP of 137±7, peak HR of 797±14, and peak activity of 1.50±0.3. Forced swim: male mice responded with peak MAP of 136±5, peak HR of 729±30, and peak activity of 1.50±0.3; whereas female mice responded with peak MAP of 134±5, peak HR of 694±7, and peak activity of 1.25±0.5.

Conclusions: In this preliminary study, no significant sex difference was observed in male and female mice in response to the various acute stressors, however there was a trend for sex difference in MAP during acute restraint stress. This study needs to be repeated to increase sample size before further conclusions can be made.

401 - Poster
Classification: GSBS Student
Presenter: Garen K. Anderson
Department: GSBS: Physiology & Anatomy
Authors: Garen Anderson; Alexander (A.J.) Rosenberg; Victoria L. Kay; Justin D. Sprick; Caroline A. Rickards

Are Spontaneous Low Frequency Oscillations in Arterial Pressure and Cerebral Blood Flow Associated with the Protection of Cerebral Tissue Oxygenation during Simulated Hemorrhage?

Introduction: Prior studies have independently demonstrated that subjects with higher tolerance to simulated hemorrhage elicited by lower body negative pressure (LBNP) exhibit maintenance of cerebral tissue oxygenation, and higher amplitude in spontaneously generated low frequency (~0.1 Hz) oscillations in arterial pressure and cerebral blood flow. We hypothesized that these two independent observations are related, wherein subjects with higher tolerance to LBNP would exhibit increased low frequency power in arterial pressure and cerebral blood flow, which may contribute to the protection of cerebral tissue oxygenation.

Methods: Healthy male (n=19, 25±1 y) and female (n=13, 28±1 y) subjects participated in a stepwise LBNP protocol to pre-syncope. Mean arterial pressure (MAP), middle cerebral artery velocity (MCAv), cerebral tissue oxygen saturation (ScO$_2$), and end tidal CO$_2$ (etCO$_2$) were measured continuously. Subjects were classified as high tolerant if they completed the -60 mmHg step of LBNP. Low frequency oscillations in MAP and MCAv were assessed in the 0.04-0.15 Hz range. Both time and frequency domain data were analyzed using a linear mixed model analysis of variance with Tukey post hoc tests. Comparisons were made at baseline across LBNP stages (-15, -30, -45, and -60 mmHg).

Results: Of the 32 subjects tested, 20 were classified as high tolerant and 12 as low tolerant. No differences were observed between high and low tolerant subjects in MAP (P=0.28), low frequency power of MAP (P=0.13), or low frequency power of MCAv (P=0.24) during LBNP. However, high tolerant subjects exhibited greater protection against reductions in ScO$_2$ (P2(P

Conclusion: Contrary to our hypothesis, low frequency oscillations in MAP and MCAv did not account for the observed protection in ScO$_2$ for high tolerant subjects. Rather, maintenance of oxygen delivery (indexed via MCAv) appeared to account for the protection in cerebral oxygenation in this cohort of young, healthy subjects.

402 - Poster
Classification: Postdoctoral Fellow
Presenter: Gef Farmer
Department: GSBS: Physiology & Anatomy
Authors: George E Farmer, Jr; Joel T Little; Alexandria B. Marciante; J. Thomas Cunningham

Contribution of K+/Cl- Cotransporters in AT1aR Dependent GABAa Inhibition in the MnPO Following Chronic Intermittent Hypoxia

Purpose: Chronic intermittent hypoxia (CIH) is an animal model that simulates the hypoxemia seen in obstructive sleep apnea (OSA). Rats exposed to CIH exhibit an increase in blood pressure during periods of normoxia, similar to that observed in OSA. The median preoptic nucleus (MnPO) exhibits increases in Angiotensin type 1a receptor (AT1aR) mRNA following CIH and blocking this increase in AT1aR mRNA prevents the sustained increase in blood pressure. Here we investigate the role of AT1aR in the MnPO and the contribution of the K+/Cl- cotransporters KCC2 and NKCC1 on excitatory/inhibitory balance in rats subjected to CIH.

Methods: Under isoflurane (2-3%) anesthesia, male Sprague-Dawley rats (250-350g) received microinfusions (0.4 µL) of recombinant AAV construct containing GFP reporter and shRNA against AT1aR (AT1aKD) or an AAV containing the GFP reporter and a shRNA scramble (Scr) targeted to the MnPO. After recovery, rats were subjected to 7 days of CIH (0800-1600 hrs). The CIH protocol consisted of 6 min cycles (3 min 21% O2, 3 min 10% O2) repeated 10x/hr for 8 consecutive hrs (during the normal inactive/sleep phase) on 7 consecutive days. After 7 days CIH, the rats were anesthetized with isoflurane (2-3%) and coronal slices (300 µm) containing the MnPO were cut using standard in vitro slice procedures. Loose patch recordings were obtained from GFP labeled neurons using glass micropipettes containing aCSF as the internal solution (1-3 MΩ). Spontaneous action potentials (APs) were recorded in response to muscimol (100uM, 30s).

Results: The GABAa agonist muscimol decreased AP activity of neurons from normoxic/Scr rats. GABAa inhibition was blunted in neurons from CIH/Scr and normoxic/AT1aKD rats. However, GABAa activation from neurons in the CIH/AT1aKD group produced an increase in spontaneous activity. KCC2 block reduced GABAa mediated excitation in CIH/AT1aKD but had no effect GABAa mediated inhibition in CIH/Scr. NKCC1 block reduced GABAa mediated excitation in CIH/AT1aKD and facilitated GABAa mediated inhibition in CIH/Scr.

Conclusion: The current study shows AT1aKD mediated reduction in GABAa inhibition is exacerbated such that GABAa activation is excitatory following CIH. KCC2 and NKCC1 contribute to GABAa mediated excitability in CIH/AT1aKD but only NKCC1 contributes to attenuated GABAa function in CIH/Scr. Future studies will address the influence of reduced AT1a signaling and reduced GABAa mediated inhibition on downstream targets of the MnPO.

403 - Poster
Classification: Resident (Not for Competition)
Presenter: Karan Gupta
Department: Other
Authors: Aman Patel; Ahsan Khan; Karan Gupta; Aaron Timins; Douglas Johnson; Daniel Jipescu; Som Aftabizadeh; Kimberley Wilson; Senthil Thambidorai; Sanjeev Nair

Impact of left atrial appendage (LAA) morphology on Outcomes of WATCHMAN device implantation (LMOW study)

Purpose: Left atrial appendage occlusion (LAAO) with a WATCHMAN device is approved to be used in atrial fibrillation (AF) patients who are not good candidates for long term oral anticoagulation therapy (OAT) as an alternative stroke prevention strategy. Over the years, a number of different trials have addressed the various aspects of LAAO procedure, but there is still not enough literature on the impact of LAA anatomy on procedural outcomes of WATCHMAN device implantation. Besides shape, the location and orientation of LAA is a significant determinant of the complexity and success of the procedure. Chicken wing morphology has well been described as a particularly challenging anatomy from an interventional standpoint. We would like to assess the impact of the LAA morphology, as per a prior accepted classification (Chicken Wing, Cauliflower, Wind Sock or others), on the intraprocedural outcomes including procedure success, duration, compression ratio, number of devices used and major complications in the periprocedural period.

Methods: A single center observational study from individual institutional registries attempting to assess the impact of LAA anatomy on outcomes after WATCHMAN device implantation. Procedural outcomes, as mentioned above, will be compared between patients with and without chicken wing LAA anatomy.

Results: A number of 77 patients were found in our registry between September 2015 and April 2018, out of which 31(40%) had Windsock, 31(40%) had Cauliflower and 15(19%) had Chicken wing morphology. All of them had 100% successful implantation. The mean duration was noted to be 74.8 minutes with 1.065 number of attempts (NOA) for the patients with Cauliflower, 72.3 min with 1.294 NOA for the Chicken Wing and 70.3 minutes with 1.182 NOA for the Windsock.

Conclusion: After a thorough analysis of 77 patients it was noted that the patients with Cauliflower morphology had the longest duration of the procedures but had the least number of attempts. The patients with Chicken wing morphology had the highest number of attempts and the patients with Windsock had the lowest duration of implantation. Although the patients with the Cauliflower morphology took the longest time to be implanted having the lowest number of attempts might decrease the risk of complications. We recommend a more extensive analysis with a larger sample of patients to be able to find a significant correlation.

Sponsor: N/A
IRB/IACUC/IBC#: MCFW-IRB

404 - Poster
Classification: Resident (Not for Competition)
Presenter: Ahsan Khan
Department: Other
Authors: Aman Patel; Ahsan Khan; Daniel Jipescu; Satish Chandraprakasam; Senthil Thambidorai

Stiff Left Atrial Syndrome Masquerading as Mitral Stenosis

Background: Stiff left atrial syndrome first described in 1988 by Pilote et al. and co in JACC is an uncommon condition that could have similar presentation to congestive heart failure with preserved EF and often missed if not considered as differential diagnosis of patient with heart failure symptoms especially in setting of past history radiofrequency ablation (RFA) for atrial fibrillation (Afib). We present a case of stiff left atrial syndrome that masqueraded as bioprosthetic mitral valve (MV) dysfunction and required multimodality imaging to diagnose this disease (1).

Case Description: The patient is a 79-year-old female with a past medical history of permanent Afib, paroxysmal atrial flutter, bioprosthetic MVR along with 1 vessel coronary artery bypass graft surgery. 2 years ago, she underwent a pulmonary vein isolation (PVI) radiofrequency ablation (RF) with roof line, posterior inferior line and cavotricuspid isthmus ablation. Recently, she developed progressive dyspnea on exertion (NYHA class III). A transthoracic echocardiogram appeared to show increased mitral valve gradient. She was brought to our institution for left and right heart catheterization followed by transesophageal echocardiogram (TEE).During cardiac catheterization, simultaneous recording of left ventricular pressure and pulmonary capillary wedge pressure (PCWP) demonstrated an elevated transmitral mean gradient of 13.15 mmHg and a calculated effective orifice area of 0.64 cm2. The PCWP was elevated at 25 mmHg, the mean pulmonary artery pressure was elevated at 31 mmHg and the left ventricular end diastolic pressure (LVEDP) and pulmonary vascular resistance were normal. Conversely, a TEE showed a normally functioning MV with no hemodynamically significant stenosis (mean gradient 4 mm Hg). Computed tomography angiography did not show evidence of iatrogenic pulmonary vein stenosis to explain these discordant findings but confirmed an enlarged left atrium (LA). Due to her history of mitral valve replacement and RF ablation, we determined that Stiff Left Atrial Syndrome was the likely cause of the patient's symptoms.

Discussion: Stiff left atrium syndrome is a condition that is caused by scarring and fibrosis of the LA leading to decreased compliance. It clinically manifests as pulmonary edema and dyspnea on exertion and is often difficult to discern from diastolic heart failure of other common etiologies. Pulmonary hypertension may develop from this condition as well (1,3). It was initially described in relation to mitral valve replacement surgery and maze procedure, but now being recognized to be caused by radiofrequency ablation for atrial fibrillation. Hemodynamically, there is often elevated pulmonary artery pressures, elevated PCWP and normal LVEDP. A large v wave may be seen in PCWP tracings. In our patient, the elevated PCWP to LVEDP gradient and inaccurate effective orifice area were likely due to elevated LA pressure caused by extensive scarring and noncompliance rather than a problem with the MVR. Pulmonary vein stenosis and mitral valve stenosis must be ruled out, as it was with our patient (1). There are no proven therapies for Stiff Left Atrial Syndrome, but diuretics are primarily used. Creation of an atrial septal defect to relieve LA pressure has been tried experimentally (1,2).

Sponsor: N/A
IRB/IACUC/IBC#: N/A

405 - Poster
Classification: Resident (Not for Competition)
Presenter: Aman Patel
Department: Other
Authors: Aman Patel; Mark Chou; Daniel Jipescu

"Posterior STEMI- The solar eclipse of EKG". How to uncode and not miss it

Background/Abstract: The clinical presentation of posterior myocardial infarction (PMI) is not always easy, not even for the cardiologist. True posterior myocardial infarction is difficult to recognise because the leads of the standard 12-lead electrocardiogram are not a direct representation of the area involved. Only with indirect changes in the precordial leads as such the diagnosis can be suspected. It is suggested to be one of the most commonly missed types of acute myocardial infarction (MI) electrocardiographic patterns.

Case Report: A 47-years-old caucasian former 22 pack per year smoker with no significant PMHx presented with complaint of upper back pain radiating to both shoulders that started during a business meeting. He went home had some beers and rested. He slept and woke up at 11:30PM with severe pain in b/w shoulders: sharp, 10/10, constant with no aggravating or alleviating factors. The pain progressed to involve his both arms and chest and he got worried, therefore, decided to go to the ED where EKG changes and troponin elevation were noted. He reported nausea, palpitations. Denied SOB, diaphoresis, fever, cough, chills, physical exertion, trauma. His father had an MI at 53 yo. EKG was noted with: ST/T depression in inferolateral leads with loss of T wave balance in V1 and R wave in V2 taller than V3. Troponin elevation to 2.25 . The patient was taken emergently to cardiac cath and he was noted to have: patent Left main artery, patent left anterior descending artery, mild disease in the mid right coronary artery, and 100% occlusion of the Left Circumflex coronary artery. A drug eluting stent was placed.

Discussion/Conclusion: True isolated posterior STEMI is rare and comprises of 3% of total STEMI and missed frequently in ER as well as in patient setting. Posterior STEMI associated with inferior or lateral MI is very common and comprises of 20% of the STEMI cases and usually not missed due to STEMI changes in inferior or lateral leads. Missed STEMI leads to increased cardiac morbidity and mortality and thus for clinicians it is very important to read each and every EKG for the patients presenting with suspected coronary disease. Our patient had back pain and first clinical impression was aortic dissection that was ruled out with CXR and urgent TTE. With back pain, elevated troponins and Tall R wave in lead V2 in the absence of any other causes of elevated troponin, posterior STEMI was suspected leading to emergent LHC that was suggestive of total occlusion of circumflex artery that was stented with a drug eluting stent with good flow was noted after that (TIMI 3 flow). Patient did well and was discharged home on same day with maximal medical therapy.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

406 - Poster
Classification: Resident (Not for Competition)
Presenter: Aman Patel
Department: Other
Authors: Aman Patel; Ahsan Khan; Karan Gupta; Kimberly Wilson; Daniel Jipescu; Anand Subramanian; Senthil Thambidorai; Douglas Johnson; Aaron Timins

Safety and Efficacy Analysis of Balloon Cryoablation vs Radiofrequency Ablation in Atrial Fibrillation: A Retrospective Analysis. (SECARA AFib TRIAL)

Background: According to the ACC/AHA/HRS guidelines, Pulmonary-Vein Isolation has become the cornerstone approach in ablation for patients with medication refractory paroxysmal atrial fibrillation. (Class 1). Radiofrequency ablation is the most frequently employed technology followed by balloon cryoablation. According to multiple, smaller studies in recent past, both procedures have similar efficacy in terms of recurrence with little difference in complication rate. The FreezeAF trial, a 5-year observational study from 2011-2016 involving 4,073 patients, showed a better safety profile with radiofrequency ablation with lower rates of phrenic-nerve injuries in comparison to those of balloon cryoablation. However, some studies have shown that the rate of perforation was higher with thermal ablation. The landmark FIRE AND ICE Trial, a multicenter randomized controlled noninferiority trial of almost 800 patients published in 2016 in NEJM by Karl Heinz et al. showed a similar result in terms of efficacy and end safety result between the two. A systematic review of 7200 patients by Yi-He Chen et al. concluded that cryoablation has fewer rates of atrial fibrillation recurrence, shorter procedural duration and similar fluoroscopy times. Similar other studies are favoring the use of balloon cryoablation due to lower rate of hospitalizations, repeat ablation, and cardioversions.

Methods: Retrospective single center chart review.

Results: Cryoablation (n -139) vs RF (n -507)
MACE - (OR 2.62, p: 0.045, CI: 1.1 - 6.28)
Non cardiac ADEs (OR 6.47, p: 0.0029, CI 2.3098 - 18.1395)
Death: (1 vs 2, OR 1.84, p: 0.52, CI: 0.16-20.28)
Efficacy: Persistent afib at discharge: (OR 1.69, p: 0.08, CI: 0.85-3.07)
Mean Contrast volume: (78 cc vs 4.48 cc, p < 0.0001)
Mean LA volume: (3.94 vs 4.59)
Mean Fluoroscopy time: (31 vs 32 mins, p: 0.86)

Conclusion: In our retrospective single-center study, patients who underwent cryoablation for pAF had a statistically significant higher incidence of MACE and noncardiac ADEs. There was no significant difference in mortality rates or primary efficacy.

Sponsor: N/A
IRB/IACUC/IBC#: MCFW-IRB

407 - Poster
Classification: School of Health Professions Student
Presenter: Emily Brown
Department: School of Health Professions: Physician Assistant Studies
Authors: Emily B. Brown; Madison A. Pryor; Brittany N. Ho; Bryanne R. Rudder; Jessica L. Hartos

Does Physical Health Differ by Weight Status in Females Ages 55-79 with Coronary Heart Disease (CHD)?

Purpose: There is a higher prevalence of poor physical health and obesity in older adult populations and females, but there is limited research of this relationship. The purpose of this study is to assess the relationship between physical health and weight status in females ages 55 to 79 with coronary heart disease (CHD) in the general population.

Methods: This study is a cross-sectional analysis using data from the 2016 Behavioral Risk Factor Surveillance System (BRFSS) for 958 females ages 55-79 years old with CHD from the states of Alabama, Georgia, Kentucky, Louisiana and Oklahoma. Ordered logistic regression using combined state data examined the relationship between physical health and weight status, while controlling for the health conditions, mental health, physical activity, smoking status, age, race, education, employment status, and state.

Results: The results showed about half of the participants reported poor physical health (40-50%), and the majority reported a BMI classified as obese (45-60%) or overweight (33-40%). Adjusted results indicated that there is an inverse relationship between weight status and physical health. In addition, number of health conditions, mental health, physical activity, and smoking status were all related to physical health in the target population.

Conclusion: The results showed that weight status was moderately related to physical health in older females with CHD. These results may generalize to primary care for women 55-79 years old with CHD. In practice, clinicians may expect a moderate proportion of patients in this target population to report poor physical health, and overweight or obese BMI. Because of moderate relations between them, providers should screen for both if presented with symptoms of either. Given the small proportion and relationship between physical health and smoking, clinicians should continue to screen for smoking in this population. In addition, clinicians can expect moderate proportions of good mental health and physical activity. Since these are highly related to physical health, providers should screen for all if presented symptoms of one. Given the results, clinicians should recommend weight loss, smoking cessation, improving mental health, and increasing physical activity to better physical health.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

408 - Poster
Classification: School of Public Health Student
Presenter: Helen Orimoloye
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Helen T Orimoloye; Oluwatimilehin Okunowo; Ndolembai Njesada; Ambe Solomon; Sulaimon Bakre

Relationship between Sleep Duration and Hypertension in US Adults using Age- and BMI-Stratified Models

Background: Hypertension is a strong risk factor for cardiovascular disease and mortality. Previous research has confirmed the relationship between sleep duration and hypertension. However, there are unanswered questions on how this relationship is affected by age and body mass index (BMI).

Purpose: To examine the association between sleep duration and hypertension in US adults and investigate interaction by age and BMI.

Methods: Data from the National Health Interview Survey (NHIS) between 2014 and 2017 was analyzed for adults aged 18 years or older (n=130,139). Sleep duration was categorized as short (hours) or long (>9 hours). Multivariable logistic regression estimated the likelihood of hypertension associated with short or long sleep duration relative to the National Sleep Foundation's recommended 7-9 hours.

Results: After adjusting for potential confounders, short sleep was associated with higher odds of hypertension (OR: 1.68, 95% CI: 1.35-2.02). Although not statistically significant, long sleep was also associated with higher odds of hypertension (OR: 1.19, 95% CI: 0.71-1.67). A significant sleep x age and sleep x BMI interaction was noted (p

Conclusions: Short sleep duration is a significant risk factor for hypertension in the United States. This relationship is mediated by age and BMI and is especially notable in middle-aged and underweight adults.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-104

409 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Heather DeVille
Department: TCOM: Internal Medicine & Geriatrics
Authors: Heather D. DeVille, MS; Conner D Reynolds, MS; Kevin P Thompson, MS; Nancy Tierney, PhD, RN, ACNP

Sinus Node Dysfunction in a Young Female Without Identifiable Risk Factors

Background: Sinoatrial Node Dysfunction (SND) is a multifactorial disorder leading to symptomatic bradycardia and asystolic pauses. Epidemiological studies estimate the SND annual incidence at 0.8 per 1,000 person-years, with the majority of cases occurring over 75 years old.

Case Presentation: A 32-year-old Caucasian female presented to the emergency department with sharp, episodic chest pain, radiating to the mid-back and jaw. Her episodes were associated with dizziness, diminished vision, and syncope, lasting approximately 5 minutes before resolving spontaneously. She had a history of PVCs, uncomplicated C-section, & LARC placement, but not for tobacco use, DVT/PE, CAD, immobilization, or cancer. Laboratory studies revealed prolonged PT (12.7), but troponin series, PTT, TSH, BNP, CBC, magnesium, I-STAT 6, and urine hCG were within normal limits. ECG showed sinus bradycardia. She was discharged home to follow up with electrophysiology. Two days later, episodes began occurring with higher frequency and shorter latency, necessitating admission to the cardiac intensive care unit. On admission, she appeared lethargic with a HR of 41bpm, BP of 108/60, and O2 saturation of 98%. Secondary assessment revealed normal heart sounds with no rubs, gallops, or murmurs. Laboratory assessment revealed prolonged PT and isolated lymphopenia (22.9%), but troponin series was within normal limits. ECG showed no ST-changes or T-wave inversions. Echocardiogram showed no evidence of valvular or structural heart disease. On Day 2, CBC revealed leukopenia (4,900mc/L) and CMP revealed low AST (10), calcium (7.6), albumin (3.1), and total protein (5.3), as well as high BUN/Cr (21.7). On Day 3, Lyme, Lupus Anticoagulant, and Rheumatoid Factor titers were within normal limits. BUN/Cr levels had also returned to 11.7. Coronary artery angiogram showed no evidence of aneurysm or pathologic vessel narrowing. Continuous telemetry showed an average heart rate of 50bpm while awake and 30bpm while asleep. Upon ambulation she achieved 66bpm, but was so fatigued afterwards that she had to return to bed. Given the degree of bradycardia and intolerance to ambulation, the decision was made to proceed with dual-chamber pacemaker implantation. The device was successfully placed without intraoperative complications.

Conclusions: This case illustrates a unique presentation of SND in a highly atypical age group without contributory medical history or identifiable risk factors.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

410 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Hamza Malik
Department: Non-UNTHSC
Authors: Hamza Malik; Mark Chou, DO; Farhan Ali, MD

Treating Rare mid femoral pseudoaneurysm after chronic total occlusion revascularization.

Background: Arterial pseudoaneurysms (PSAs) are rare complications of endovascular procedures.They are characterized by a defect in vessel wall layers which may result in severe pain, nerve compression or even hemodynamic instability. Treatment is dependent on the size of the lesion with larger defects at higher risk for expansion or rupture. Typical treatments include manual compression, thrombin injection or open vascular repair.Usually PSAs arise at puncture sites in the common femoral artery (CFA). In this case report, we present a unique scenario of a PSA resulting from endovascular repair of mid-superficial femoral artery (SFA) chronic total occlusion by re-entry from the sub-intimal space. This case describes use of a Viabahn covered stent to occlude a mid SFA PSA successfully.

Case information: 73-year-old male with a history of severe COPD, ischemic heart disease, and 30-year history of smoking presented with severe left lower extremity claudication progressively worsening over the last year. Due to comorbidities, he was deemed too high risk for surgical bypass and instead, underwent a complex intervention requiring complete revascularization with angioplasty and stenting from a transpedal approach with contrast staining of the subintimal space. One week post-operatively, he presented back in the ER with severe mid-thigh pain. Arterial Doppler showed the patent left SFA stent, with a large PSA in the mid-left SFA at the prior location of subintimal injury during revascularization. A decision was made to attempt percutaneous covered stent placement to occlude the neck of the PSA. A Viabahn stent was deployed successfully across the PSA and within the previously placed Supera stent without complication. Post-dilation was performed with excellent final angiographic result that showed patency of the SFA with successful exclusion of the PSA. The patient had immediate improvement in pain and was back to baseline one week later.

Conclusions: Although rare, PSAs found in the mid-SFA are an ideal location for correction with covered stent. Covered stents offer low risk and high reward rates, and identify a viable new treatment modality that could potentially replace the need for open surgical repair in the correct patient population. Additionally, this minimally invasive approach could be a viable treatment option for PSAs in locations not easily amenable for standard methods of repair.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

411 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Kyle Ames
Department: TCOM: Medical Education
Authors: Taylor WB Blackwood; Kyle S Ames; Cara Fisher, Ph.D

Variant of Left Vertebral Artery Origin and Transverse Foramina Entry

Background: Variations in the origin, course, and transverse foramina entry of the left vertebral artery(LVA) are well documented in literature. The LVA usually originates from the left subclavian artery and courses through the neck to enter at the C6 transverse foramina. While variants of the LVA are not known to cause pathological problems, knowledge of the common variants is of great use to diagnostic radiologists, interventional radiologists, and cardiologists.

Case Information: During routine dissection of a 67 year-old white female cadaver, a variant left vertebral artery was discovered. This variant was found to branch off the arch of the aorta between the left common carotid and left subclavian artery, instead of its typical origin from the left subclavian artery. Additionally, we noted that the LVA entered at the transverse foramina of the C4 vertebrae instead of its usual entry point at C6. Although a complete medical history was unable to be obtained, no other significant arterial variants were noted. However, the cadaver did possess extensive right lower extremity varicose veins, which we suspect are unrelated. The cause of death was noted to be metastatic pancreatic cancer.

Conclusions: This study serves to add to the expanding body of knowledge surrounding anatomical variations of the vertebral artery including its origins and transverse foramina entry point locations. The left vertebral artery originating from the aortic arch occurs in approximately 6% of the population, but these variations are not recognized to cause problems for those individuals, assuming there is no hypertrophy or atrophy of the arterial wall. The transverse foramina entry point in this cadaver was noted to be C4, higher than the normal C6 entry point. Komiyama et al. found an incidence of dissection of 1.7% for vertebral arteries arising from the aortic arch, as opposed to .9% in the general population for those with the appropriated normal anatomy. While the exact reason has yet to be elucidated, it is hypothesized that this is due to the association of vertebral arteries off the aortic arch traveling farther in the neck to C3 and C4, thus predisposing individuals to increased stress on the vasculature allowing for dissection. For these reasons diagnostic radiologists, interventional radiologists, and cardiologists should be acutely aware of the common variants to improve diagnosis, treatment, and reduce potential complications.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

412 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Andrew Nguyen
Department: TCOM: Pediatrics
Authors: Andrew Nguyen, M.Eng; Steve Muyskens, MD, FACC, FSCMR; Tyler Hamby, PhD

Beyond Magnetic Resonance Angiography in Anomalous Aortic Origin of the Coronary Arteries: Additive Value of Late Gadolinium Enhancement

Purpose: Anomalous aortic origin of the coronary arteries (AAOCA) is a common cause of sudden cardiac death (SCD) in young athletes. The prevalence, pathophysiology, and optimal method of risk stratifying AAOCA are unknown. Coronary magnetic resonance angiography (MRA) has been shown to reliably define anatomical features. However, studies evaluating current methods of detecting inducible or chronic ischemia in patients with AAOCA are lacking. We present our institutional experience utilizing late gadolinium enhancement (LGE) as an adjunct to exertional symptoms, exercise stress testing (EST), and single-photon emission computed tomography (SPECT) for risk stratifying high-risk AAOCA.

Methods: A retrospective review was conducted of all patients referred for evaluation of possible AAOCA by cardiac magnetic resonance imaging (CMR) between January 2011 and December 2017. Patients with high-risk coronary anatomy were included; patients with complex congenital heart disease were excluded. High-risk AAOCA was defined as the presence of interarterial or intramural features. We assessed the utility of risk stratifying high-risk AAOCA by LGE, SPECT and exertional symptoms. Validity of SPECT in detecting affected coronary vascular territories was also examined. Chi-square test of independence was used for statistical analysis.

Results: There were 74 patients evaluated for possible AAOCA (median age 14.3 years; 69% male); 40 met high-risk inclusion criteria (34 right, 6 left). SPECT was performed in 33 patients, and EST in 36 patients. Exertional symptoms were present in 11 patients. One patient with aborted SCD had subepicardial LGE, most consistent with myocarditis. No additional patients had baseline ventricular dysfunction or LGE findings on CMR. Risk stratification by exertional symptoms or coronary variant revealed no significant correlation to any markers of ischemia. Furthermore, SPECT was predominantly negative (70%), and 3 of 10 positive results did not correlate with the affected coronary vascular territory.

Conclusions: Our study demonstrates the difficulties in utilizing common techniques for risk stratification in patients with AAOCA. While coronary MRA has been shown to reliably assess coronary anatomy, CMR-derived LGE had no additive value in this cohort, and SPECT had a high false positive rate. A larger multicenter study including the utility of stress CMR would be beneficial in this patient population.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

413 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Tommy Li
Department: TCOM: Pediatrics
Authors: Tommy Z Li; James Kuo, MD; Tyler Hamby, PhD; Fadeke Ogunyankin, MBBS MPH CPH

Identifying Factors That May Affect Mortality of Infants with Hypoplastic Left Heart Syndrome

Purpose/Background: Hypoplastic left heart syndrome (HLHS) is a severe congenital heart defect that is fatal without surgical intervention. The CDC states that HLHS make up approximately 3% of all congenital heart defects and occur in about 3 babies per 10,000 live births. While studies have shown that survival rates are improving (5-10 year survival rate was 50-60% in 2001, 60-80% in 2014), there are still many factors that play a role in the outcome of patients born with HLHS that needs further investigation. This study aims to determine specific risk factors that may affect mortality in HLHS patients.

Methods: We conducted a retrospective cohort study of patients with HLHS who underwent Norwood surgery at Cook Children's Medical Center between January 1, 2007 and December 31, 2017. The variables included total length of intubation time (≥7 days vs.days), degree of atrial septal defect (restricted vs. intact), timing of HLHS diagnosis (prenatal vs. postnatal), and survival to initial discharge (alive vs. dead). These groups were compared using descriptive statistics and chi-square test of independence. A p-value

Results: There were 151 patients meeting study criteria and 124 (82.1%) survived to discharge. We found that patients who were intubated ≥7 days were less likely to survive to discharge (75.6% vs. 91.8%; p=0.01). RAS/IAS and timing of diagnosis was not significantly related to survival to initial discharge.

Conclusion: The results suggest intubation length may play a role in patient outcome and mortality, but we cannot state that there is a direct correlation from this study alone. Further analysis must be done in order to determine whether intubation length itself contributed to mortality or if confounding variables were responsible.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

414 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Mahnoor Javed
Department: TCOM: Medical Education
Authors: Mahnoor Javed; Jay Duncan; Tyler Hamby

Risk Factors Associated with Stroke in Pediatric Patients Undergoing Fontan Palliation

Purpose: Congenital heart disease is the leading known cause for stroke in childhood. The Fontan operation is performed as the third palliative procedure in patients who have complex single ventricle physiology. Patients undergoing Fontan Palliation are at risk for 3 types of strokes: watershed, embolic, or hemorrhagic. Stroke following Fontan Palliation can result in significant deterioration of functional ability. The incidence of this complication seemed higher at Cook Children's Medical Center (CCMC) as compared to a previous study done at Children's Hospital in Boston (2.6%). Therefore, the aim of our study is to identify variables contributing to the development of stroke and the risk factors associated with it. The hypothesis is that there are identifiable and potentially modifiable intra-operative and post-operative risk factors that are present in Fontan patients who have radiographic and clinical evidence of stroke.

Methods: This was a retrospective chart review of 149 pediatric patients who underwent Fontan Palliation at CCMC between 2007 and 2017. Exclusion factors were any patient undergoing revision of prior Fontan or death within 72 hours of the operation. Covariates included AV valve regurgitation, ventricular function, SVC pressure (pre and post op), and intraoperative change in hematocrit. A Fisher's exact test was used and p

Results: Overall 11% post-Fontan patients had a stroke, all of which were watershed infarcts. Stroke was statistically significantly associated with pre- and post-operative AV valve regurgitation, and depressed ventricular function. Cardiac bypass time, mean arterial pressure, SVC pressure (pre- and post-operative) and intraoperative changes in hematocrit were not significantly associated with stroke. Though the relationship wasn't significant, all stroke patients had a vasoactive infusion score greater than 5.

Conclusion: Pre-Fontan physiology is the single most important factor when determining the risk of developing a watershed infarct with Fontan procedure. AV valve regurgitation and depressed pre-operative single ventricular function are potentially the most significant risk factors for perioperative stroke. This information may be helpful in counseling families about potential post-operative complications.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

415 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Marcus A. Villarreal
Department: GSBS: Physiology & Anatomy
Authors: Marcus A. Villarreal; Michael L. Smith

Development of Predictive Model for Detection of Sleep Apnea in Underrepresented Minorities

Purpose: Obstructive Sleep Apnea (OSA) is a sleep disorder that is caused by recurrent upper airway closure and is highly associated with hypertension. OSA is also known to be underdiagnosed in the general population. Previous studies have shown that individuals with OSA experience hypoxia which leads to elevated sympathetic nerve activity (SNA) and arterial pressure (AP). The elevated SNA has been shown to directly correlate to an increased pressor response through voluntary apneas. This pressor response is exaggerated in OSA despite the degree of hypoxia that subjects are exposed to prior to the apnea. The current standard for the diagnosis of OSA is through polysomnography (PSG) which relies on a sleep laboratory and can be inaccessible to some patients. In order to minimize or reduce underdiagnoses, the elevated systolic AP observed in OSA patients during voluntary apneas could serve as alternative or adjunctive measure with PSG along with other predictors such as the Epworth Sleepiness Scale (ESS).

Methods: A combination of anthropometric data, STOPBANG, ESS and AP responses to voluntary apnea data were used to assess the predictive power for OSA in all populations. In order to achieve this, multiple regression analyses and estimations of specificity and sensitivity were determined from cohorts of patient data from sleep and of a previously collected data set. This data set includes participants with diagnosed OSA, Normotensive participants who do not have OSA, and undiagnosed participants.

Results and Conclusions: The preliminary findings from this pilot study suggest that 1) addition of the pressor response to apnea enhances predictive power for OSA and 2) the predictive power is equally strong in underrepresented minority and Caucasian populations.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-019

416 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Mitchell Petty
Department: GSBS: Physiology & Anatomy
Authors: Mitchell Petty; Brandon Cherry; Anh Nguyen; Imran Qureshi; Bryan McGee; Thomas Medrano; Albert Yurvati; Robert Mallet

Renal cortical antioxidant enzymes are not inactivated by cardiac arrest-resuscitation in pigs

Purpose: Cardiac arrest interrupts renal blood flow, and cardiopulmonary resuscitation (CPR) and restoration of sinus rhythm and renal perfusion may generate reactive oxygen species (ROS) that damage the kidneys. Cardiac arrest, CPR and cardioversion inactivate ROS-sensitive enzymes in heart and brain, but intravenous sodium pyruvate (PYR) treatment preserves the enzymes and prevents heart and brain injury. The impacts of cardiac arrest-CPR and PYR on ROS-sensitive antioxidant enzymes in renal cortex is unknown. This study tested the hypothesis that cardiac arrest-CPR-recovery inactivates, while PYR preserves, these renal enzymes.

Methods: Yorkshire swine (c. 30 kg) were intubated and mechanically ventilated with 1-3% isoflurane in O_2. Cardiac electrical activity was monitored by lead II electrocardiography. Cardiac pacing (60 Hz) produced ventricular fibrillation, and ventilation was suspended. From 6 to 10 min cardiac arrest, precordial chest compressions were applied (100/min), and then transthoracic DC countershocks were administered to achieve cardioversion, and ventilation resumed. PYR (n=7) or NaCl (n=6) were infused iv (0.1 mmol/kg/min) from 5.5 min cardiac arrest to 60 min recovery. Non-arrested sham pigs (n=9) also were studied. At 4 h recovery, the kidneys were excised, and renal cortex biopsied and snap-frozen in liquid N_2. The biopsies were pulverized and extracted in 1 mM phosphate buffer (pH 7.2). Extract activities of glutathione peroxidase (GP), glutathione reductase (GR), the anti-glycation enzyme glyoxylase-1 (GLO-1), and NADPH-generating glucose 6-phosphate dehydrogenase (G6PD) and isocitrate dehydrogenase (ICD) were assayed at 37°C by spectrophotometry and normalized to total protein.

Results: Contrary to our hypothesis, neither cardiac arrest-CPR-recovery, nor PYR treatment, produced statistically significant effects (single-factor ANOVA; a=0.05) on the enzyme activities (U/mg protein: mean±SEM): GP: sham 0.18±0.03, NaCl 0.25±0.07, PYR 0.15±0.02; GR: sham 0.21±0.04, NaCl 0.22±0.05, PYR 0.17±0.01, GLO-1: sham 4.45±0.40, NaCl 4.35±0.86, PYR 3.77±0.80, G6PD: sham 0.62±0.06, NaCl 0.69±0.14, PYR 0.52±0.13; ICD: sham 0.89±0.15, NaCl 1.15±0.28, PYR 0.99±0.12).

Conclusions: Ischemic and oxidative stress produced by 10 min cardiac arrest with 4 min CPR did not inflict sufficient ischemic and oxidative stress to inactivate the renal cortex's antioxidant enzymes, leaving no deficits correctable by PYR treatment.

Cell & Molecular Biology (Abstracts in the 500s)

500 - Poster
Classification: GSBS Student
Presenter: Jessica Proulx
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Jessica Proulx; Chaitanya Joshi; Vinod Labhasetwar; Kathleen Borgmann; Anuja Ghorpade

Poly lactic-co-glycolic acid (PLGA) mediated gene delivery to astrocytes requires arginine-modified polyethylenimine (PEI) polymer to facilitate gene expression

Purpose: The global burden of neurodegenerative diseases and disorders devastate not only their victims but also their loved ones. Astrocyte dysfunction is a hallmark of central nervous system injury or infection. As a primary contributor to neurodegeneration, astrocytes are an ideal therapeutic target to combat neurodegenerative conditions. Gene therapy has arisen as an innovative technique that provides excellent prospect for disease intervention. Poly lactic-co-glycolic-acid (PLGA) and polyethylenimine (PEI) are polymeric nanoparticles commonly used in gene delivery, each manifesting their own set of advantages and disadvantages. While PLGA nanoparticles are FDA approved and well established for their biocompatibility, they fail to facilitate exogenous gene expression in primary human astrocytes. Furthermore, PEI polymers illustrate high delivery efficiency but induce cytotoxicity. The purpose of this study is to develop viable and biocompatible nanoparticles for astrocyte-targeted gene therapy.

Methods: Successful gene expression by PLGA nanoparticles alone or in combination with arginine-modified PEI polymers (A_5P_{10}) was accessed by a luciferase reporter gene encapsulated in PLGA nanoparticles. Cytoplasmic release and nuclear localization were investigated using fluorescent confocal imaging with YOYO-labeled DNA. Nanoparticle-mediated cytotoxicity was assessed via lactate dehydrogenase (LDH) in primary human astrocytes and neurons.

Results: Confocal imaging of YOYO-labeled DNA confirmed PLGA nanoparticles delivered DNA to the cytoplasm in a dose and time dependent manner. However, co-staining revealed DNA delivered by PLGA did not localize to the nucleus. The addition of A_5P_{10} improved nuclear localization and successfully achieved gene expression in primary human astrocytes. Moreover, these formulations were biocompatible with both astrocytes and neurons.

Conclusion: By integrating two polymeric nanoparticles, we developed an improved system for gene delivery and expression in primary human astrocytes. These findings provide a biocompatible and clinically translatable method to regulate astrocyte function during neurodegenerative diseases and disorders.

501 - Poster
Classification: Postdoctoral Fellow
Presenter: Yan Fan
Department: GSBS: Pharmacology & Neuroscience
Authors: Yan Fan; Wei Zhang; Sai Chavala

Chemical Reprogramming of Mouse and Human Müller glia into Retinal Ganglion-Like Cells (RGCs)

Purpose: Glaucoma is a leading cause of irreversible blindness with increasing prevalence as the population ages. Glaucoma is characterized by loss of retinal ganglion cells (RGCs), and current therapies, whether surgical, pharmacological, or neuroprotective, do not reverse the degeneration. Stem cell approaches to replace lost RGCs are a viable option. However, the use of stem cells for RGC replacement currently faces several barriers: 1) absence of a safe, non-immunogenic, and ethical stem cell source of RGCs, 2) inefficient differentiation protocols that can take more than 40 days, and 3) RGC donor integration into the degenerate host retina are major issues that need to be overcome to be considered for clinical use. A radically new approach to restoring vision for glaucoma patients that can overcome these limitations would be to reengineer a resident cell in the retina, such as Müller glia, that could serve as a reservoir for new RGCs, and avoid the need for cell transplantation. In this study, we take the first step in realizing our long-term goal of using a chemically reprogramming strategy to replace lost RGCs and restore vision.

Materials and Methods: Primary Müller glia were isolated from mouse or human retina. Small molecules were purchased from Sigma or Cayman. For the in vitro studies, Müller glia were fixed after small molecule conversion with 4% PFA. Immunofluorescence staining was performed to detect RGC specific markers: Brn3a, Brn3b, ISL-1, RBPMS, and Tuj1. Total RNA was isolated and subjected for real-time PCR for detection of neuronal marker NeuN and RGC markers: Brn3a, Brn3b, ISL-1, NefH, and Nefl. For the in vivo studies, intravitreal injection was performed to deliver small molecules and other growth factors. BrdU was injected intravitreally or intraperitoneally to label proliferating and regenerating cells. 24 hours after the final injection, eyes were enucleated, fixed, and embedded for frozen sections. Immunofluorescence staining was performed to detect proliferation with BrdU and Ki67. After 7, 21, and 35 days of final injection, BrdU and RGC markers were co-stained to detect newly generated RGC-like cells.

Results: Both mouse and human Müller glia can be converted to RGC-like cells within 24 hours in vitro. In vivo injection of small molecule and growth factor cocktail into the vitreous stimulated cell proliferation, which was located between the outer nuclear layer and the inner nuclear layer where the cells stained positive with GFAP. After 7 days, BrdU positive cells migrated to the inner edge of INL. After 21 days, BrdU positive cells reached the ganglion cell layer (GCL) but no co-staining with a RGC marker was observed at this time point. Strikingly after 35 days, we detected co-stained BrdU and ISL-1 or RBPMS in the GCL. There was no retinal toxicity observed from the small molecule injection.

Conclusion: Our small molecule cocktail is highly efficient in converting mouse and human Müller glia to RGC-like cells in vitro, enabling us to generate RGC-like cells in approximately one day with more than a 90% conversion efficiency. The small molecule cocktail can be injected intravitreally to stimulate cell proliferation and RGC regeneration in vivo. Additional retinal toxicity testing will be needed to evaluate the safety profile of the intravitreal small molecule cocktail.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-0015

502 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Maryam Riaz
Department: TCOM: Medical Education
Authors: Maryam Riaz; Spencer C Cushen; Nicole R Phillips; Styliani Goulopoulou

Inhibition of Mitochondrial Respiratory Chain Complex I Induces Vascular Endothelial Cell Apoptosis and Release of Mitochondrial DNA

Purpose: Vascular endothelial oxidative stress is a common feature of preeclampsia, a pregnancy specific hypertensive syndrome with high incidence of maternal and fetal mortality and morbidity. Cellular oxidative stress can lead to cell death, which promotes the release of cellular constituents (e.g. mitochondrial fragments) into the extracellular space. Circulating cell-free mitochondrial DNA (mtDNA) concentrations are increased in pregnant women with preeclampsia. The main objective of this study was to determine the mechanisms by which vascular endothelial cells may contribute to this increase in cell-free mtDNA. The hypothesis was that mitochondrial complex I inhibition results in extrusion of mtDNA from vascular endothelial cells via cell death-dependent mechanisms.

Methods: Human umbilical vein endothelial cells (HUVEC, Lonza) were grown to 80-90% confluency before treatment with a mitochondrial complex I inhibitor (Rotenone: 5, 10, 25 µM - 4 h). Immunocytochemistry was used to confirm that HUVEC maintained endothelial cell characteristics. Cell death (apoptotic and non-apoptotic) was quantified using flow cytometry (staining for Annexin V and propidium iodide). mtDNA was measured on total nucleic acid extracts from cell culture supernatants using absolute real-time PCR techniques.

Results: Treatment of HUVECs with rotenone increased early apoptosis and late apoptosis/necrosis [5µM (n=7), Veh: 11.16 ± 1.96% vs Rotenone: 14.74 ± 1.96% p=0.0159; 10µM (n=7), Veh: 10.54 ± 1.93% vs Rotenone: 14.83 ± 2.60% p=0.0033; 25µM (n=7), Veh: 10.34 ± 1.85% vs Rotenone: 15.87 ± 3.023% p=0.0002; 1-way ANOVA followed by Sidak's post-hoc test]. Concentrations of mtDNA in HUVEC supernatant were increased in HUVECs treated with 5 µM of Rotenone [Veh (n=5): 2.45 ± 0.05 pg/mL vs. Rotenone (n=6): 3.65 ± 0.39 pg/mL, p=0.0700; Sidak's post-hoc test]. Higher concentrations of Rotenone had no effect on concentrations of extracellular mtDNA (p>0.84).

Conclusions: Mitochondrial oxidative stress due to inhibition of mitochondrial respiratory chain complex I induces vascular endothelial cell death. Extrusion of mtDNA from apoptotic and necrotic endothelial cells may contribute to increased circulating mtDNA concentrations in preeclamptic pregnancies. Future studies will test this hypothesis using integrative pharmacological and physiological approaches.

IRB/IACUC/IBC#: N/A

Community Medicine (Abstracts in the 600s)

600 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Russell Vo
Department: TCOM: Medical Education
Authors: Russell Vo; Luke C Cooksey; Soongjin Ahn; Sushyreta Rose; Daniel Hubbard

Health Literacy: Obstacles to Quality Healthcare in Tarrant County

Purpose: To identify the primary barriers to health literacy and the resources available to community members to optimize health literacy.

Background & Conclusion: Health literacy is defined as the degree to which individuals have the capacity to obtain, process, and understand basic health information and the services needed to make appropriate health decisions. According to the U.S. Department of Health & Human Services, only 12% of persons in the United States are classified as proficient, meanwhile more than 25% of persons (> 77 million people) in the United States experience difficulty with mundane health tasks like following the directions on a prescription label. There are a variety of influencing factors that determine a person's overall health literacy including demographic factors, biological, and psychosocial factors. There are four main demographic factors that influence health literacy: poverty status, race/ethnicity, education level, and age. Patients that are below the poverty status line, have minority status, have achieved less than a high school education or its equivalent, and/or are above 65 years of age are at an increased risk of possessing less than proficient health literacy. The primary biological and psychosocial aspects that influence health literacy include a patient's lifestyle and occupation, language competency, culture, and/or cognitive ability. In Tarrant County, there are a number of accessible and expedient resources available to healthcare professionals and members of the community to optimize health literacy and subsequently, health outcomes. The resources available include: United Way of Tarrant County Health Symposium, North Texas Area Community Health Centers, Tarrant County Diabetes Collaboration, Healthy Aging and Independent Living Initiative, Health Education and Literacy Project Consortium, UNT Health Science Center, and of course, your primary care provider.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

601 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Austin Wolstein
Department: Other
Authors: Austin Wolstein; Austin Turnbow; Reiza Ali; Daeija Lewis; Jose De Arrigunaga

A peek into Tarrant County's declining Tobacco Usage

Background: Smoking is the leading cause of preventable death in the United States. It is estimated that nearly half a million premature deaths can be attributed to smoking per year. Tarrant County has shown a steady decline in adult smokers in the past decade. In 2015, Fort Worth showed an adult smoking rate of 15.80%, compared to 16.70% in the state of Texas. This number dropped to 14% by 2017. To better understand future health implications, the contributing factors to this decline are discussed.

Methods: Through the use of data collection from a variety of community resources, a compilation of the most noteworthy efforts made towards combating tobacco addiction are identified and thoroughly evaluated. These resources are identified through tarrant211.org and the Tarrant Cares website.

Results: Many services use an evidence-based approach to reduce the likelihood of substance use through education, familial support, and acquiring the skills needed to live a tobacco free life. Setting goals, making good decisions, and developing a strong-willed mind set can help residents gain confidence and make healthy choices. Many of the substance abuse prevention services that are available include community coalition programs, youth prevention programs, partnership for success, and strategic prevention framework through prescriptions.

Conclusions: Based on the efficacy of the programs that were evaluated, it can be concluded that these resources have indeed led to a decrease in tobacco use amongst Tarrant County residents. With more widespread efforts towards combating tobacco use through various resources, Texas can become a healthier state as a whole. The resources available in Tarrant County are effective, and a tribute to local government leaders who have made it a priority to have these resources available to its residents. The returns on these investments should encourage expanded efforts, especially aimed at youth.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

602 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Barbara Karnkowska
Department: TCOM: Medical Education
Authors: Laura M. Garcia; Barbara Karnkowska; Nova Mebane; Ashton Norris; Samuel Shawn

HIV Prevalence and Resource Availability in Tarrant County

Purpose: Human Immunodeficiency Virus (HIV) is a retrovirus that attacks the immune system and can progress to Acquired Immunodeficiency syndrome (AIDS) if not treated. HIV management has been improving since its discovery in the 1970's. However, lack of knowledge regarding community resources is a limiting factor in the low-income population. The purpose of this review is to report HIV mechanism of infection, current infection rates and resources available in Tarrant County.

Methods: We conducted a literature search to find resources specific to the Tarrant County area focusing on HIV education, transmission reduction, treatment as well as support groups.

Results: Services provided at low cost that help prevent the spread of HIV are the most widely available. These are made available by the AOC (AIDS Outreach Center), HELP (Health Education and Learning Project), the Tarrant County Public Health Department, and the JPS Healing Wings HIV/AIDS Center. HIV education services are limited due to the constraint of appointments. The most comprehensive assistance programs are reserved for low-income individuals diagnosed with HIV/AIDS. These comprehensive programs assign a case manager to help individuals take advantage of the broad range of services offered, such as psychological counseling, nutritional guidance, support groups, cancer screenings, and pain management.

Conclusion: Since the discovery of this disease, there has been a growing effort to help this subpopulation of people in the Fort Worth community. There are many programs that aid a HIV patient with important needs such as healthcare, medicine access, HIV education, or a supportive community to live in. Many of these resources discussed can be easily accessed through the internet, by telephone, or inquiring with their local community organization. However, there are still barriers that may exclude people from receiving the benefits of these resources such as income status and household size. It is evident through these programs that not just prevention of this disease should be a main focus, but also caring for those who are afflicted with this illness as well.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

603 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Hadia Aziz
Department: TCOM: Medical Education
Authors: Hadia Aziz; Jedidiah Mahan; Matthew Shultz; Kristi Kway; Ana Adams; Sandeep Chilakamarri

Evaluating services provided to the homeless population of Fort Worth

Purpose: This study identifies and evaluates services provided to the homeless population in Fort Worth, Texas by local and state organizations.

Methods: Six organizations serving the homeless population of Fort Worth were identified and evaluated for eligibility, location, services provided, and barriers to access. These organizations include True Worth Place, Presbyterian Night Shelter, Union Gospel Mission, Section 8 Project Rental Assistance (PRA) Program, LegUp Program, and The Net.

Results/Conclusions: Interventions employed by local and state organizations address the physiological, psychological, and/or social components of homelessness. Common services include shelter (emergency, transitional, and long-term), medical care, life skills coaching, social support, and basic needs provision. These organizations either provide these services outright or by implementing a system where persons may earn the services after completing certain tasks such as attending a certain number of meetings and workshops. Frequent eligibility criteria required by the local and state organizations include valid U.S. identification and proof of low-income or homeless status. The most prominent barriers to access were identified to be insufficient transportation, community uprooting, and time constraints.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

604 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Dania Bairuty
Department: TCOM: Medical Education
Authors: Dania Bairuty; Aaron Saleen; Patricia Colucci; Ashley Lutz; Minh Le; Aaron Perez

Evaluation of Resources for Homeless Veterans in Tarrant County

Purpose: Our project aimed to gather and present information about the homeless veteran population of Tarrant County and the resources available to them. Three to six percent of homeless veterans in the United States reside in Texas and the majority of that population is in metropolitan areas such as Dallas-Fort Worth. This number is increasing with each passing year and access to information pertaining to services that can help them is limited and often difficult to find. The homeless veteran population faces many unique problems including mental illness, physical disability, and acquiring proper health care.

Methods & Results: Research and analysis of resources offered for the homeless in Tarrant County yielded several assistance programs. Of those programs, several were aimed towards serving the veteran population including the VA hospital, Compensated Work Therapy, Veterans Justice Outreach Program, Presbyterian Night Shelter, and HUD-Veterans Affairs Supportive Housing (HUD-VASH). Each program had unique barriers to access but common themes were distance to service site and lack of funding.

Conclusions: While there are numerous resources for homeless veterans to utilize, the barriers to accessing care and specific eligibility guidelines for each resource prevent them from benefiting from services to improve quality of life through housing and healthcare. There is a need for increased social awareness as well as minimizing barriers to access.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

605 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Carly Randall
Department: TCOM: Pediatrics
Authors: Carly Randall; Dr. Christina Robinson, MD

Screening for Adverse Childhood Experiences in the Fort Worth Pediatric Mobile Clinic - A Quality Improvement Initiative

Purpose: Adverse Childhood Experiences, or ACEs, are stressful or traumatic events that can disrupt childhood cognitive, social, and emotional development and can increase the likelihood of adopting health-risk behaviors. ACEs have also shown strong correlations to the development of disease, disability, and asocial problems later in life. Low socioeconomic status, health disparities, low health literacy, and poor access to healthcare are factors that play an important role in poor health. Along with ACEs, prolonged adversity can cause a Toxic Stress Response, which can play an important role in negative health outcomes and poor well-being long-term. The Pediatric Mobile Clinic, or PMC, sees patients without insurance or who are on Medicaid. The goal of this project is to screen the patients of the PMC for ACEs and early symptoms associated with ACEs, determine if the patient population at the PMC has a higher prevalence, and develop an intervention about ACEs and poor health outcomes.

Methods: Data was collected from 43 patients at the UNTHSC Pediatric Mobile Clinic. Patients were asked to complete two surveys about themselves regarding ACEs, life stressors, and associated symptoms. The surveys used were adapted from the Center for Youth Wellness ACE-Questionnaires. Data was interpreted by following the CYW ACE-Q Scoring Guidelines and the patients would be categorized as either a "refer to treatment" or not. Data was assessed using Microsoft Excel for the prevalence of ACEs and associated symptoms in the patients seen.

Results: The number of PMC patients that fit into the category of "refer to treatment", because their total ACE Q Score was between 1-3 with associated symptoms or over 4 with or without symptoms was 8 out of 43, or 19%. %. The average age for "refer to treatment" was 7.5 years old for the younger age group, and 17.6 years old for the adolescent group. The average total ACE Q score was 3.25, and the average number of associated symptoms was 2.5. The most common associated symptoms reported by the PMC patients was weight gain or loss, unexplained somatic complaints, conflicts with friends and family, and developmental or speech delays. The data also showed a positive relationship between the ACE Score and the total number of relevant symptoms.

Conclusions: There is a positive relationship to the total number of ACEs and life stressors and the total number of ACE associated symptoms. Routine screening for ACEs offers the ability to identify at-risk individuals, raise awareness of the importance of preventing additional exposure to ACEs, and the opportunity for intervention and treatment.With the current low sample size, the hypothesis was not supported by the data, with less than the majority of the PMC patients fitting the "refer to treatment" category. The study will continue to reach an appropriate sample size and the level of privacy the patient has while completing the questionnaires will be noted and taken into consideration for results. In the future, the PMC hopes to adopt a system of screening for ACEs and life stressors in their patients, educating the at-risk children and families about the role of ACEs on future negative health outcomes, and intervening when necessary.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

606 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Mahima Dhume
Department: TCOM: Medical Education
Authors: Mahima Dhume; Shweta Bhatnagar; Ellen Cocanougher; Sharyn Geis; Ava Moorhead

Reproductive Health of Women in Tarrant County: A Review of Resources and Services

Purpose: The landscape for female reproductive health in Texas is appalling. Texas has the highest uninsured rate, the highest rate of cervical cancer, and the highest repeat teen birth rate in the United States. Additionally, Texas has the worst maternal mortality rate (MMR) of any state. Texas established the Texas Maternal Mortality and Morbidity Task Force in 2013 to investigate a shocking spike in the maternal deaths reported. While the task force concluded the data was erroneous, it is still universally acknowledged that there has been an alarming increase in MMR in the last decade. Furthermore, the MMR within Tarrant County is much higher than the statewide rate, and is comparable to many developing countries. Maternal mortality disproportionately affects African American women with an MMR 1.5-2.5 times greater than those of other racial groups.

Methods: This study is a review of resources available locally, and attempts to highlight the services offered by four prominent institutions in Tarrant County: Planned Parenthood, John Peter Smith Hospital, Tarrant County Public Health Department, and Healthy Texas Women.

Results: While this issue is multifactorial, Tarrant County has numerous resources set-up to assist all women ranging from healthy teens to pregnant women to new mothers.

Conclusion: Although there is a broad range of services offered locally, we believe there is still a great scope for improvements to tackle the rising MMR from a policy perspective, as well as services targeted at assisting African American women who suffer disproportionately.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

607 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Holy Chor
Department: TCOM: Pediatrics
Authors: Holy Chor; Amy Raines-Milenkov

Preventative Health Screenings in the Cambodian Community

Purpose: This research explores the knowledge and receipt of preventive health screenings among Cambodian immigrants in the United States. Cambodians entered the United States as refugees after a group of Communists named Khmer Rouge proceeded to rule the country with extraordinary brutality. An estimated 1.7 million Cambodian people died from executions, hunger, disease, injuries, and coerced labor, and exposure to elements. Cambodian immigrants face poverty, limited education, and health disparities in cardiovascular disease, diabetes, related risk factors, and mental health, including post-traumatic stress disorder and depression, which influence their ability to practice prevention and obtain treatment. Identification of the preventative health practices of this community may help healthcare providers better understand the needs of Cambodian immigrant and refugee populations in the United States.

Methods: Surveys that assessed demographic, health insurance, health seeking behaviors, trauma, tobacco and smoking, alcohol use, cancer screening history and vaccinations, health education interest, and women's health were collected from Cambodian men and women who are the age 21 and above. 49 surveys were completed from participants at faith-based gatherings, and other community events within the Dallas-Fort Worth area.

Results: Along with other data, the results revealed that about 67% of individuals have had frightening experiences in their lives during which their personal safety or someone else's safety was threatened, 32% of participants did not know their Hepatitis B status, and 6% have a positive Hepatitis B status. Moreover, 92% of participants indicated interest in participating in a program offered in Khmer that educates them about preventative health screenings. Limitations do exist because this focus group has a small sample size and is not representative of all Cambodian immigrant and refugee communities in the United States. However, themes have matched existing literature.

Conclusions: Screening rates in this population near or exceed Healthy People 2020 Goals for screening (HP 2020: Colonoscopy 70.5%, Pap test 93%, mammogram 81.1%). However, Hepatitis B vaccination and knowledge could be improved. Providing culturally tailored education on Hepatitis B, vaccinations, and mental health could lead to increased cancer screening uptake, vaccination completion, and mental health awareness among this population.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-125

608 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Katherine Nguyen
Department: TCOM: Pediatrics
Authors: Katherine Nguyen, OMS-II; Shane Fernando, PhD, MS, FRSPH

Assessing the Relationship Between Human Papilloma Virus Vaccine Health Literacy and Caregiver Primary Language

Background: Although the Human Papilloma Virus (HPV) vaccine has shown to greatly reduce the incidence of cervical cancer and HPV infection rates, HPV vaccination rates remain low within the United States. Studies suggest that HPV health literacy is correlated with several social determinants, but the relationship between caregiver primary language and HPV health literacy is less well-established.

Objectives: Determine whether the lack of physician-caregiver communication regarding the HPV vaccine is a barrier in increasing HPV vaccination rates in children whose caregivers do not speak English as their primary language at home.

Hypothesis: Caregivers who do not speak English as their primary language (NE) have lower HPV health literacy than caregivers who speak English as the primary language (E).

Methods: 165 caregivers completed a multiple-choice paper survey regarding their knowledge and perception of the HPV vaccine within the Pediatrics and Women's Health department of the UNT Health Science Center. After completion of the survey, caregivers then engaged in a short education session and completed the same survey via phone or email 10-20 days after the initial encounter. Statistical analysis was performed using chi-square analysis.

Results: NE caregivers were less likely to have heard of HPV (p

Conclusions: NE caregivers have lower HPV health literacy rates and are less likely to give the HPV vaccine to their children. The variance between the two sets of parents indicate that the lack of physician-caregiver discussion regarding the HPV vaccine may be a cause of the low HPV vaccination rates within this population. A priori literature suggests NE caregivers are at a disadvantage in learning about the preventative benefits of vaccines. These results highlight the potential benefit that HPV health education by physicians and allied health professionals can provide in efforts to increase HPV vaccination rates among children of NE caregivers.

Sponsor: N/A
IRB/IACUC/IBC#: 2015-148

Diabetes (Abstracts in the 700s)

700 - Poster
Classification: School of Health Professions Student
Presenter: Micah Bowman
Department: School of Health Professions: Physician Assistant Studies
Authors: Micah Bowman; Haylee Moore; Meredith Allen; Tierney Gonzales; America McGuffee; Jessica Hartos

Does General Health Differ by Routine Check-up in Diabetic, Middle-Aged Females?

Purpose: Given limited evidence that routine check-ups with a medical provider improves quality of life, the purpose of this study is to assess whether general health differs by routine check-up in diabetic, middle-aged females.

Methods: This cross-sectional analysis used 2016 data from the Behavioral Risk Factor Surveillance System (BRFSS) for diabetic females ages 45-65 from Alabama (N=370), Georgia (N=256), Kentucky (N=485), Mississippi (N=275), and West Virginia (N=268). The relationship between general health and routine check-up was assessed separately by state using multiple logistic regression analysis while controlling for comorbid health conditions, weight status, physical activity, tobacco and alcohol use, age, ethnicity, educational level, income level, and employment status.

Results: Across states, about half of diabetic females reported fair or poor general health (50-53%), while most reported having a routine check-up within the past year (90-93%). Adjusted analysis indicated that general health was not significantly related to routine check-up but was inversely related to having diabetes plus two or more health conditions and positively related to physical activity.

Conclusion: The results of this study indicated that general health was not related to routine check-up in diabetic middle-aged females. However, there was a strong inverse relation between those patients with good or better general health and those with diabetes plus two or more health conditions and a moderate relation between physical activity and good or better general health. Therefore, in diabetic middle-aged females, practitioners should automatically screen for general health, other health conditions and physical activity in order to optimize treatment, manage diabetes and other health conditions, and properly educate their patients to optimize their general health.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

701 - Poster
Classification: School of Health Professions Student
Presenter: Julia Forsberg
Department: School of Health Professions: Physician Assistant Studies
Authors: Julia Forsberg, PA-S; Amanda Flores, PA-S; Abigail Plec, PA-S; Savannah Vincent, PA-S; Jessica Hartos, PhD

Does Mental Health Differ by Diabetes Status in Older Adult Females?

Purpose: Research has assessed the relationship between specific mental health conditions and diabetes status, but not current mental health in specific demographic groups. The purpose of our study is to examine whether current mental health status differs by diabetes status in older adult females in the general population.

Methods: This cross-sectional analysis used 2016 data from the Behavioral Risk Factor Surveillance System (BRFSS) for 65 to 75 year old females from Alabama (N=867), Kentucky (N=1356), Mississippi (N=668), and Texas (N=1714). We assessed the relationship between diabetes status and mental health using ordered logistic regression by state while controlling for weight status, the number of health conditions, access to health care, and demographic factors.

Results: Across states, about one-fourth of participants reported low or moderate mental health in the last 30 days (22-31%), and a being diagnosed with diabetes (23-26%). The results of adjusted analysis indicated that mental health status and diabetes status were not significantly related in any state; however, mental health was inversely related to number of health conditions in all four states.

Conclusion: Overall, current mental health status was not related to diabetes status in older adult females. However, mental health was consistently and inversely related to number of health conditions. Practitioners should not automatically screen for mental health issues in all 65-75 year old females based on diabetes status. However, practitioners should screen for mental health issues in patients with multiple health conditions, as well as screen for other health conditions in patients with mental health issues. Based on screening results, patients may need to be referred to psychiatry or other specialties after determining severity and management of their conditions.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

702 - Poster
Classification: School of Health Professions Student
Presenter: Michelle Huang
Department: School of Health Professions: Physician Assistant Studies
Authors: Michelle Huang; Molly Berrier; Lindsey Graff; Amy Allen; Jessica Hartos

Does Health Status Differ by Healthcare Access in Diabetic Females Ages 45-79?

Purpose: Healthcare access can impact health status in patients with diabetes, but research assessing healthcare access and health status in diabetic females is limited. The purpose of this study was to assess the relationship between health status (general, physical, and mental health) and healthcare access (coverage and cost) in diabetic females ages 45 to 79.

Methods: This cross-sectional analysis used data from the 2016 Behavioral Risk Factor Surveillance System (BRFSS) for diabetic females ages 45 to 79 from Louisiana (N=594), Mississippi (N=541), Oklahoma (N=566), and Texas (N=1013). Multiple logistic regression and ordered logistic regression were conducted by state to determine the relationship between health status and healthcare access after controlling for health-related and demographic factors.

Results: Across states, about half of diabetic females reported fair or poor general health (43-49%), low to moderate physical health (51-61%), and low to moderate mental health (39-45%). In addition, most reported having healthcare coverage (90-95%) and few reported that cost precluded doctor visits (16-22%). Adjusted analysis indicated that health status was related to healthcare cost, but not to coverage, across states. Those for whom cost precluded doctor visits were less likely to report higher levels of general, physical, and mental health. In addition, all health status variables were inversely related to having three or more health conditions. Also, general and physical health were inversely related to tobacco use across states.

Conclusion: The results for diabetic females ages 45 to 79 indicated that health status was inversely related to healthcare cost and to having three or more comorbid health conditions, but not to healthcare coverage. Practitioners should screen all patients in the target population for multiple health conditions, determine severity and management, and educate patients on the importance of managing diabetes with comorbidities. Additionally, practitioners should be aware of how financial constraints can negatively impact patients' health status, such as considering treatment costs when treating low income patients.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

703 - Poster
Classification: School of Health Professions Student
Presenter: Eric Graham
Department: School of Health Professions: Physician Assistant Studies
Authors: Eric Graham; Brooke Alden; Harmeet Kaur; Alexa Wingo; Jessica Hartos

Does Sleep Duration Differ by Diabetes Status in Middle-aged Adults?

Purpose: We wanted to assess whether sleep duration differed by diabetes status in middle-aged (40-65) males and females in the general U.S. population because there is currently insufficient research on this relationship.

Methods: This cross-sectional analysis used 2016 data from the Behavior Risk Factor Surveillance System (BRFSS) for males and females aged 40-65 years old in Georgia (N=2352), Louisiana (N=2377), New Mexico (N=2832), and Oklahoma (N=2908). We performed multiple logistic regression analysis by state to assess the relationship between diabetes status and sleep duration while controlling for factors related to health, health behaviors, and demographics.

Results: Across states, almost one-fourth of participants reported a non-moderate amount of sleep each night (less than 6 or more than 8 hours, 19-24%) and less than one-fifth reported a diagnosis of diabetes (16-18%). Adjusted results indicated that sleep duration was not significantly related to diabetes status across states. However, sleep duration was moderately and inversely related to number of health conditions in all four states, and moderately and positively related to mental health and physical activity in at least three of four states.

Conclusion: Diabetes status was not significantly related to sleep duration in middle-aged males and females in the general population. However, up to one-third of middle-aged adults reported two or more health conditions, mental health issues, and physical inactivity, and these were inversely related to moderate sleep duration. Thus, primary care providers should screen for sleep duration, health conditions, mental health, and physical activity in this target population if symptoms of any are present and educate and treat as comorbid conditions.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

704 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Sohail Siraj
Department: TCOM: Medical Education
Authors: Sohail Siraj, MS; Nadia J Ahmed, MS; Michael Mitchell; Stefan Panturu; Vishal Patel

Diabetes in Tarrant County: Populations Most at Risk, Barriers to Acquiring Care, and Resources Available for Disease Management

Purpose: Diabetes mellitus is quickly becoming a public health crisis in the United States. As of 2015, 23.1 million adults in the U.S. are diagnosed with diabetes, with an estimated 1.5 million new cases diagnosed each year. The purpose of this research is to provide background information on diabetes in Tarrant county. We identified which populations are most at risk for being diagnosed with Diabetes Mellitus (DM) Type II, determined potential barriers to acquiring care, and searched for regional programs available for disease management.

Materials and Methods: Epidemiological information regarding DM in Texas was acquired through searching the Texas Department of State Health Services for current census information, as well as the CDC for national data in order to compare regional statistics to the rest of the U.S. population. A web search for local resources was conducted and relevant information for five available organizations providing care for DM patients of Tarrant County is presented here.

Results: Diabetes is the 6th leading cause of death in Tarrant County. Diabetes prevalence is highest among Non-Hispanic African Americans (16%), followed by Hispanics (12%). Prevalence of diabetes in Tarrant county is also higher among adults who did not graduate from high school. In Tarrant county, 21.9% of the population is uninsured, compared to 12.2% nationally. Resources available in Tarrant county for disease management include; Tarrant County Diabetes Collaboration, HealthForMe Self Management Classes, United Way of Tarrant County, Texas Healthy Lifestyles Workshop, and JPS Diabetes Education program.

Conclusions: In Tarrant county diabetes prevalence is highest in African American and Hispanic populations. Barriers to acquiring care include lack of health insurance and lack of knowledge regarding proper nutrition. Various community resources are available to aide in management of diabetes.

Sponsor: N/A
IRB/IACUC/IBC#:

705 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Viktoria Taskov
Department: Other
Authors: Viktoria Taskov; Michael Chandra; Jatinder Singh; Alisha Khanna; Shannon Brewer

The Diabetes Epidemic

Background: Diabetes is a disease of increasing prevalence in the United States. Thus, it is imperative to appreciate the current state of the disease, its impact on the population, and the resources available to potentially get ahead of the diabetes epidemic. This research project is a meta-analysis of diabetes data nationally, as well as within the state of Texas and Tarrant County itself. In 2015, 30.3 million Americans suffered from diabetes, which was approximately 9.4% of the population at the time. Every year there are approximately 1.5 million new diagnoses of diabetes. One of the most pressing issues that the United States has been facing in the last decade and a half is the increase in type 2 diabetes among children. Between 2002 and 2012, the rate of newly diagnosed cases in children between ages 0-19 increased by 4.8 percent each year. Diabetes remains the seventh leading cause of death (as of 2015) in the United States. This epidemic incurs a heavy financial burden, costing the country an estimated $327 billion annually. Our team uncovered the psychosocial impact the disease has on patients, which would also need to be addressed to tackle the diabetes epidemic from all aspects to be effective.

Methods: We sought additional resources that could help address the psychosocial impacts. Tarrant211.org and Tarrant Cares websites were used to identify community resources for people with diabetes in Tarrant County.

Results: We found a number of resources available in Tarrant County to handle this issue. These include national and local as well as governmental and non-profit organizations. These include Medicare, Medicaid, and the American Diabetes Association on the national level and programs such as the Texas Diabetes Council on a state level. Some of the programs specific to Tarrant county that we look into include the Diabetes Community Grant Health Program, and the Tarrant County Diabetes Collaboration.

Conclusions: A variety of community resources are available for those with diabetes, including those mentioned above. Resources that are targeted specifically at the adolescent population, however, remain scarce and some gaps remain.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

706 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Monika Schmitt
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Monika E Schmitt, OMS-II; Gita Pathak, MSc; Nicole Phillips, PhD, MS; John C Licciardone, DO, MS, MBA, FACPM

The Link Between Low Back Pain And Diabetes: Gene-Based Association Study In People With Comorbid Diabetes Mellitus And Low Back Pain

Purpose: Diabetes mellitus type 2 is a disease associated with chronic pain. Mechanisms of this association are not fully understood. Few studies have explored the genetics of this association, and an independent genetic link between diabetes and low back pain (LBP) has not been completely investigated. We hypothesize that variants in candidate genes are associated with comorbid diabetes and LBP phenotypes.

Methods: This cross-sectional study is a part of a larger study of subacute and chronic LBP within the PRECISION Pain Research Registry. Subjects were recruited from the Dallas–Fort Worth Metroplex and reported LBP for at least 2 months (subacute) or 6 months (chronic) for half or more of the days with the relevant time period.

Primary outcomes were assessed using a Numerical Rating Scale (NRS) for pain intensity, the Roland-Morris Disability Questionnaire for back-specific functioning, and the Patient-Reported Outcomes Measurement Information System (PROMIS) for quality of life measures.

Study participants self-reported diabetes. Biological samples were collected to determine participants' genotypes using the Infinium Global Screening Array. Analyses were conducted using SPSS among 488 study participants, 109 of whom reported diabetes.

Twenty-seven candidate genes concurrently implicated in both pain phenotypes and diabetic phenotypes were identified from the literature. These candidate genes were used to perform a gene-based association study (GBAS) to identify their potential association with diabetes and LBP. Genetic variants were mapped to candidate genes for association with each of the pain phenotypes after adjusting for age, sex, diabetes status, and ancestry components 1-10 using MAGMA.

Results: GBAS results point to variants in the PRKCA gene as being associated with both NRS of LBP intensity and diabetes. PRKCA is a family of protein kinases implicated in neuropathic pain and formation of advanced glycation end products.

Conclusions: Of the 27 genes tested, only variants in PRKCA are significantly associated with LBP and diabetes in the PRECISION cohort. These findings build on a framework which suggests that genetic predisposition in PRKCA may underlie diabetes and LBP.

Sponsor: American Osteopathic Association
IRB/IACUC/IBC#: 2015-169 2019-0106

Education (Abstracts in the 800s)

800 - Poster
Classification: School of Health Professions Student
Presenter: Elizabeth Henderson
Department: School of Health Professions: Physical Therapy
Authors: Elizabeth Henderson, SPT; Caren Hamilton, SPT; Farrah Shelack, SPT; Mike Richardson, PT, DPT, GCS, COMT; Brandy Schwarz, PT, EdD, DPT, OT, MBA; Evan Papa, PT, DPT, PhD

Physical Therapist Student Perceptions of Creating and Consuming Peer-Generated Flipped Content to Augment Psychomotor Learning

Background: The flipped classroom showed increased mastery and employment of content (McLaughlin et al., 2014). Reciprocal peer teaching (RPT) has also proven valid in enhancing students' learning (Lydon, 2017; Irvine 2017). Using these two learning styles creates an innovative strategy of peer-generated flipped content (FC). The purpose of this study was to explore student perceptions of creating and consuming peer-generated FC to augment psychomotor learning. We hypothesize students will view this design favorably.

Case Information: As part of RPT, first year Doctor of Physical Therapy (DPT) students created manual muscle test videos to augment psychomotor learning. Students viewed the videos via an online learning management platform. Upon course completion, students completed a Likert survey on their perceptions of teaching and learning from peers. Participants completed an electronic informed consent. This study was approved by the IRB at a public university in Texas.

Conclusions: This study shows an overall positive experience creating and consuming peer-generated FC as part of RPT. Students valued the RPT experiences as useful for content mastery. The sample was limited to 1st year DPT students at UNTHSC in Fort Worth, TX and involved one course. Data may not be generalizable beyond these conditions.

Sponsor: N/A
IRB/IACUC/IBC#: Protocol 2016-135

801 - Poster
Classification: School of Public Health Student
Presenter: Luvleen Dharni
Department: School of Public Health: Health Behavior & Health Systems
Authors: Luvleen K Dharni; Ann Adams; Erika Thompson

Sports Team Participation: Suicidal Ideation Assessment of Adolescents in the U.S.

Purpose: Increasing rates of depression and death by suicide among adolescent populations remains a key public health issue. As such, national health promotion programs have recommended an increase in physical activity as a potential approach to suicide prevention. It is important to explore whether participation or non-participation in sports activity impacts suicide ideation among adolescents. The objective of this study was to assess the association between participation in sports teams and suicidal ideation among US adolescents.

Methods: The Youth Risk Behavior Surveillance System (YRBSS) 2017 was examined among 9th– 12th grade students in the United States. The initial inclusion sample size was a total of 14,765 usable observations and after a complete domain analysis, 3,466 participants are excluded for missing values with the final sample size of N=11,299. The outcome variable was suicidal ideation in the last 12 months. The predictor variable was participation in a sports team (yes/no). An adjusted survey-weighted logistic regression analysis in SAS 9.4 was used to assess the participation in sports teams and suicidal ideation adjusting for age, gender, grade level, and race/ethnicity.

Results: 17.1% of adolescents were found to consider suicidal ideation and 47.8% of those students participated in at least one or more sports team. Those who participated in 0 teams were significantly less likely to consider seriously attempting suicide than those who participated in one or more teams (OR=0.77, 95%CI 0.61,0.96). Females were less likely (OR=0.48, 95%CI 0.40, 0.57) to consider suicide ideation than males. Multiple non-Hispanic were less likely to have suicidal ideations than their white counterparts (OR=0.70, 95%CI 0.50,0.89).

Conclusions: The findings indicate participation in 0 sports teams may be a protective factor against suicidal ideation when controlling for age, gender, grade level, and race/ethnicity. This may be indicative of student participation in one team or more may be a burden or stressor contributing to adolescents' mental health status. Next steps could consider assessing the dose of the sports activity and its influence on adolescent's mental health status.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-104

802 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Tiraj Parikh
Department: TCOM: Medical Education
Authors: Tiraj Parikh; Frank Papa

A Computer-Based Approach to Developing Diagnostic Rules

Purpose: In 2015, the National Academy of Medicine published a report revealing that diagnostic error may be America's third leading cause of death and responsible for the majority of paid medical malpractice claims. Medical education researchers are now looking to the learning sciences for theories that might support improvements in the diagnostic performance of tomorrow's health care providers. One such theory, called "Dual-Process Theory", suggests that people utilize two distinct approaches to diagnostic reasoning: pattern recognition and analytical reasoning. To date, researchers have paid little attention to how we reason analytically. Dual-process theorists suggest that analytical reasoning is, in part, predicated upon a clinician's knowledge of diagnostic rules. These rules encompass knowledge in the form of experientially-based, statistically-framed estimates of the frequency with which a given disease is associated with each of its characteristic findings. The purpose of this project is to produce a computer-based training tool which supports learners in how to analytically reason via the acquisition and application of conditional probability (CP) derived diagnostic rules.

Methods: This tool will have four components: 1) a display of CP derived diagnostic rules associated with signs and symptoms most likely to be linked to a given clinical presentation 2) a set of interactive tools enabling learners to identify which of those rules are most robust in ruling in/out the various differentials, 3) a set of practice cases where learners are given multiple opportunities to apply these CP derived rules, and 4) interactive screen prompts designed to guide the students in developing a cognitive strategy to apply high-yield rules to diagnose a multitude of test cases.

Results: The exhibitor will demonstrate a tool which: 1) displays disease by sign/symptom CPs, 2) enables their rearrangement (by history & physical, breadth by feature strength, and depth by selected differential) as the basis for formulating diagnostic rules, and 3) functions which support the construction of a diagnostic strategy.

Conclusions: After completion of the described educational tool, the authors will execute an IRB approved study involving students in a year 2 systems course, and a treatment/control research design.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

803 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Thuy Nguyen
Department: TCOM: Medical Education
Authors: Thuy Nguyen

Student Initiative in Medical Simulation: Review of the UNTHSC Chapter

Purpose: Due to the popular demand of more medical simulation, the UNTHSC SIMS organization began as a division of their parent organization, the Emergency Medicine Interest Group. UNTHSC Student Initiative in Medical Simulation(SIMS) offers pre-clinical students an outlet to apply clinical knowledge in a fun, clinically-based setting. Students in SIMS are able to practice mannequin-based cases where teamwork and quick thinking are rewarded. This provides an advantage to the students before their clinical rotations, where urgent situation often arises without warning. The purpose of this review is to explore what UNTHSC SIMS offers student, it's curriculum design, and chronically record all of the events that this organization has contributed to UNTHSC as a whole.

Methods: Quantitative data such as event participation were extracted from Orgsync. Further quantitative data for the making of a timeline were received from Dr. Tierney(head of SIMS lab).

Results: As this is a review paper, the results section included "growth & engagement" of UNTHSC SIMS. The organization started out with five participants wanting more simulation skills and events, grew to over 200 members, hosting state and national level conferences, and to date have organized several community events in connection with TCOM itself and other organizations. UNTHSC SIMS has grown to be the most active organization on campus due to members participation and sheer numbers of events offered to its members.

Conclusions: Despite many successes, UNTHSC SIMS still struggles with challenges such as retaining and involving more physician mentors for meetings and competitions. As member numbers grow, the need for more officers and space is apparent. The UNTHSC SIMS officers also are working on developing more variety in in-house written cases for simulation, a task that takes expert review and hours of design per case.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

804 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Nasim Shakibai
Department: TCOM: Pediatrics
Authors: Nasim Shakibai; Michelle C Marcincuk; W Paul Bowman

Branchial Cleft Cyst: A Case Study in a Thirteen Year Old Girl

Background: Second branchial cleft cysts are the most common branchial cleft lesions, found near the anterior upper one-third aspect of the sternocleidomastoid muscle. Branchial sinuses or fistulae are often found after birth, but internal sinus tracts and branchial cleft cysts may be found later in life. Although branchial clefts are resectable, the surgeries become more complicated following an infection. We report a case of a patient with a second branchial cleft cyst with a previous infection, leading to a difficult resection.

Case information: A 13-year-old female patient presented to her pediatrician with tender mass on the left side of her neck for two days. She denied fever, fatigue, weight loss, or cat scratches. Her boyfriend had Infectious Mononucleosis a few weeks prior. Her labs revealed a normal Epstein-Barr Virus panel and a negative mononucleosis spot test, rapid strep A test, and Bartonella Henselae Antibodies. Her erythrocyte sedimentation rate and C-reactive protein were elevated. She completed a course of clindamycin and azithromycin, but the mass remained. A chest x-ray revealed clear lungs. Her MRI with contrast showed a mass which her otolaryngologist identified as a branchial cleft cyst. The resection was complicated due to her previous infection; the cyst was adherent to the great vessels, the accessory nerve and the sternocleidomastoid. The patient recovered uneventfully.

Conclusions: Branchial cleft cysts account for approximately 20-30% of all pediatric neck masses. If a patient presents with a neck mass, health care providers should consider branchial cleft anomalies in the differential diagnosis. Knowledge about branchial cleft cysts and their presentation will help health care providers ensure these patients receive appropriate management more rapidly, thus avoiding some of the challenges and risks of surgical excision once infection has occurred.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

805 - Poster
Classification: UNT System College of Pharmacy Student
Presenter: Hoang Nguyen
Department: UNT System College of Pharmacy: Pharmacotherapy
Authors: Hoang Nguyen; Shara Elrod

Retrospective Analysis of Pharmacy Students' Perceived Readiness from Pharmacy Residency Preparation Elective with their Match Rates

Purpose: Pharmacy residency is becoming a standard requirement for pharmacists who work in the clinical field and is a competitive process. Giving a presentation is a part of the interview process to obtain a residency. There are courses available that helps students to better prepare for residency by having them give a presentation. The purpose of this study is to compare students' and preceptors' evaluations of how well each student gave their presentations with relation to their match rates to ASHP certified residency programs. Secondary factors that could affect match rates include GPA, gender, and age.

Methods: Students taking the residency preparation course during the Spring of 2016 and 2017 were asked to choose and present a disease state presentation from a list of topics. Their presentations were assessed by their peers, as well as, by pharmacists who have had residency experience. A Likert scale was utilized to assess 15 different areas of the presentation ranging from nonverbal cues to depth of knowledge. Scores ranges from 1 to 5, with 5 being favorable. Mann Whitney U was used to assess the 15 areas with relation to residency match rate via SPSS. De-identified information concerning residency match rates, age, gender and overall GPA, from both groups were analyzed and compared to one another to see how the seminar is impacting student match rates. The de-identified information was obtained from UNTHSC's senior data manager.

Results: A total of 26 students were assessed who took the residency preparation course in 2016 or 2017 and applied for residency. Of these students, 18 were female (69.2%) and 8 were male (30.8%). The median age was 24.5 years (IRQ 23 - 27.5) and the average GPA was 3.28 ± 0.3. Of the students that took the course in 2016, 12 were assessed; 9 were females, 3 were males. The median age for 2016 was 24 (IQR 23 -25) and the mean GPA was 3.32 ± 0.30. Of the students that took the course in 2017, a total of 14 students were assessed, with 9 females and 5 males. The median age for 2017 was 25.5 (IQR 23 – 30) with a mean GPA of 3.18 ± 0.3. Most of the median scores for the 15 questions had a value of 5.

Conclusion: Students tended to rate their peers highly in formative assessments. A possible limitation to this study could include having a small study population. Also, we noticed that students and pharmacists tended to prefer to rate each presentation highly so our results may have been skewed to the right.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-142

806 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Saad Jafri
Department: TCOM: Medical Education
Authors: Saad Jafri; Spencer Smith, MD

Senior Medical Student Attitudes Toward Radiology and Confidence in Their Imaging Skills

Purpose: Most medical students do not receive formal radiology training until clinical rotations which is taught in the context of medicine/surgery, or during an elective rotation that is not a part of the core curriculum, leading to young physicians who are sub-optimally prepared to interpret imaging studies. In addition, other physicians' attitudes towards radiology may be biased by a lack of early exposure to radiologists during medical school. This study is designed to determine senior medical student attitudes toward radiology and their radiology skills confidence levels both prior to and following an elective radiology clerkship in an effort to improve radiology instruction. We hypothesize that a radiology clerkship will positively impact students' attitudes towards radiology as well as increase their confidence in their own imaging skills.

Methods: 4th-year TCOM medical students enrolled in an elective radiology clerkship were sent anonymous online pre and post-clerkship survey via email 2 weeks before the start of their clerkship and 2 weeks after conclusion of the clerkship. The 4-week course covered more than the basics of diagnostic radiology that graduating students should know in preparation for internship. Responses were restricted to 1 per student.

Results: 17/25 students enrolled in the February 2019 radiology clerkship responded (68%). At the time of this abstract, only a pre-clerkship survey was conducted. Students were, on average, not confident in their overall image interpretation skills (2.47/5). However, students had higher confidence interpreting plain radiographs (2.94/5) as opposed to computed tomography scans (2.06/5, p = 0.0096). Regarding student attitudes towards radiology, most found radiology to be "interesting in its own right" (58.8%). In addition, students found having a basic working knowledge of radiology important (52.9%) and vitally important (47.1%) in becoming a competent doctor. Finally, students reported that radiology findings often (52.9%) and very often (41.2%) change patient care.

Conclusion: The pre-clerkship survey results demonstrate that fourth-year medical students at TCOM lack confidence in their ability to interpret imaging studies. However, they regard radiology as quite important to the contemporary practice of medicine. An identical post-clerkship survey will be offered to the original survey respondents to determine the impact of a didactic radiology clerkship on pre-existing student impressions.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

Eye/Vision (Abstracts in the 900s)

900 - Poster
Classification: GSBS Student
Presenter: Renuka Chaphalkar
Department: North Texas Eye Research Institute
Authors: Renuka M Chaphalkar; Dorota Stankowska; shaoqing He; Bindu Kodati; Raghu Krishnamoorthy; Renuka Chaphalkar

Endothelin-1 Mediated Decrease in Expression of Mitochondrial Proteins ATP5H and COX17 in Retinal Ganglion Cells.

Purpose: Endothelin-1 (ET-1) treatment has been shown to promote apoptosis of retinal ganglion cells (RGCs), however, the precise mechanisms underlying these effects are still unknown. The purpose of the study was to assess the changes in gene expression at the level of the translatome, occurring during ET-1 mediated neurodegeneration of RGCs.

Methods: Primary RGCs isolated from post-natal day 5 rat pups were treated with ET-1 (100 nM) for 24 h in trophic factor-free medium. Polysomal RNA was isolated and libraries for RNA-Seq were prepared. Trimmed mean of M-values (TMM) was used to normalize the gene expression. Genes with expression changes more than 1.5 fold with $p < 0.05$ were considered differentially expressed. Two of the key mitochondrial genes, Cytochrome C Oxidase Copper Chaperone (COX17) and ATP Synthase, H+ Transporting, Mitochondrial Fo Complex (ATP5H) involved in oxidative phosphorylation were tested for their protein expression in primary culture of RGCs treated with ET-1. Following ET-1 treatment for 24 hours, primary RGCs were fixed with 4% PFA and immunocytochemical analysis was performed using specific antibodies to COX17 and ATP5H. To confirm these findings in vivo, retired breeder Brown Norway rats were intravitreally injected in one eye with either 2 nmole of ET-1 or vehicle. The animals were euthanized 24 hours post-injection and retina sections obtained were analysed for expression of ATP5H and COX17.

Results: STRING network analysis revealed 156 differentially expressed genes, of which 23 genes were identified with known or predicted mitochondrial function. Immunostaining of primary RGCs showed an appreciable decline in expression of COX17, while ATP5H expression was modestly decreased. A decreasing trend (three out of four rats) in immunostaining for ATP5H as well as COX17 was found in retinas of rats intravitreally injected with ET-1 (n=4).

Conclusions: ET-1 treatment produced a decrease in expression of key components of mitochondrial electron transport chain. A compromise in bioenergetics could be one mechanism by which ET-1 promotes neurodegeneration of RGCs in glaucoma.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-0024

901 - Poster
Classification: GSBS Student
Presenter: Amanda Lenell Roberts
Department: GSBS: Pharmacology & Neuroscience
Authors: Amanda L. Roberts; Stacy Curry; Abe Clark; Colleen M. McDowell

TGFβ2-TLR4 Crosstalk Signaling in the Glaucomatous Trabecular Meshwork

Purpose: Glaucoma is a group of optic neuropathies and the leading cause of irreversible blindness worldwide. Primary open angle glaucoma (POAG) is the most prevalent type of glaucoma. Elevated intraocular pressure (IOP) is a major risk factor for the development of POAG. Elevated IOP is caused by aqueous humor fluid not draining properly through the drainage structures in the eye and leads to vision loss. Discovering potential new targets to lower IOP is necessary to develop novel and effective drug therapies. Here we explore a novel molecular mechanism involved in the development of glaucomatous trabecular meshwork (TM) damage. The TM regulates aqueous humor outflow and IOP. The effects of transforming growth factor beta (TGFβ)signaling pathways on the TM's extracellular matrix (EÇM) have been extensively studied. Recently, we identified TGFβ2 and toll-like receptor 4 (TLR4) signaling crosstalk regulates changes in the TM ECM and mutation in Tlr4 rescues TGFβ2-induced ocular hypertension in mice. Here, we investigated the role of an endogenous TLR4 ligand, FN-EDA, and a downstream signaling molecule of TLR4, NFκB, in TGFβ2-induced ocular hypertension in mice.

Methods: B6.FN-EDA$^{+/+}$, B6.TLR4$^{-/-}$, B6.FN-EDA$^{-/-}$, B6.FN-EDA$^{+/+}$/TLR4$^{-/-}$, B6.FN-EDA$^{-/-}$/TLR4$^{-/-}$, and C57BL/6J mice were intravitreally injected with 2.0μL Ad5.TGFβ2 (2.5x10^{7}pfu) in one eye and the contralateral uninjected eye was used as a negative control. Likewise, we tested mice lacking the p50 subunit of NFκB (B6.Cg-NFκB1tm1Bal/J) and C57BL/6J mice. IOP was measured once per week using a TonoLab rebound tonometer on isoflurane-anesthetized mice 42 or 49 days post-injection. Significance determined by one-way ANOVA at each time point. Eyes were harvested, fixed in 4% paraformaldehyde, and sectioned for immunohistochemistry to access total fibronectin and FN-EDA isoform expression.

Results: Ad5.TGFβ2significantly induced ocular hypertension in C57BL/6J mice and enhanced ocular hypertension in B6.EDA$^{+/+}$ mice. Mutations in Tlr4,FN-EDA, and NFκB blocked Ad5.TGFβ2induced ocular hypertension with no significant IOP elevation at any time point. Total FN and FN-EDA isoform expression increased in Ad5.TGFβ2 injected C57BL/6J mice. Data suggest the onset of ocular hypertension developed in uninjected B6.EDA$^{+/+}$ mice at 14 weeks of age and Ad5.TGFβ2 enhanced elevated IOP levels.

Conclusions: TLR4, FN-EDA, and NFkB are necessary for TGFβ2 induced ocular hypertension in mice. In the absence of Ad5.TGFb2 constitutively active EDA (FN-EDA$^{+/+}$) mice develop ocular hypertension and in the presence of Ad5.TGFβ2 ocular hypertension is enhanced. These data demonstrate that the crosstalk between TGFβ2 and TLR4 is involved in the glaucomatous development within the trabecular meshwork. In addition, it provides potential new targets to lower IOP and to further explore mechanisms involved in the development of glaucomatous TM damage.

902 - Poster
Classification: GSBS Student
Presenter: Navita Lopez
Department: GSBS: Pharmacology & Neuroscience
Authors: Navita N Lopez; Abbot F Clark, PhD; Tara Tovar-Vidales, PhD

Role of miR-29c-3p in regulation of extracellular matrix synthesis

Purpose: Glaucoma is a group of optic neuropathies characterized by cupping of the optic nerve head (ONH) and degeneration of retinal ganglion cell (RGC) axons that lead to loss of visual function. Primary open angle glaucoma (POAG) is the most common form of glaucoma, with a global prevalence of 65.5 million, approximately 74% of glaucoma cases. The initial site of damage in POAG is within the lamina cribrosa (LC) region of the ONH. There is upregulation of the pro-fibrotic cytokine, TGFβ2, and marked disparity in the distribution and organisation of extracellular matrix (ECM) proteins. TGFβ2 induced downregulation of miR-29 has been shown, in part, to drive ECM protein synthesis in trabecular meshwork cells. Our purpose was to determine the effect of TGFβ2 on miRNA expression, in cells that populate the LC. We hypothesise that increased TGFβ2 signalling downregulates the expression of anti-fibrotic miRNAs, stimulating a fibrotic response and remodelling of the glaucomatous LC.

Methods: Primary human LC cells were grown to 100% confluency, treated with TGFβ2 (5ng/ml) or control for 24hours and differences in expression of miRNAs were analysed by PCR arrays. LC cells were transfected with miR-29c-3p (10nM) mimic, inhibitor or non-targeting controls and analysed by Q-PCR to confirm overexpression or knockdown of miR-29c-3p. mRNA targets of miR-29c-3p were determined through protein expression analysis by immunocytochemistry. The effects of miR-29c-3p and TGFβ2 on collagen type (COL) I and IV protein expression were evaluated in cells transfected with miR-29c-3p mimic, inhibitor or control and treated with TGFβ2 expression.

Results: TGFβ2 treatment downregulated the expression of miR-29c-3p in LC cells (n=4, pa-smooth muscle actin,COL (collagen) I and IV. Transfection of miR-29c-3p mimic or inhibitor showed upregulation and downregulation of miR-29c-3p respectively, confirming transfection efficiency. miR-29c-3p was found to be a key regulator of COL I and IV synthesis. Overexpression of miR-29c-3p decreased TGFβ2 induced COL I and IV expression in LC cells. Inhibition of miR-29c-3p exacerbated the effects of TGFβ2 on COL I and IV expression.

Conclusion: This suggests that elevated TGFβ2 signalling may stimulate a pro-fibrotic response through downregulation of miR-29c-3p. Although miR-29c-3p may be protective by decreasing the effects of TGFβ2 induced ECM protein synthesis, we will need to further elucidate the role of TGFβ2 and miR-29c-3p in maintaining the balance of ECM synthesis.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

903 - Poster
Classification: GSBS Student
Presenter: Shruti Patil
Department: North Texas Eye Research Institute
Authors: Shruti V Patil; Ramesh Kasetti, PhD; Gulab Zode, PhD

TGFβ2 induces chronic endoplasmic reticulum stress in trabecular meshwork cells.

Purpose: TGFβ2-induced extracellular matrix (ECM) accumulation in trabecular meshwork (TM) is associated with aqueous humor outflow resistance and IOP elevation. Recently, we have demonstrated that abnormal ECM accumulation leads to endoplasmic reticulum (ER) stress in TM. Here, we examined whether TGFβ2 induces ER stress in human TM cells.

Methods: GTM3 or primary human TM cells (n=2) were treated with vehicle or recombinant TGFβ2 (5 ng/ml) in 0.5% FBS containing DMEM medium for 3 days & 7 days respectively. ER stress markers (Grp78, Grp94, ATF4 and CHOP) and ECM proteins (Fibronectin & Collagen IV) were examined by Western blot and immunostaining. GTM3 cells were transfected with plasmids expressing CRISPR-Cas9 targeting ATF4 or CHOP and subsequently treated with TGFβ2 for 48 hours. Cellular lysates were examined for ER stress and ECM proteins.

Results: Western blot analysis demonstrated that TGFβ2 treatment led to ER stress as evident from increased levels of Grp78, Grp94, ATF4 and CHOP proteins compared to the vehicle treatment. TGFβ2-induced ER stress markers were also associated with ECM protein (fibronectin and Collagen IV) levels. Moreover, TGFβ2 treatment increased fibronectin staining and its colocalization with ER stress markers, suggesting TGFβ2- induced ECM proteins are associated with ER stress. Knockdown of key chronic ER stress transcriptional factors, ATF4 or CHOP prevented TGFβ2-induced ECM deposition and also reduced ER stress in GTM3 cells.

Conclusions: Our preliminary findings clearly indicate that TGFβ2 can directly induce chronic ER stress in cultured human TM cells.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

904 - Poster
Classification: GSBS Student
Presenter: Declan I. Hesson
Department: GSBS: Pharmacology & Neuroscience
Authors: Declan Hesson; Yang Liu; Abbot F Clark, PhD

Canonical Wnt signaling in optic nerve head astrocytes

Purpose: Canonical Wnt signaling has been explored in areas of the eye like the trabecular meshwork and ciliary body during glaucomatous pathology, but it has not been explored in the lamina cribrosa (LC). Complement protein 1, subunit q (C1q) has been shown to be an activator of the canonical Wnt pathway leading to an increase in fibrosis in various tissues. As C1q concentration increases in blood serum and central nervous system with an increase in age, C1q activation of canonical Wnt signaling may be an important factor in glaucomatous pathology and may be a source of increased fibrosis. Therefore, we aimed to prove that a functional canonical Wnt signaling pathway is expressed in the lamina cribrosa, C1q is an activator of the pathway, and an increase in fibrosis is a result.

Methods: Primary human optic nerve head (ONH) astrocytes from human donor eyes were cultured and characterized. When confluent, cells were serum starved overnight and then treated for 48 hours with 100 nM Wnt3a or left untreated as a control. Following treatment, cells were collected and had cytosolic and nuclear fractions separated. Fractions were then western blotted and probed for β-Catenin. Bands were analyzed via densotometry and fold changes in expression were compared to control cells. Additional primary human ONH astrocytes were cultured and, when confluent, serum starved overnight. Cells were treated with 100 nM C1q, with or without 100 nM DKK1, and expression of fibronectin, laminin, and collagens I and IV was determined via western blotting and immunohistochemistry.

Results: In a single primary human ONH astrocyte strain, β-Catenin expression increased 1.3-fold when treated with Wnt3a and 1.42-fold when treated with C1q in the cytoplasmic fraction compared to control. β-Catenin expression increased 1.3-fold when treated with Wnt3a and 1.39-fold when treated with C1q in the nuclear fraction compared to control. Immunohistochemistry staining for fibronectin increased following treatment with C1q compared to the control. Without additional cell strains, statistical significance is not able to be determined.

Conclusions: Our very preliminary results support our hypothesis that a functional canonical Wnt signaling pathway is expressed in the LC. Additional cell strains will need to be examined to fully determine presence of a functional canonical Wnt signaling pathway as well as determining if C1q activates the pathway in this population.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

905 - Poster
Classification: School of Health Professions Student
Presenter: Saavedra, Alvaro O.; Williamson, Catherine H.; Patel, Visha; Dossou, Sarah S.; Mozdbar, Sima; Aryal, Subhash; Clark, Abbot F.; Bugnariu, Nicoleta
Department: School of Health Professions: Physical Therapy
Authors: Alvaro O Saavedra; Catherine Williamson; Visha Patel; Sarah Dossou; Sima Mozdbar; Subhash Aryal; Abbot F. Clark; Nicoleta Bugnariu

Prevalence of Visual Impairments and their Potential Impact on the Daily Lives of Pre-K Children

Purpose/Hypothesis: The purpose of this study was to report the prevalence of visual impairments (myopia, hyperopia, astigmatism, amblyopia) in pre-school children and discuss the implications of those impairments on motor function in the academic environment.

Number of Subjects: We collected data from 1424 children, 698 female and 726 male, enrolled in Pre-K programs in 20 elementary schools within the Ft. Worth ISD.

Materials/Methods: Children were screened for myopia, hyperopia, astigmatism, and gaze asymmetry using the plusoptiX™ hand-held vision-screening refractometer1. Descriptive statistics provided prevalence of refractive errors and amblyopia. A Chi-squared test was used to compare proportions between male and female, and Hispanic and Non-Hispanic subjects, and those who needed a referral or not.

Results: Our sample had a similar proportion of male (51%) and female (49%) students (p = 0.4581); and the following breakdown by race: Asian 2.25%, Black 22.89%, Caucasian 12.57%, Hispanic 60.74%, and Mixed 1.54%. A total of 932 children (65.5%) passed the vision screening while 493 children (34.5%) were referred for further evaluation. For 184 subjects OD and OS sphere measurements were not recorded. We identified 493 children with isometropic refractive amblyopia risk factors: 9 children with myopia, 30 children with hyperopia, and 454 children with astigmatism. Additionally, 27 children were identified as being at-risk for anisometropic refractive amblyopia. We further evaluated our data for the four risk factors between Hispanic and Non-Hispanic groups. There was no significant difference in myopia (OR = 1.25, 95% CI 0.3361-4.7077) and anisometropia (OR= 1.08, 95%CI 0.49-2.38) between Hispanic and Non-Hispanic groups. There was significant difference in hyperopia (OR = 3.25, 95% CI 1.23-8.57) and astigmatism (OR = 1.58 95% CI 1.25-2.00) between Hispanic and Non-Hispanic groups.

Conclusions: Preliminary results from this sample indicate that myopia and anisometropia have similar prevalence across race groups, but hyperopia and astigmatism are more prevalent in the Hispanic vs. Non-Hispanic group.

Clinical Relevance: Visual impairments have been associated with delayed development and decreased performance in areas including gross motor skill, fine motor, and academic performance. Other studies have shown that there is an association between visual impairments and delayed gross motor skills leading to decreased physical activity and participation. Further studies have shown that with proper visual correction, academic performance can improve to age-matched peers. Gross motor skill delay is often due to lack of opportunity to practice skills rather than just the impairment itself. Therefore screening and correcting visual impairments is pivotal to facilitate typical motor function and

development, increase physical activity and participation, and improve academic performance in children

906 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Payton Harris
Department: North Texas Eye Research Institute
Authors: Payton Harris; Vignesh Krishnamoorthy; Zhang wei; Bindu Kodati; Sai Chavala; Raghu Krishnamoorthy; Dorota Stankowska

The Endothelin Receptor Antagonist Macitentan Ameliorates Endothelin-Mediated Vasoconstriction and Promotes Neuroprotection of Retinal Ganglion Cells in Rats.

Purpose: To determine if dietary administration of the dual ET_A/ET_B receptor antagonist, macitentan, could protect retinal ganglion cells (RGCs) following endothelin-1 mediated vasoconstriction in Brown Norway rats.

Methods: Adult male and female Brown Norway rats were either untreated or treated with macitentan (5 mg/kg body weight) once a day for 3 days followed by intravitreal injection of either 4 µl of 500 mM ET-1 or vehicle in one eye. Imaging of the retinal vasculature using fluorescein angiography was carried out a various time points including 2, 5, 10 and 20 minutes. Following the imaging of the vasculature, treatment of rats was continued for 1 week with either macitentan (5 mg/kg/body weight) in dietary gels or untreated control gels. After euthanizing the rats, retinal flat mounts from the rats were prepared, immunostained for RGC marker Brn3a, imaged and surviving RGCs were counted in a masked manner.

Results: Vasoconstrictive effects following intravitreal ET-1 injection were greatly reduced in rats administered with macitentan in the diet prior to the ET-1 administration. ET-1 intravitreal injection produced a 45% loss of RGCs which was significantly reduced in macitentan-treated rats and RGC counts were similar to that observed in control retinas.

Conclusions: The endothelin receptor antagonist, macitentan, has neuroprotective effects in retinas of Brown Norway rats that occurs through different mechanisms, including, enhancement of RGC survival and reduction ET-1 mediated vasoconstriction preventing ischemia.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-0024

907 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Hania Kahlon
Department: TCOM: Medical Education
Authors: Hania M Kahlon; Mark Jenkins, MD

Ocular Findings and Management in a Steven-Johnson Syndrome Patient

Background: Steven Johnson Syndrome (SJS) is a rare, severe mucocutaneous reaction that commonly occurs in response to medications. The response involves necrosis of the epidermis with severe effects on the patient's mucous membranes. SJS occurs in two to seven people per million each year, with overall mortality at 30%. In our case, we focus on the ocular findings of SJS. Reported ocular findings of SJS commonly include photophobia, severe conjunctivitis, and corneal ulceration. We present a case of SJS to discuss ocular findings in SJS and emphasize the importance of proper recognition of the clinical indications and management of SJS.

Case Information: We present the case of a 52 year old patient who was diagnosed with Steven Johnson Syndrome in January of 1984, 24 hours after taking a sulfa drug. Though the patient was initially misdiagnosed, the patient was eventually admitted with SJS for a 6-week inpatient stay. The patient was placed on a course of outpatient steroids after his hospital stay. It was not until April of 1985 that the patient began seeing an ophthalmologist for his deteriorating vision. The ophthalmologist found that the patient's ocular findings included trichiasis without entropion of both left and right eyelids, corneal epithelial defect in both eyes, pinguecula of the conjunctiva of both eyes, and hyperemia with lid eversion in both eyes. The patient presents to the office every week for epilation of his lashes, as he has for over 20 years. We followed the patient for a period of 6 months to monitor for any changes in his ocular findings. The management of the patient's ocular findings includes weekly epilation of his lashes, along with medications.

Conclusion: This case highlights the ocular findings that can be found in the rare SJS patient. Furthermore, our case indicates the need for further research on the ocular management of SJS. Since our patient's SJS was initially misdiagnosed, our case also indicates the importance of clinical knowledge of the early symptoms of SJS. We hope that, by sharing this information, we can add to the limited research and documentation that we currently have of this rare condition.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

908 - Poster
Classification: GSBS Student
Presenter: Duenshian Wang
Department: GSBS: Pharmacology & Neuroscience
Authors: DuenShian Wang; Xiaobin Liu; Frank Ssentamu; Luis Aguilera Garcia; Yu Yu; Yousong Li; Hongli Wu

Glutaredoxin 2 (Grx2) protects the retina from light-induced photoreceptor damage via regulating the endothelin receptor B (Ednrb) pathway

Purpose: Glutaredoxin 2 (Grx2) is a glutathione-dependent oxidoreductase which is known to reduce S-glutathionylated proteins. In a previous study, we have found that Grx2 could protect the retina from light-induced retinal degeneration. However, the molecular mechanisms that coordinate thiol-repair processes and cell survival systems in the damaged retina remain largely unknown. To better understand the protective effects of Grx2 in the retina, our study was thus extended to analyze the full transcriptome changes of the retinal tissue in light-exposed Grx2 knockout (KO) mice.

Methods: Wild type (WT) and Grx2 KO mice were exposed to white light at 23,000 lux for 1 hour after dark adaptation for 10 hours. The retinal damage was confirmed by the electroretinogram (ERG) recording and spectral domain optical coherence tomography (SD-OCT) measurement. Protein glutathionylation level was evaluated by Western Blot. We then compared the full transcriptome of the retinal tissue in WT and Grx2 KO mice using transcriptome shotgun sequencing (RNA-seq). The gene network was analyzed using DESeq2 pathway analysis software, and real-time PCR and Western Blot further confirmed the selected genes of interest.

Results: Light-exposed Grx2 KO mice showed compromised visual function as indicated by severe loss of both a- and b-wave amplitudes and the thinning of the outer nuclear layer (ONL). Protein glutathionylation level was elevated in light-exposed Grx2 KO mice. We identified thousands of genes with statistically significant expression changes in light-exposed Grx2 KO mice and classified them into cellular processes and molecular pathways. Among these pathways, many genes that are related to complement activation, inflammation, and cell survival system were significantly upregulated. These genes include Bcl-3 and Fgf2 in NF-KappaB family pathway, C4b in classical activation pathway, Jak3 and STAT3 in JAK-STAT signaling pathway, Cdkn1a in DNA damage response pathway, Edn2 and Ednrb in endothelin 2 signaling pathway.

Conclusions: Collectively, our results suggest that Grx2 could protect the retina from light-induced retinal degeneration. Grx2 plays an important role in regulating light-induced retinal inflammation which may be associated with its ability to repair S-glutathionylated substrates.

IRB/IACUC/IBC#: 2016-0010

910 - Poster
Classification: UNT System College of Pharmacy Student
Presenter: Deidra Lee
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Deidra Lee; Linya Li; Dorette Ellis; Shaqing He; Thomas Yorio

Neuroprotective properties of sigma-1 Receptor in Retinal Ganglion cells from Optic Crush Model

Glaucoma is a group of neurodegenerative disorders that lead to the death of the retinal ganglion cells (RGC), optic nerve damage, and may ultimately cause blindness. Elevated intraocular pressure (IOP) is one of the major contributors to glaucoma. As a result, the majority of treatments available target lowering IOP, as a therapy for glaucoma.

Purpose: Studying the neuroprotection of RGCs is important to provide alternative therapies for pro-survival which mitigates RGC death and irreversible optic nerve damage. This study will investigate the sigma-1 receptor as an alternate additional therapeutic target to provide protection of Retinal ganglion cells (RGCs) and possible treatment for glaucoma. Hypothesis: It is hypothesized that the sigma-1 receptor (σ-1r) offers neuroprotection to retinal ganglion cells, therefore, it will restore RGCs and mitigate cell death.

Methods: Treatment groups: wild type mice and σ-1r KO mice. Transfected mice with AAV2-σ-1r vector in order to induce overexpression of sigma-1 receptor (σ-1r), activated σ-1r through agonist-pentazocine, afterward induced injury via Optic Nerve Crush (ONC) protocol, then assessed RGC function and survival. Expression of σ-1r assessed using immunohistostaining & western blot analysis. Pattern Electrocardiogram (PERG) was used to assess visual function of mice retina pre and post- ONC. Adobe Photoshop software was used post retina staining and flat mount to assess the density of RGCs.

Results & Conclusion: When σ-1r was activated and overexpressed, retinal ganglion cells death was mitigated in σ-1r knock out mice. This data suggests that σ-1r has neuroprotective functions to the retinal ganglion cells. Studying the mitigation of retinal ganglion cell death may be beneficial as an alternate target in the treatment of Glaucoma and other optic neuropathies.

IRB/IACUC/IBC#: 2018-0038

1000 - Poster
Classification: GSBS Student
Presenter: Courtney Hall
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Courtney Hall; Roxanne Zascavage; Fritz Sedlazeck; John Planz

Sequencing Long Amplicon Microsatellite Loci Using the Oxford Nanopore Technologies MinION Device

Purpose: Forensic DNA typing exploits the high variability of short tandem repeat (STR) markers to differentiate individuals. Typical STR workflow consists of PCR followed by separation and detection via capillary electrophoresis (CE). Despite the power and reliability of current techniques, variations in nucleotide sequences are masked in size-based DNA profiles. Nanopore sequencing has the ability to provide long-read DNA sequence data that allows for accurate alignment and identification of single nucleotide polymorphisms (SNPs) both within and around STRs of interest. Detection of hidden sequence variation significantly expands the resolving power of STRs and aids in interpretation of more challenging samples. This project aimed to evaluate the applicability of nanopore sequencing to forensically-relevant autosomal and Y STR markers.

Methods: Twenty unrelated individuals, two control DNAs, and three NIST-traceable standards were evaluated for 45 STR loci. Primer sets targeting 800 base pair amplicons containing the repeat and flanking regions were designed and multiplexed. Amplicons from each sample were barcoded and sequenced on the ONT MinION device using 1D read chemistry and SpotON flow cells (vR9.4.1). Raw reads were basecalled with MinKNOW's real-time, local base caller. Sequence data were separated by barcode, merged by sample, and mapped to the human reference sequence (GRCh37/hg19) using NextGenMap-LR (NGMLR). Variations in motif composition and flanking SNPs were detected using Sniffles and visualized with Integrative Genomics Viewer (IGV). Consensus sequences and variant reports were compiled for each sample. Size-based allelic designations were predicted and compared to those generated via CE to evaluate concordance between the STR typing approaches.

Results: High quality sequencing results were obtained for all STR loci interrogated. Concordance between size-based allelic designations revealed the reliability of nanopore sequencing data analyzed using this customized pipeline. Identification of flanking SNPs within the longer amplicons added variations that could differentiate alleles with the same motif structure, enriching discrimination potential.

Conclusions: Complete nucleotide sequence data for repeat and flanking regions enhances the resolving power over that of current STR typing techniques. This project sets the foundation for future development of STRs for biomedically-relevant regions and potential forensic applications.

General Medicine (Abstracts in the 1100s)

1100 - Poster
Classification: Resident (Not for Competition)
Presenter: Matthew John Terhark
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: MATTHEW TERHARK

Constrictive Pericarditis: When Horses Become Zebras

Background: Disease of the pericardium can be broken down into 3 pericardial compressive syndromes. Of particular interest involving the following case is that of constrictive pericarditis. This disease process is typically secondary to loss of the normal elasticity of the pericardial sac.
Precipitating factors for loss of physiologic elasticity of the pericardial sac include idiopathic, viral, connective tissue disorders, iatrogenic neoplastic processes.

Case information: A 57yo male presented to PCP with upper respiratory symptoms, treated with antibiotics, failed to follow up with PCP initially. Continued to experience worsening shortness of breath, was referred to pulmonology who identified significant right sided infiltrate on chest x-ray. Patient directed to our facility where chest tube was placed and TPA administered for loculated pleural effusion. Patient required pressor support following administration and echocardiogram was obtained revealing pericardial calcifications. Patient underwent left heart catheterization followed by staged pericardiectomy then right sided thoracotomy. Patient tolerated procedure well and underwent an uncomplicated postoperative course.

Conclusions: While the symptoms of upper respiratory infection often lead to a benign outcome the potential for adverse disease sequelae is broad.

In this particular case the patients likely viral URI likely lead to the subsequent diagnosis of constrictive pericarditis. In order to prevent permanent and likely progressive symptoms as seen with constrictive pericarditis the patient underwent a pericardectomy within a week of identification. The patient tolerated this procedure well and had complete resolution of constrictive pericarditis symptoms.
In general, Patients experiencing constrictive pericarditis typically present with symptoms related to fluid overload (i.e.-edema, ascites) owing to a diminished cardiac output. As seen with this patient, treatment often involves pericardiectomy otherwise patients are often left with permanent and progressive symptoms.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1101 - Poster
Classification: Resident (Not for Competition)
Presenter: Zachary Ripley
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Zachary Ripley; Huan Nguyen

Depersonalization Disorder Following Medication Withdrawal

Background: Migraine headaches affects nearly 15% or roughly one billion people worldwide and are more common in women. Annually our country spends $78 billion on medical costs (both preventative and abortive) and lost wages. Symptoms can diminish quality of life and often last for several hours and even days.

This case follows a 29-year-old Caucasian female with past medical history of migraine headaches that was admitted to the hospital for depersonalization secondary to Topamax withdrawals.

Case information: A 29-year-old Caucasian female with a past medical history of migraine diagnosed many years ago who was admitted to the hospital with the complaint of confusion, unsteady gait, drowsiness and a feeling of being "disconnected from my body. Upon questioning, the patient takes propranolol 20 mg/day and Topamax 100 mg/day for migraine prophylaxis, but that she was forced to discontinue her Topamax 2 weeks prior due to change in her health insurance. She was diagnosed with depersonalization due to Topamax withdrawal. Topamax was restarted and her mentation returned to baseline. The patient was discharged from the hospital in stable condition.

Conclusions: The goals of migraine preventive therapy include; reducing frequency, severity, and duration, improving responsiveness to treatment of acute attacks, improving function, and preventing progression of episodic to chronic occurrences. Treatment options should be individualized. In 2004, the Food and Drug Administration approved Topamax for the prevention of migraine in adult. Topamax is associated with various psychiatric and neurocognitive side effects and withdrawal symptoms secondary to abrupt discontinuation. Depersonalization is a period of feeling disconnected or detached from one's body and thought while maintaining reality. The disorder belongs to a group of disorders called dissociative disorders. Depersonalization disorder can be precipitated by trauma, seizures, substance abuse, and medication withdrawal.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1102 - Poster
Classification: Resident (Not for Competition)
Presenter: Blessy Varughese, DO, PGY2
Department: Other
Authors: Brandi Addison, DO; Blessy Varughese, DO,PGYII; William Wang, DO, PGYIII

Recognizing Cushing syndrome in Preoperative Assessments for Bariatric Surgery

Background: Bariatric surgery is indicated for BMI ≥ 35 or ≥ 30 with obesity-related co-morbidities. Guidelines recommend ruling out secondary causes of obesity before considering surgery (Mechanick et al., 2013). The incidence of Cushing disease is about 8 cases per million in the United States (Broder 2014). Souto (2015) reported the first case of Cushing disease diagnosed after bariatric surgery and incidentally this patient was found to have a recurrence with lung metastasis a year after an adrenalectomy. In addition, Javorsky et al. (2015) reported 15 cases of Cushing syndrome diagnosed after bariatric surgery at multiple tertiary centers.

Case Information: A 60-year-old female, with a history of morbid obesity and gastric bypass in 2005, was referred to an endocrinology clinic September 2018 for concerns of hypercortisolism. The patient reported symptoms of 40-pound weight gain, rounder face, thin skin, easy bruising, fatigue, and lower extremity weakness. The patient was screened for Cushing syndrome with a 1-mg low dose suppression test. Morning ACTH and cortisol levels were elevated at 31 and 12.2, respectively. This was followed by a high dose suppression test with 8-mg dexamethasone and both morning ACTH and cortisol were significantly lowered to 7 and 2.4, confirming a pituitary origin. A MRI of the brain pituitary protocol was performed in October 2018 revealing a "left sided pituitary adenoma". Ultimately neurosurgery recommended medical management with surveillance MRIs. The patient was started on mifepristone for hypercortisolism symptoms.

Conclusions: The bariatric surgery guidelines (ASMBS), which is co-sponsored by American Association of Clinical Endocrinologist and The Obesity Society, strongly recommend the screening of Cushing syndrome if it is clinically suspected. However, patients may not be screened due to lack of recognition of this syndrome (Mechanick et al., 2013). Furthermore, complications can occur in patients with untreated Cushing syndrome undergoing bariatric surgery including thromboembolic events and osteoporosis (Savastano). Prior to referral for bariatric surgery, physicians must be vigilant about Cushing syndrome as a cause of obesity in their preoperative assessment. Therefore, avoiding a delay in diagnosis and treatment of the underlying disease can prevent long term consequences and reduce mortality (Savastano, Borsoi).

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1103 - Poster
Classification: Resident (Not for Competition)
Presenter: Robert Dillard, DO
Department: TCOM: Medical Education
Authors: Elizabeth Kim, MD; Robert Dillard

Rectal perforation injury following high pressure water penetrating trauma: a case report

Background: Injuries to the rectum and perineal regions secondary to jet-ski and watercraft vessels are uncommon and unique, presenting a potentially complicated clinical scenario. While this injury pattern has been described before, severity, intervention and hospital course has varied among cases[1]. Additional descriptions of these trauma types may be necessary to establish a standardized approach to the treatment of such injuries.

Case information: The patient is a 16-year-old female with a past medical history of asthma that was a transfer from an outside medical facility. She presented following a trauma sustained after falling off a jet-ski. She reports being the third individual seated at the rear of the watercraft when the wake created by another vessel caused her to be thrown from the back. She states that she fell backwards onto the water being propelled from the back of the jet-ski and felt a sudden sharp burst of pain. She described her pain as moderate, located in the lower pelvis, radiating to her abdomen and back. The patient was brought to an outside hospital where she was found to have several small lacerations in the perianal region and rectal bleeding. On presentation to our institution approximately 8 hours after injury, she was neurologically intact (GCS 15), blood pressure 128/73, heart rate 120s, febrile 101.5F. Primary trauma survey was intact and the secondary survey revealed two small superficial lacerations at the anterior and posterior aspects of her anus, good sphincter tone, and malodorous dark rectal discharge mixed with blood. Abdominal examination revealed tenderness to palpation over the lower quadrants with guarding.

Given the above findings, the patient was taken to the operating room for surgical evaluation and treatment. She was placed in the lithotomy position and proctoscopy performed. Visualization was difficult secondary to a large amount of dark, watery anal discharge but a large posterior rectal defect was appreciated on examination, about 6 cm from the anal verge. The surgical team proceeded to perform a diagnostic laparoscopy which was converted to an exploratory laparotomy after confirmation of intra-abdominal extension of contaminated water. Upon evaluation of the pelvis, the presacral space was found to be dissected with underlying exposure of the sacrum and rupture of the retroperitoneum near the bifurcation of the aorta. Additionally, large amounts of contaminated water were found throughout the bilateral paracolic gutters and between the small bowel loops. The rectum also demonstrated a 5 cm anterior vertical serosal tear. Surgical intervention involved stapling and transection of the rectosigmoid junction leaving ~15cm rectal stump and providing colonic diversion, rectal serosal repair, abdominal washout, drain placement within the presacral space exiting the right lower abdominal quadrant, and temporary abdominal closure. She remained intubated and was admitted to the trauma surgical intensive care unit.

Planned takeback occurred 24 hours later. Proctoscopy was repeated with better visualization. The rectal defect was found to involve approximately 40% of the posterior circumference. The celiotomy was reopened and explored, no residual fluid collections were noted, all observed bowel was viable. The abdominal cavity and presacral space were irrigated once more and a second drain placed exiting the

left lower abdominal quadrant. An end sigmoid colostomy was created and the abdominal fascia closed. A subcutaneous wound vacuum device was placed. The patient was extubated and returned to the ICU. Postoperative care included empiric broad spectrum antibiotic coverage for freshwater organisms. The initial regimen included Levaquin and Flagyl for anaerobic/gram-negative bowel flora contamination and Clindamycin with Fluconazole for possible endemic organisms present within the water contamination. This antibiotic combination was continued from the time of admission until 24 hours after final closure when Clindamycin and Flagyl were discontinued. Intraoperative cultures resulted negative and all antibiotics were discontinued after a total of nine days.

On postoperative day fourteen, the patient began to experience intermittent fevers with moderately elevated leukocytosis. Computed tomography of the pelvis showed an abscess collection present within the presacral space. Interventional radiology was consulted for percutaneous drain placement. Drain cultures were taken and yielded a specimen positive for multi-drug resistant Staph epidermidis, Streptococcus viridans, and Gardnerella vaginalis, for which she was treated with Cefepime, Flagyl, and Vancomycin. On postoperative day nineteen, the patient continued to experience intermittent fevers. Repeat imaging of the pelvis showed an abscess collection present despite the surgical drains in place. The patient was returned to the operating room for surgical drainage. She was placed in the lithotomy position and proctoscopy was performed with the rectal defect irrigated with two liters normal saline to drain the presacral abscess. A large penrose drain was left in place through the defect. Antibiotic coverage was continued until the patient's discharge to an ancillary facility.

Conclusions: The above case presents several points of interest. Rectal injuries and perforations from high pressure water exposure is an uncommonly reported incident and the subsequent management less defined. The initial approach to such an injury first requires recognition of the potential sequelae of the mechanism and appropriate evaluation of the patient's clinical status. A prior case report acknowledged the benefits of a multimodal assessment with the use of imaging and non-operative interventions as warranted in hemodynamically stable patients in whom peritonitis was not present[1]. For more severe cases, where further intra-abdominal involvement is suspected, imaging becomes more selected as surgical intervention will most likely be warranted.

Close examination of the entire perineal region should be performed, including both the genital and anal areas. Proctoscopy is beneficial in identifying the proximity and circumference extent of the rectal injury, which may be difficult to assess during laparotomy, especially if present on the posterior/retroperitoneal surface. Frequently, however, frank watery discharge is present in excess and impedes visualization of the injury. When intra-abdominal extension is likely, laparoscopy/laparotomy is indicated for presacral drainage. In the case above, exposure of this area showed a large dead space created by the pressure injury, denoting a difficult area to control surgically and subsequently abscesses occurred despite multiple drains in place. As commonly documented in previously reported cases, an end diverting colostomy was created. After adequate drainage and diversion, the rectal injury is allow to heal without attempts at primary closure. A colorectal consultation may be beneficial, both at the onset of treatment and for further long-term followup.

Empiric antibiotic coverage should be initiated to include specimens both present within the gastrointestinal tract and water source. Freshwater exposure includes Aeromonas, Edwardsiella, Erysipelothrix, Vibrio, and Mycobacterium species. A third or fourth generation cephalosporin, fluoroquinolone or clindamycin is appropriate for gram-negative coverage in addition to Vancomycin for gram-positive organisms. Metronidazole should be added for anaerobic coverage. Antibiotics can then be tailored once cultures have speciated.

Multidisciplinary care is advantageous in a unique case such as this and should follow the tenants of safe surgical diversion and drainage. Awareness of rectal injuries associated with watercraft vessels can aid in prompt identification and effective management.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1104 - Poster
Classification: School of Health Professions Student
Presenter: Dylan Graham
Department: School of Health Professions: Physician Assistant Studies
Authors: Iqra M. Parupia, PA-S; Leanne O. Esbayhat, PA-S; Dylan S. Graham, PA-S; April L. Ruggiano, PA-S; Jessica L. Hartos, Ph.D

Is Sleep Duration Related to Weight Status in Young Adults With Asthma?

Purpose: Sleep duration and weight status have been found to be related in prior studies in healthy populations; however, there are conflicting findings and limited research for young adults with asthma. The purpose of this study was to determine whether sleep duration is related to weight status in young adults with asthma.

Methods: This cross-sectional analysis used 2016 data from the BRFSS for males (N=116) and females (N=212) ages 18-34 years with asthma in Alaska, Arizona, Arkansas, and Maine. The relationship between sleep duration and weight status was assessed by gender with combined state data using multiple logistic regression analysis while controlling for mental and physical health, physical activity, alcohol and tobacco use, ethnicity, age, income level, educational level, employment status, and state.

Results: Across states, the majority of male and female participants with asthma reported being overweight or obese (57-59%) and a relatively low amount reported averaging more than 8 hours of sleep (7-11%). The results of adjusted analysis indicated that male participants who averaged more than 8 hours of sleep per night were less likely to be overweight or obese compared to those who averaged 6-8 hours per night. Weight status was not related to sleep in females.

Conclusions: After assessing the relationship between sleep duration and weight status in young adults with asthma, results indicated that males who slept more than 8 hours per night were less likely to be overweight or obese. Primary care clinicians might expect to find a moderate prevalence of obesity and a low prevalence of a sleep duration of more than 8 hours in males and females with asthma. If young adult males with asthma have symptoms of either obesity or short sleep duration, providers should screen for both and provide education and treatment. There was no significant relationship in females.

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IRB/IACUC/IBC#: 2017-169

1105 - Poster
Classification: School of Health Professions Student
Presenter: Katherine Mankus
Department: School of Health Professions: Physician Assistant Studies
Authors: Katherine E. Mankus, PA-S; Meghan N. McMahon, PA-S; Mary E. Morgan, PA-S; Valerie L. O'Rourke, PA-S; Jessica L. Hartos, PhD

Does Tobacco Use Differ by Metropolitan Status in Young Adults Ages 18-24?

Purpose: Prior research shows conflicting findings for the relationship between tobacco use and metropolitan status. The purpose of this study is to determine whether tobacco use, including smoking and chewing tobacco, differs by metropolitan status among young adults ages 18-34 years old.

Methods: This is a cross sectional analysis using 2016 BRFSS data for Florida (N=752), Michigan (N=182), New York (N=1112), and Washington (N=285). Ordered logistic regression was performed for combined state data to assess patterns in relationships between tobacco use and metropolitan status while controlling for demographic and socioeconomic factors, health status, and alcohol use.

Results: Across states, most people reported no tobacco use (77%), about one-fifth reported only smoking tobacco (19%), and very few people reported only chewing tobacco (3%) or both chewing and smoking tobacco (2%). For metropolitan status, about one-quarter reported living in a urban area (26%) and about one-third reported living in a suburban area (39%) or rural area (34%). The results of the adjusted analysis indicated that each successive level of tobacco use was moderately related to living in a rural or suburban area and highly related to alcohol use.

Conclusion: The results of this study indicate that each successive level of tobacco use is moderately related to living in a suburban and rural area, compared to living in an urban area, and to alcohol use in young adults ages 18-34 years old. For primary care providers, it is recommended to screen for tobacco and alcohol use in all young adults, especially those living in rural and suburban communities. Clinicians should provide education for substance use and resources for substance abuse programs as needed.

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IRB/IACUC/IBC#: 2017-169

1106 - Poster
Classification: School of Health Professions Student
Presenter: Merin Mathew
Department: School of Health Professions: Physician Assistant Studies
Authors: Merin Mathew; Rija Amir; Hailey E Alford; Sonya Mohan; Jessica L Hartos

Does Alcohol Use Increase the Risk for Obesity in Middle Aged Males?

Purpose: Alcohol misuse is a serious public health issue within the general population, but there are conflicting findings regarding its relationship to obesity. The purpose of this study was to determine whether alcohol use increases the risk for obesity in middle aged males in the general population.

Methods: This cross sectional analysis used 2016 Behavioral Risk Factor Surveillance System (BRFSS) data for males ages 45 to 64 from Maine (N=1,667), North Dakota (N=1,060), South Carolina (N=1,669), and Wisconsin (N=998). Multiple logistic regression analyses conducted by state were utilized to examine the relationship between alcohol use and obesity while controlling for health related and demographic factors.

Results: Across states, about one third of the sample was obese (35-38%) and about half to two thirds reported alcohol use (55-69%). Adjusted results indicated that weight status was inversely related to excessive alcohol use in three of four states. In addition, weight status was positively related to health conditions while inversely related to physical activity and tobacco use.

Conclusions: Overall, alcohol use was inversely related to obesity in representative samples of 45-64 year old males. As there is likely low to moderate prevalence of both obesity and alcohol use in middle aged males, it is recommended that providers screen for obesity and alcohol use separately. Adequate nutrition should be evaluated in individuals with excessive alcohol use and referrals to addiction specialists should be made as needed. In addition, there may be moderate to high prevalence of smoking, physical activity, and more than two health conditions, and these may be moderately related to obesity. Providers should screen middle aged males for smoking and physical activity during all visits and specifically screen for health conditions in individuals with an obese weight status as these were directly related. In addition, encouragement and education should be provided on the benefits of exercise and referrals to a fitness instructor or dietician should be provided as needed.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

1107 - Poster
Classification: School of Health Professions Student
Presenter: Alexandra Enzor
Department: School of Health Professions: Physician Assistant Studies
Authors: Alexandra M. Enzor; Amelia G. Etzel; Emily A. Lau; Gloria B. Vertin; Jessica L. Hartos, Ph.D.

Is Weight Status Related to Mental Health Status in Young Adult Females?

Purpose: The aim of this study was to assess the relationship between weight status and mental health status in young adult females given limited research regarding the relation between these variables in this target population.

Methods: This cross-sectional analysis used 2016 BRFSS data for young adult females ages 18-34 from Alabama (N=636), Kentucky (N=751), Louisiana (N=303), and Mississippi (N=441). Ordered logistic regression was conducted separately by state to assess the relationship between mental health status and weight status while controlling for general health status, physical activity, sleep duration, substance use, income level, education, employment status, age, and ethnicity/race.

Results: About half of young adult females reported low or moderate mental health status (43-54%) in the last month, and the majority reported being overweight (26-32%) or obese (29-38%). The results of this study indicated that mental health was not significantly related to weight status in 3 out of 4 states after controlling for health-related factors, substance use, socioeconomic factors, and demographic factors. However, mental health was positively related to general health status, and inversely related to sleep and age in all four states.

Conclusion: Overall, in females ages 18-34, there was a moderate prevalence of low or moderate mental health status and a high prevalence of overweight or obese weight status, but mental health status was not significantly related to weight status. Therefore, primary care practitioners should screen all patients for both but treat separately. However, mental health was positively related to general health and inversely related to sleep duration and ages 18-24. As these are significantly related, primary care practitioners should screen for all and treat concurrently. Practitioners should educate patients on improving general health status and on the importance of getting six or more hours of sleep each night, and provide referrals as necessary.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

1108 - Poster
Classification: School of Health Professions Student
Presenter: Laura Rozell
Department: School of Health Professions: Physician Assistant Studies
Authors: Laura A. Rozell; Madison E. Roman; Kayla F. Thornhill; Jamie P. Callahan; Jessica L. Hartos; Julia O. Reynolds

Is Sleep Related to Mental Health in Middle Aged Males & Females?

Purpose: Studies have related sleep disturbances and mental health disorders, but not sleep duration and current general mental health. Therefore, this study aims to determine whether sleep duration is related to current general mental health in middle aged males and females in the general population.

Methods: This cross-sectional analysis used 2016 BRFSS data for males and females ages 35 to 54 in Alabama (N=2000), Arkansas (N=1118), Kentucky (N=2890), Oregon (N=1578), and West Virginia (N=2087). Ordered logistic regression analysis was conducted separately by state and gender to assess the relationship between sleep duration and mental health while controlling for health-related and demographic factors.

Results: About one-third to one-half of male and female participants reported low to moderate mental health (31-51%) and less than one-fourth reported short sleep duration (11-21%). Mental health was significantly related to sleep and health conditions for both genders as well as to smoking status, alcohol use, and physical activity for females.

Conclusion: Mental health was related to sleep duration and health conditions for both genders. Therefore, clinicians should screen for mental health status, sleep issues, and health conditions if symptoms of any present. For females, mental health is also related to smoking status, alcohol use, and physical activity, so clinicians should screen for all if symptoms of any present. Clinicians should address each of these factors concurrently with mental health.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

1109 - Poster
Classification: School of Health Professions Student
Presenter: Ryan Benner
Department: School of Health Professions: Physician Assistant Studies
Authors: Daisy Herrera-Vazquez; Ryan Benner; Jessica Hartos; Audrey Avila

Assessing the Relation Between Weight Status and Sleep Status in 18-24 year old Females

Purpose: Obesity and sleep deprivation are prevalent within the United States. The purpose of this study was to determine whether weight status differs by sleep duration in 18-24 year old females.

Methods: This sample includes women age 18-24 years old in Louisiana (N=100), Mississippi (N=118), and Texas (N=215). Descriptive statistics for each category by state and multiple logistic regression for each category by combined states were used for analysis using StataIC 15.1. Cross sectional analysis was performed using data obtained from the 2016 Behavioral Risk Factor Surveillance System conducted by the Center for Disease Control and Prevention.

Results: Results indicated that approximately 40% of participants were either overweight or obese and approximately 20% had either long or short sleep duration. BMI was not significantly related to sleep duration in participants; however, physical activity was inversely related to weight status.

Conclusion: The purpose of this study was to determine whether weight status differed by sleep duration in 18-24 year olds and it was found that there was no significant relation in this demographic. Results did, however, find that physical activity was highly related to weight status. Thus, in primary care practice, women age 18-24 with a higher BMI should be screened for their physical activity level. Those who do not participate in physical activity should be encouraged to participate, and possibly be referred to physical therapy to find appropriate exercises.

Sponsor: N/A
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1110 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Russell Vo
Department: Other
Authors: Russell Vo; David D. Nguyen; Janet D. Lee; Sanketh R. Kichena; Dexter E. Nwachukwu; Kristi A. Kway; Cara S. Lammers; Alissa Mirochnitchenko; Cara L. Fisher

Clinical Implications of Accessory Renal Arteries: A Case Report

The kidneys are paired retroperitoneal organs that receive 20-25% of cardiac output and function in the filtration of blood and maintenance of homeostasis. In 70% of the population, each kidney is perfused by a single renal artery that branches off the abdominal aorta at L1-2 vertebrae. This leaves 30% of individuals with either accessory or aberrant renal arteries. (1) Accessory renal arteries are auxiliary to the main renal artery and both travel together through the hilum to perfuse the kidney. Meanwhile aberrant renal arteries are the sole source of kidney perfusion and typically branch directly from the abdominal aorta, entering the kidney outside of the hilum. (2) During a routine dissection of an 82-year-old female cadaver, a unilateral accessory renal artery was identified on the right side. This accessory artery was identified entering the inferior pole of the right kidney, branching directly from the anterolateral aspect of the abdominal aorta prior to its bifurcation. This accessory artery passed under the ureter and gonadal vessels. Accessory renal arteries and renal stenosis both produce similar symptoms and effects including systemic hypertension and hydronephrosis of the implicated kidney. (3) It is pertinent that these vascular anomalies be identified prior to medical procedures and surgeries such that adequate perfusion is maintained to prevent ischemia and kidney loss. Methods to identify accessory or aberrant renal arteries prior to surgical approaches, radiological interventions, and kidney transplants must be considered to prevent or mitigate the risk of complications.

1111 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Matthew Schultz
Department: Other
Authors: Matthew J Schultz; Eric A Barcak, DO

Medial periarticular clavicle fracture repair using inverted distal clavicle plate and sternal fixation: a case study

Background: Fractures of the medial third of the clavicle are rare, comprising less than 3% of all clavicle fractures. Available studies regarding medial clavicle fractures report frequent poor outcomes with traditionally-accepted nonoperative management, especially in cases of complete displacement. The medial periarticular clavicle fracture presents a distinct therapeutic challenge as the medial fragment may be too small for adequate screw fixation. We report a favorable outcome following surgical repair of a fully displaced medial periarticular clavicle fracture using an inverted distal clavicle plate and sternal fixation.

Case information: A 29-year-old male presented with left shoulder pain and visible deformity along the left medial clavicle following a motor vehicle collision. Radiographs demonstrated a medial clavicle fracture with greater than 100% displacement and shortening of approximately 2 cm. The surgeon opted to perform open reduction and internal fixation due to significant displacement, shortening and cosmetic deformity. Upon reduction, it was determined that the medial fracture fragment was too small for adequate screw fixation. Instead, a distal clavicle plate normally used for the right shoulder was inverted, placed along the fracture site, and utilized to obtain multiple fixation points in the clavicle and sternum. Final imaging showed adequate fracture reduction and restoration of shoulder length. The patient was placed in a shoulder immobilizer and later discharged with instructions for physical therapy. His plate was removed 6 months after surgery. 8 months after surgery, the patient had full range of motion, strength comparable to the contralateral side, and returned to work without complication.

Conclusions: This case describes the unique surgical repair of a medial periarticular clavicle fracture. Traditional management of this injury has been nonoperative, but available literature reports frequent unsatisfactory results, including symptomatic non-union and continued pain. Despite the severity of this case, the patient accomplished a full recovery with no complications. The findings of this case study support surgical intervention for displaced medial periarticular clavicle fractures and suggests that fixation to the sternum is appropriate in cases where the medial fracture fragment is too small for adequate screw fixation.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1112 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Alfred Laborde
Department: TCOM: Medical Education
Authors: Taylor WB Blackwood; Alfred J Laborde; Cara Fisher, Ph.D

Supraclavicular Course of Left External Jugular Vein

Background: The external jugular vein is formed by the union of posterior division of retromandibular vein and posterior auricular vein. Variant drainage of the venous system is common and has been discussed at length in anatomical journals and textbooks. However, variations in the drainage of the EJV is uncommon and as such there are limited reports of this specific anomaly. We report a rare case of unilateral left EJV drainage that coursed superficial to the left clavicle and then proceeded to drain into the left subclavian vein.

Case Information: During routine dissection of a 70-year-old African-American male cadaver, a unilateral variation in the left external jugular vein (EJV) was noted. This variant EJV was found to descend superficial to the left clavicle and then proceeded to drain into the left subclavian vein. This is a deviation from the typical left EJV path which normally courses posterior and deep to the clavicle before draining into the left subclavian vein. This cadaver was an African-American male and as such the variant was not noted on pre-dissection integumentary exam. It is unclear whether he possessed knowledge of his anomaly. We were unable to obtain a full medical history for the cadaver; however, the cause of death was determined to be metastatic esophageal cancer.

Conclusions: Anatomical variations of the EJV may pose certain health risks increase the complexity of various surgical procedures. The EJV is commonly used as an indicator for increased central venous pressure which can be used concordantly with other symptoms for the diagnosis of: right-sided heart failure, pulmonary hypertension, or tricuspid valve stenosis. Knowledge of the EJV and its common variants is important for clinicians and surgical specialists. Surgeons performing placement of pacemaker leads or implantable cardioverter defibrillators should be acutely aware of the EJV and its variants to reduce complications and improve patient outcomes. Patients and individuals possessing this EJV variation may be at increased risk of adverse outcomes in the event they were to fracture their clavicle. The clavicle is the most commonly fractured bone in the body and the middle third is the most fractured segment, where this variant was noted. Notching of the clavicle was noted where the EJV passed superficial to it. We postulate this may be due to increased pressure from its tortuous path as well as aberrant development due to the mobility of the clavicle.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1113 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Shannon Chang
Department: TCOM: Pediatrics
Authors: Shannon Chang; Karolina Kata, M.B.S.; Abhinaya Ganesh; Joyce E. Mauk, M.D.; Paul Bowman, M.D.; Laurie Bailey, Ph.D; Tyler Hamby, Ph.D; Haylie L. Miller, Ph.D.

A Comparison of Autism Spectrum Disorder (ASD) and a dual diagnosis of ASD + Developmental Coordination Disorder (DCD): A Case Study

Background: Autism Spectrum Disorder (ASD), Developmental Coordination Disorder (DCD), and the dual diagnosis of ASD+DCD often have longer diagnostic trajectories given the complexity of their symptom profiles and associated difficulty with differential diagnosis. While first concerns may originate from parents, schools, or medical professionals, it may take years of waiting and assessments to reach a final diagnosis. Patients with co-occurring disorders can undergo a lengthier process as symptoms of 1 disorder may mask symptoms of another and create confusions within a care team. By understanding differences in the lines of service visited, symptoms, and parent concerns exist for patients with and without a dual diagnosis, we aim to identify potential targets for improvement in the diagnostic process.

Case Information: Patient 1 (ASD+DCD) is a Caucasian female who presented with first concerns at 2 years and reached an ASD diagnosis at 6.25 years and a DCD diagnosis at 2 years. She was recommended and utilized speech therapy (ST), occupational therapy (OT), and physical therapy (PT). She had 9 visits with professionals and was assessed with the Ages and Stages Questionnaire (ASQ), Modified Checklist for Autism in Toddlers (M-CHAT), and the Autism Diagnostic Observation Schedule (ADOS). Patient 2 (ASD) is a Hispanic male with first concerns at 2 years and reached a final diagnosis at 6.5 years. While he was recommended ST, OT, and PT, he only utilized ST. He had 10 visits with professionals before reaching his diagnosis and was assessed with the ASQ, ADOS, and Social Communication Questionnaire (SCQ). Both were first seen by Pediatrics and were given a final diagnosis at Child Study Center.

Conclusions: The age when a reliable diagnosis for ASD or DCD can be made is 1.5 and 5 years, respectively. However, the average age of diagnosis for ASD or DCD is 4.9 and 7.8 years. While patient 1 reached her DCD diagnosis at 2 years, both patients received their ASD diagnoses later than average. Several factors, such as the physician's knowledge, clinical resources, sex, socioeconomic status, cultural and language barriers, and co-occurrence with ADHD may play a role in explaining this delay in diagnosis.

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IRB/IACUC/IBC#: 2018-024 and CCMC-IRB

1114 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Hamza Salim
Department: Non-UNTHSC
Authors: Hamza Salim; Thrupthi Komandur; Usman Shah; Mohammed Turab; Pritvhi B Patil; Nirav Thosani

Radiofrequency ablation (RFA) for the treatment of refractory gastric antral vascular ectasia: a systematic review and meta-analysis

Purpose: Gastric antral vascular ectasia (GAVE) is an uncommon cause of upper GI bleeding characterized by mucosal and submucosal vascular ectasia that commonly manifests as occult bleeding and chronic anemia. Argon Plasma Coagulation (APC) is frequently used as initial treatment for symptomatic GAVE. APC often requires multiple endoscopies and patients may not have full resolution of symptoms. Radiofrequency ablation (RFA) has emerged as a successful alternative. This study aims to conduct a systematic review and meta-analysis to evaluate the safety and efficacy of RFA in the treatment of GAVE.

Methods: A comprehensive search of Pubmed, EMBASE, and Web of Science databases was performed, which focused on reviewing titles/abstracts, choosing relevant studies, and conducting necessary data extrapolation. This search was done on literature from 2008 up until June 2018 and studies with less than 5 patients were excluded. The measured parameters included improved hemoglobin levels, transfusion dependence, RFA treatment modality, adverse events, and number of RFA treatments.

Results: We identified a total of 8 studies (N=128 patients) that used RFA for refractory GAVE. The HALO-90 or HALO-ULTRA ablation catheter (Covidien, GI Solutions, Sunnyvale, CA, USA), with a power capacity of 10-15 $J/cm2$, were the treatment modalities used. The overall clinical success rate for RFA in treatment for refractory GAVE was 68% (59%-76%, I2 value for heterogeneity 0). Average pre-treatment Hb value increased significantly from 8.03 (6.88-9.18, I2 94) to 10.38 (9.49-11.27, I2 77) after the RFA treatment. This difference was statistically significant: Standardize difference in mean 1.92 (0.50-3.35, $p < 0.01$, I2 77).

Conclusions: RFA can be an effective alternative in treatment for GAVE refractory to APC. While long-term data is limited, the evidence shows improved Hemoglobin levels and decreased transfusion dependence in treated patients. Further controlled trials are needed to compare the long-term safety, efficacy, and cost-effectiveness between RFA and APC in the treatment of GAVE and CRP.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1115 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Matthew Mitts
Department: TCOM: Pediatrics
Authors: Matthew Mitts; Preetam Gongidi; Don Wilson; Luke Hamilton; Joel Steelman

Skeletal dysplasia and growth failure in congenital hypothyroidism due to a novel form generalized thyroid hormone resistance.

Background: Thyroid hormone exerts systemic actions mediated by its specific receptors. These actions encompass a wide array of functions, including energy homeostasis, skeletal growth, neural development, cardiac function, and gastrointestinal function.

There are two thyroid hormone receptors, thyroid hormone receptor alpha (THRA) and thyroid hormone receptor beta (THRB) which are encoded by genes on two different chromosomes and with differing tissue distributions. Only mutations in THRB were known until recently with a reported incidence of 1 in ~40,000. Mutations in thyroid receptor THRA have recently been discovered and are is exceedingly rare, with 14 cases documented in the past five years. We report a case of a patient with generalized thyroid hormone resistance due to THRA mutation.

Clinical Case: Patient was born to non-consanguineous parents at term and was appropriate for gestational age. Prenatal ultrasound was suspect for shortened long bones. Congenital heart disease (ASD and VSD) were detected at birth.

Genetics consultation confirmed ultrasound concern with finding of mild rhizomelia. Patient had coarse facial features, macroglossia, and dysmorphic appearance. Initial genetics work-up showed normal chromosomes, normal newborn screening, and normal metabolic studies. Genetics was concerned for possible mucopolysaccharidosis, but further testing ordered did not show definite results of this diagnosis. Patient exhibited post-natal growth failure after birth with length well below 3[rd]percentile by 18 months old. Delayed developmental milestones (verbal > motor) was seen.

Thyroid function tests between birth and 11 months old were normal. Thyroid function testing at 11 months old were suspect for central hypothyroidism with free T4 0.6 ng/dl (0.6-1.3) and TSH 1.07 uIU/ml (0.71-5.81). Cranial MRI scan showed no abnormalities in hypothalamic-pituitary area.

Levothyroxine 37.5 mcg was started, and thyroid function tests normalized. However, little change was seen clinically in patient's growth pattern or development. Whole exome screening performed in 2013 demonstrated a heterozygous mutation in the THRA gene consistent with generalized thyroid hormone resistance from this mutation. Liothyronine treatment was added in 2014. Growth has continued to be extremely slow with current height standard deviation score of -4.2. Patient is developmentally delayed and non-verbal.

Conclusions: A constellation of findings including post-natal growth failure, skeletal findings, and prominent verbal developmental delays are seen in generalized thyroid hormone resistance due to THRA mutation. The subtle presentation of this condition is different from congenital hypothyroidism or generalized thyroid hormone resistance due to THRB mutation. This case will help geneticists and endocrinologist recognize this condition.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

1116 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Matthew Pueringer
Department: TCOM: Medical Education
Authors: Matthew Pueringer; Jordan Brzezny; Randa Razzouk; Tyler Hamby; Julie Barrow

Retrospective analysis of the patients referred to the pediatric nephrology clinic at Cook Children's for evaluation of hypertension

Background/Significant Aims/ Purpose: There is increasing evidence that hypertension and pre-hypertension are becoming more prevalent in the pediatric population and may contribute to premature atherosclerosis and the early development of cardiovascular disease and kidney disease. Higher blood pressure in childhood correlates with higher blood pressure in adulthood and the onset of hypertension in young adulthood. Despite the awareness of this increasing prevalence, pediatric hypertension is often unrecognized. The purpose of this study was to quantify the proportion of patients, referred to pediatric nephrology clinics for hypertension, who first had elevated blood pressure (EBP) ≥1 year prior to referral.

Methods: This study was a single center retrospective chart review of patients aged 3-18 years and referred to the outpatient nephrology clinic at Cook Children's for the evaluation of hypertension, pre-hypertension, or EBP between July 1st 2016 and July 1st 2017. We excluded patients referred for diagnoses other than hypertension, patients previously seen by nephrology, and patients lacking appropriate documentation. We examined patients' numbers of appointments with EBP (systolic and/or diastolic BP ≥95th percentile) prior to referral and the proportion of patients with ≥1 year between EBP and referral to nephrology. Additionally, we examined the source of the appointments with EBP, looking at the clinics from specialty versus primary care.

Results: Of the 135 charts reviewed, 46 patients met inclusion criteria. Of these, only 5 (11%) were referred within the first year of documented EBP. The median time to referral in years was 3.54 for the population studied. The median number of visits prior to referral with documented EBP was 5, and 9 (20%) patients had ≥10 visits with EBP prior to referral. Cardiology and neurology had high and low rates of referral, respectively.

Conclusion: Hypertension, considered a silent killer, is associated with premature atherosclerosis and early-onset vascular disease manifestations. Early diagnosis and management are crucial, and preventative measures to limit further development should be taken. For the present data, both the duration of time and number of visits from first EBP to referral to nephrology are concerning from a prevention standpoint. Further data acquisition and analysis are required but the awareness on this topic is essential.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

1117 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Maryam Burney
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Maryam Burney; John Licciardone; Nicole Phillips

Investigating the Interaction Between Self-Reported Measures of Pain and COMT and BDNF Polymorphisms in the Setting of Chronic Low Back Pain

Purpose: Chronic low back pain (CLBP) is now the leading cause of disability worldwide and is the second most common reason for health care visits. The etiology of CLBP is multifactorial, from molecular to psychosocial factors. Single genetic polymorphisms (SNPs) of catechol-o-methyltransferase (COMT) and brain derived neurotrophic factor (BDNF) have been shown to moderate pain outcomes. Also, certain cognitive responses of pain have been shown to amplify pain intensity. Current literature lends support to the predictive value of a bio-psychosocial model on pain outcomes. Thus, it is hypothesized that cognitive pain responses and COMT and BDNF SNPs interact to modulate pain outcomes.

Methods: This cross-sectional study included 424 subjects with CLBP. Subjects provided biological samples for analysis and completed cognitive measures of pain, the pain self-efficacy (PSE) and pain catastrophizing (PCS). A one-way ANOVA was run for rs4680 (COMTVal158Met) and rs6265 (BDNFVal66Met) using the Numerical Rating Scale (NRS), PCS and PSE as phenotypes. LSD post hoc analyses were completed for the rs4680 and r56263 genotypes that showed a statistically significant difference ($p<.05$).

Results: One-way ANOVA showed a statistically significant difference in the rs4680 genotypes and NRS pain outcomes ($p=0.03$). A LSD post hoc analysis of rs4680 revealed that the AG group ($p=0.017$) had lower pain outcomes compared to the AA group. The one-way ANOVA did not present a relationship between rs6265 genotypes and pain outcomes ($p=0.40$). Neither pain catastrophizing nor self-efficacy were associated with rs4680 and rs6265.

Conclusions: Results indicate that pain outcomes in rs4680 AG heterozygotes are statistically reduced when compared to AA homozygotes. Thus, the AG genotype of rs4680 could be a significant predictor of pain outcomes in the setting of CLBP.

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1118 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Lilly Hammack
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Lilly Hammack; John Licciardone

Gender Differences in Chronic Low Back Pain Perception and Chosen Treatment Modalities

Background: Differences in perceptions and reported levels of pain intensity between men and women are poorly understood. Current evidence indicates an increased prevalence of chronic pain syndromes in women. However, relationships among gender, reported pain and related clinical outcomes, and pain treatment modalities have not been adequately studied.

Purpose: The purpose of this research was to examine differences between men and women in pain intensity and its clinical impact, including differences in pain treatment modalities according to gender. Hypotheses: Women are more likely to report higher levels of pain intensity than men, and thereby also experience greater back-related disability and poorer quality of life. Women are more likely to use non-pharmacological approaches to manage pain in addition to, or in place of, opioids and nonsteroidal anti-inflammatory agents (NSAIDs).

Methods: 452 patients aged 21 to 79 years with chronic low back pain were selected from the Pain Registry for Epidemiological, Clinical, and Interventional Studies and Innovation (PRECISION Pain Research Registry). Patient data at registry enrollment included sociodemographic and clinical characteristics, including pharmacological and non-pharmacological treatments used. Clinical status measures included a numerical rating scale for pain intensity (NRS), the Roland-Morris Disability Questionnaire (RMDQ), and quality of life deficits on the SPADE cluster (sleep disturbance, pain interference with activities, anxiety, depression, and low energy/fatigue). Contingency table methods and t-tests were used for analysis.

Results: No statistically significant differences between genders with respect to NRS, RMDQ, and SPADE scores (p= 0.75, 0.27, and 0.23, respectively). A statistically significant relationship was observed between females and NSAID usage (p=0.03). However, no significant relationships were observed between gender and use of opioids or other non-pharmacological pain treatment modalities.

Conclusions: Women were not more likely to report higher levels of pain, nor to report higher levels of pain-related disability or quality of life deficits. Women were more likely than men to use NSAIDs for their low back pain, but were not more likely to use opioid therapy or other non-pharmacological pain treatment modalities. Further research is needed to determine what other factors might play into women using NSAIDs more frequently.

Sponsor: N/A
IRB/IACUC/IBC#: 2015-169

1119 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Jason Gnasigamany
Department: TCOM: Internal Medicine & Geriatrics
Authors: Jason Gnasigamany; Lauren Burgess; Gabriel Cecenas Salas; Smita Subramaniam

Bilateral Pulmonary Embolism as Initial Presentation of Invasive Adenocarcinoma of the Colon

Background: Venous thromboembolism (VTE) is a frequently encountered diagnosis, and there are numerous genetic and acquired risk factors for this affliction. Thromboembolism due to hypercoagulability in cancer is well-known, and it is a common cause of death in these patients. Thrombosis represents the second most frequent cause of death in cancer patients, and cancer accounts for almost 20% of all VTE events. The highest incidence of VTE is in mucin-producing pancreatic, lung, and ovarian carcinomas. Although pulmonary embolism (PE) incidence in colon cancer is not as high as other malignancies, VTE may reflect more aggressive cancer and is a predictor of death within one year of diagnosis. In this report, we present a patient with syncope and anemia, a common scenario which uncovered the diagnosis of PE and subsequently colon adenocarcinoma.

Case Information: A 43-year-old male presented with syncope, and had experienced fatigue, chest pain and dyspnea for a week. Aside from hypertension, there is no significant history. Vitals showed tachycardia, tachypnea and decreased oxygen saturation. Physical exam was unremarkable, and labs revealed severe microcytic anemia and a BNP of 2,285 (

Conclusions: Cancer patients treated with anticoagulation have lower mortality, and guidelines recommend low-molecular-weight heparin (LMWH) for cancer-associated thromboembolism. However, new evidence suggests that direct oral anticoagulants (DOACs) are reasonable alternatives. For our patient, we decided to give Apixaban for its ease of use over LMWH, and recent approval of DOACs is increasing the confidence regarding their safety. The unique aspects of this case involving anemia and bleeding risk with the need for anticoagulation raise the awareness of the varied co-existing disorders that can impact the diagnosis and treatment of cancer patients.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1120 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Giovanny Destin
Department: TCOM: Pediatrics
Authors: Giovanny Destin; Maria Perez

Nontypical presentation of scurvy in a previously healthy child without risk factors

Background: Scurvy has been reported to be the cause of death for about two million sailors between 1500 to 1700 AD. It is a disease caused by a prolonged deficiency in Vitamin C. It is an especially rare disease in children in developed countries. It often presents with irritability, failure to thrive, muscle/joint pain, and mucocutaneous features in infants and older children. A modern interest in the subject has risen due to an increase in reports of the disease in recent years. These cases are often of children with underlying medical conditions. Very few cases have been reported in otherwise healthy children. We report a rare case of scurvy in a previously healthy 3-year-old patient from a middle-class family who presented without mucosal bleeding or odd dietary habits.

Case information: A previously healthy 3-year-old male presented to rheumatology clinic for evaluation of a limp. He had no prior hospitalizations or surgeries, and had no chronic medical problems. Mom reported a development of a nonspecific limp and a refusal to jump that began three months prior to presentation. Physical exam revealed full range of motion of all joints without swelling or tenderness. He had no epistaxis, gingival bleeding, or petechiae. Patient had extensive workup done to rule out malignancies and autoimmune disorders. Post-streptococcal glomerulonephritis, inflammatory arthropathy, axial spondyloarthropathy, leukemia, and chronic recurrent multifocal osteomyelitis were all considered during the workup for this patient due to the atypical patient presentation and nonspecific lab findings. The x-ray of the leg showed some stress fractures which raised concerns for possible vitamin deficiency. Labs showed low vitamin D levels and Vitamin C levels. A diagnosis of scurvy was made. Patient was placed on vitamin C and D supplements with rapid improvement in his condition.

Conclusion: Scurvy can have a vague presentation and can often mimic other diseases such as malignancies, osteomyelitis, septic arthritis, rheumatologic conditions, and bleeding disorders. Because of its rarity in America, a nontypical case can make it very challenging to derive this diagnosis. Although cases of scurvy in patients without underlying medical conditions have been reported, the lack of gingival and skin findings and odd nutritional habits make this a very rare and unusual case.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1121 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Robert Wilson
Department: TCOM: Internal Medicine & Geriatrics
Authors: Robert J Wilson, MS III; Brittney Campbell, MS III; Harsha Alles, MS III; Nisha Dhanabalsamy, MD; Joe Simon, MD

Lance-Adams Syndrome: A Case Study

Background: Lance-Adams syndrome (LAS) is a rare condition caused by brain hypoxia commonly due to respiratory arrest leading to chronic uncontrollable myoclonus. The myoclonus usually develops weeks to months following respiratory arrest and successful cardiopulmonary resuscitation (CPR). LAS is a rare clinical entity with as few as 150 cases reported in the medical literature. Anesthetic and surgical accidents account for the majority of respiratory arrest incidents in LAS cases. However, other inciting events include cardiac arrest, drug overdose, and suicide attempts. We present a case of a 59-year-old male who developed LAS months following cardiac arrest secondary to an anomalous cardiac artery and successful CPR.

Case information: A 59-year-old male with a past medical history of anoxic brain injury secondary to cardiac arrest, congestive heart failure, cerebral vascular accident with residual left sided weakness, and seizure disorder presented to the emergency department with generalized myoclonus, despite the use of levetiracetam 500mg twice daily. After an extensive series of imaging studies and lab work neurology was consulted due to the increasing complexity of the case. Upon neurology recommendation levetiracetam was increased to 1000mg twice daily, without clinical improvement. At this time, due to the lack of MRI, CT, and EEG findings it was determined by neurology that the patient was experiencing symptoms concurrent with LAS. The diagnosis of LAS was most likely, considering the patients history of anoxic brain injury caused by cardiac arrest just 6 months prior with successful cardiopulmonary resuscitation. Neurology stopped levetiracetam and switched to valproate at a one-time dose of 500mg. The patient had complete remission of the post-hypoxic myoclonus and eventually discharged on valproate 500mg twice daily.

Conclusion: In concordance with other cases of Lance-Adams Syndrome (LAS) which have been documented, this patient experienced a cerebral hypoxic event prior to the development of his myoclonus. As noted by several other authors' presentations of LAS, this patient also did not exhibit any acute imaging findings on CT or MRI of the brain, further supporting the the lack of pathognomonic imaging findings for LAS. Of note, though unresponsive to levetiracetam, this patient's myoclonus resolved completely with valproic acid, further validating its consideration as the first-line treatment in patients suffering from LAS.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1122 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Michael Vu
Department: TCOM: Internal Medicine & Geriatrics
Authors: Michael H Vu

Rapidly Progressive Glomerulonephritis in an Otherwise Healthy Elderly Female

Background: Rapidly progressive glomerulonephritis describes a clinical syndrome that is characterized by a rapid loss of renal function in a relatively short period of time, ranging from days to months, that can ultimately lead to complete renal failure. The histologic hallmark of RPGN presents as proliferating crescents found within the kidney glomeruli which are induced by inflammatory cytokines and made of fibrin, cellular components, and differentiating antibodies. RPGN can present as a wide variety of symptoms associated with severe acute kidney injury such as uremia, gross hematuria, edema, fatigue, hypertension, and oliguria.

Case Information: A 73-year-old female with a past medical history of well-controlled hypertension, hyperlipidemia, and type 2 diabetes mellitus along with chronic kidney disease stage 3 and chronic heart failure with preserved ejection fraction (50-55%) presented after a ground level fall at home. Traumatic injury or loss of consciousness could not be ruled out. Reported symptoms included shortness of breath, oliguria, and generalized weakness. With extensive workup and evaluation, patient exhibited markedly elevated creatinine from baseline, elevated inflammatory markers, fractional sodium excretion indicative of intra-renal disease, crescent formation on renal biopsy, and blood work positive for cytoplasmic anti-neutrophil cytoplasmic and myeloperoxidase antibodies. Treatment was initiated with aggressive steroid therapy, therapeutic plasmapheresis, and immunosuppressant therapy with Rituximab.

Conclusions: If left untreated, RPGN can be a severe syndrome that can lead to end-stage renal failure, subsequent infection, and/or massive pulmonary hemorrhage. Hallmark of treatment is centered around high-dose steroid therapy and immunosuppression. Expectations of said treatment are focused on decreasing the degree of irreversible renal injury rather than complete remission. Outcomes remain largely dependent of time of diagnosis or clinical suspicion. Even though clear diagnostic findings are outlined along with treatment guidelines, a large deal remains to be discovered regarding definitive pharmacologic options. Treatment plans should include extension discussion with the patient and family remembers regarding quality of life, side-effects and burden of aggressive immunosuppressive therapy, and degree of irreversible renal damage.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1123 - Poster
Classification: TCOM DO Student (4th Year)
Presenter: Gladys Lopez
Department: TCOM: Internal Medicine & Geriatrics
Authors: Gladys Lopez; Shara Elrod, PharmD, BCACP, BCGP

Risk factors for QTc Interval Prolongation in the Ambulatory Setting

Purpose: Prolongation of the QT interval through acquired characteristics or congenital abnormalities can lead to Torsades de Pointes (TdP), a life-threatening arrhythmia. A number of clinical characteristics and medications have an association with acquired QT prolongation, with some having a higher risk than others. The objective of our study was to identify patients seen by University of North Texas Health Science Center (UNTHSC) providers at risk for QT interval prolongation and to describe the most common QT-prolonging clinical characteristics and medications in this patient population.

Methods: A retrospective analysis for those aged 18 to 99 years seen by UNTHSC providers between July 1st through October 1st, 2018 was conducted. Records were obtained for: diagnoses, laboratory values, vitals, most recent medication list, and presence of completed electrocardiogram (EKG). Clinical characteristics were filtered for those with high quality evidence for clinical association with increased QT interval. Medications were classified, based on published evidence of prolonging the QT interval via CredibleMeds.com, as: 'Known Risk of TdP', 'Possible Risk of TdP', and 'Conditional Risk of TdP'. Collected data were analyzed using descriptive statistics.

Results: A total of 11,759 patients were identified for inclusion. Patients were mostly female and White with 15% of patients identifying themselves as Hispanic or Latino. The median age was 60 years, and 40% were at least 65 years of age. The median BMI was 29.44 kg/m2. Twenty-one patients had a calcium level below 8.5 mg/dL; with 28 having a potassium level below 3.5 mmol/L. Twenty-five patients had an eGFR (if African American) below 30 mL/min/1.73m2, and 35 patients had an eGFR (if non-African American) below 30 mL/min/1.73m2. A total of 1,359 patients had a documented EKG. The five most commonly prescribed medications in the 'Known Risk of TdP' category were escitalopram, donepezil, citalopram, ondansetron, and fluconazole.

Conclusions: Our findings highlight the importance of reviewing both medications, some of which only pose a risk under certain conditions, and clinical characteristics. Future studies can aid providers in more easily identifying patients at risk for life-threatening arrhythmias.

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IRB/IACUC/IBC#: 2018-174

1124 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Swathi Sridhar
Department: Other
Authors: Swathi Sridhar; Larry Swanson, MD

A Previously Unreported Combination of Mutations and its Unexpected Outcome in a Patient with Type 1a Rickets: A Case Study

Background: Type 1a rickets is a rare autosomal recessive condition in which the enzyme 1-alpha-hydroxylase is not fully active. The result of this mutated enzyme is the inability to convert vitamin D from 25-hydroxyvitamin D to its active form, 1,25-dihydroxyvitamin D. This form of rickets classically presents with low 1,25 (OH)2 vitamin D, hypocalcemia, elevated parathyroid hormone (PTH), and distinct radiographic findings such as bowing of the legs and widening of the growth plates.
There are a number of mutations of the CYPB27B1 gene that are known to cause impaired enzymatic activity. Individuals with homozygous and compound heterozygous mutations have been described. Correlations between specific mutations and varying degrees of enzymatic impairment have been made.

Case Information: A 14-year-old male was referred to endocrinology after experiencing a pathologic femur fracture. His mobility was severely limited secondary to bowing of his legs and pain with weight bearing. He was 48.4" tall (z = -4.8). He had pronounced bowing of his extremities and wide wrists. Labwork revealed the following: serum Ca 6.3 mg/dL, serum Phos 4.4 mg/dL, PTH 265 pg/mL, 25-hydroxyvitamin D 29 ng/mL, and 1,25 (OH)2 vitamin D 33 pg/mL (19-83).

He was then admitted to the inpatient endocrine service and treated with oral and IV calcium, ergocaliciferol, and calcitriol.

Later, whole exome sequencing revealed compound heterozygous variants of the CYP27B1 gene: c1319_1325dupCCCACCC (p.P443fs) and c.1226C>T (p.T409l).

The normal level of 1,25-(OH)2 vitamin D concentration was surprising, given that both of the mutations in this patient were previously believed to cause complete enzymatic inactivity.

The P443fs variant has been found in combination with other mutations, resulting in phenotypic variability. The T409l variant appears less frequently in the literature, but is also believed to cause complete enzymatic inactivity. The P443fs and T409l mutations, however, have not previously been described together.

Conclusion: The normal 1,25 (OH)2 vitamin D concentration in this patient suggests that at least one of these two CYP27B1 variants does not universally cause complete enzymatic inactivity, which is a departure from the current evidence base.

Further use of genetic testing in Type 1a Rickets may result in improved understanding of the connection between genotype and phenotype in this rare condition.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

General Public Health (Abstracts in the 1200s)

1200 - Poster
Classification: School of Health Professions Student
Presenter: Sarah Story
Department: School of Health Professions: Physician Assistant Studies
Authors: Sarah Story, PA-S; Mackenzie Dainty, PA-S; Lauren Weise, PA-S; Bethany Dempsey, PA-S; Jessica Hartos, PhD; Feroza Thompson, MSPAS, PA-C

Does Alcohol Use Differ by Metropolitan Status in Females Ages 25-44?

Purpose: Alcohol use can lead to serious health concerns and even death, but findings are inconsistent regarding whether risk differs by where people live. The purpose of this study was to determine whether alcohol use differs by metropolitan status in female adults ages 25-44.

Methods: This cross-sectional analysis used data from the 2016 Behavioral Risk Factor Surveillance System (BRFSS) for females ages 25-44 in California (N=271), Colorado (N=428), Florida (N=1109), New York (N=1456), and Texas (N=482). Ordered logistic regression analysis was used with combined state data to assess the relationship between alcohol use and metropolitan status while controlling for demographic and health-related factors.

Results: Across states, almost half of participants reported alcohol use (49-65%), about one-fifth reported excessive alcohol use (14-26%), few were smokers (8-20%) and about half reported mental health issues in the past 30 days (38-52%). Metropolitan status varied among urban (12-54%), suburban (24-51%), and rural (5-42%) residents. Adjusted results indicated that metropolitan status, current smoking, and mental health status were significantly related to alcohol use.

Conclusion: Overall, alcohol use differed by metropolitan status in female adults ages 25-44, with urban women reporting drinking more than their rural counterparts. In a primary care setting, providers may expect half of young adult females to drink alcohol, half to have mental health issues, and few to be smokers. Providers need to be aware that current smokers and those with mental health issues are more likely to report alcohol use. Because alcohol use is related to metropolitan status, providers should screen for alcohol use in every woman aged 25-44, and especially those from urban areas. They should also include screening for smoking and mental health status when any of these factors are present, and provide education and referrals to substance abuse programs and mental health counseling as necessary.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

1201 - Poster
Classification: School of Health Professions Student
Presenter: Michelle Shropshire
Department: School of Health Professions: Physician Assistant Studies
Authors: Michelle Shropshire; Jacob Torre; Erica Zeitz; Aleksandra Fuller; Jessica Hartos

Does Mental Health Differ by Obesity in Younger, Middle Aged, and Older Females?

Purpose: Although the relationship between mental health and obesity has been well studied, it has not been researched by age groups. The purpose of this study is to examine the relations between mental health and obesity among younger, middle aged, and older adult female age categories in the general population.

Methods: The cross-sectional analysis used 2016 data from the Behavioral Risk Factor Surveillance System (BRFSS) for females from Arkansas, Louisiana, Mississippi, and Tennessee. Multiple logistic regression was used by state to assess the relationship between obesity and mental health in females of different age groups while controlling for race, education level, income level, employment status, marital status, general health, health conditions, tobacco use, alcohol use, and physical activity.

Results: The majority of participants in all age groups reported good mental health (younger: 49-56%; middle aged: 57-59%, older: 71-82%), and less than half of participants across age groups were obese (younger: 29-41%; middle aged: 38-49%; older: 27-35%). In the adjusted analyses, mental health did not differ by weight status across states and age groups. However, a moderate inverse relationship was found between good mental health and number of health conditions across all age groups.

Conclusion: The results of this study indicate that obesity is not related to mental health in females in different age groups in the general population, but is moderately to highly related to number of health conditions. For female patients in a primary care setting, it is recommended to screen for mental health when 2 or more health conditions are present, regardless of the patient's age, and educate and treat as comorbid symptoms.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

1202 - Poster
Classification: School of Health Professions Student
Presenter: Anita Boulom
Department: School of Health Professions: Physician Assistant Studies
Authors: Anita Boulom; Jerome Siegel; Jessica Hartos; Kelly Ashworth; Justin Burns

Does Alcohol Misuse Differ by Veteran and Gender Status in Adults 25 to 75 Years of Age?

Purpose: Historically, alcohol misuse has been a problem among veterans. The purpose of this study was to examine whether alcohol misuse differs by veteran and gender status in adults 25 to 75 years of age in the general population.

Methods: This cross-sectional study used data from the 2016 Behavioral Risk Factor Surveillance System for adults 25-75 year olds in Alaska (N=2443), Arizona (N=8319), Montana (N=4754), South Dakota (N=4580), and Wyoming (N=3572). Ordered logistic regression by state was used to assess whether alcohol misuse differs by veteran and gender status when controlling for physical and mental health status, tobacco use, education, employment, income, race and marital status.

Results: Across five states, there were low levels of excessive alcohol use (21-26%) and few veteran males (12-15%) and veteran females (1-2%). After controlling for health and socioeconomic factors, results showed that veteran and non-veteran males were more likely to use alcohol than non-veteran females (moderate effect sizes). In addition, alcohol use was highly related to physical health (moderate effect sizes) and smoking status (small effect sizes), and inversely related in age 65-75 (moderate effect sizes).

Conclusion: Results of our analysis revealed a significant relationship between alcohol misuse and gender and veteran status across five states. Alcohol use was also related to smoking and good physical health in all 5 states. Providers in a primary care setting may expect a low prevalence of alcohol use in adults 55 to 75 years of age, but alcohol use screening should continue for all patients. Patients and with risk factors of alcohol misuse, that smoke tobacco, and are in good physical health, especially males, should undergo further detailed screening for moderate to high levels of alcohol use and educational materials and referrals should be made available.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

1203 - Poster
Classification: School of Public Health Student
Presenter: Samantha Harrison
Department: School of Public Health: Health Behavior & Health Systems
Authors: Samantha Harrison; Erika Thompson

Break a Sweat, Mend Your Mind: Exercise and Mood Among Adolescents

Purpose: The prevalence of depression in adolescents is rising, and regular exercise has been reported to have a decreasing effect on incidence of depressed mood in meta-analyses of adult interventions. There is a need to explore this association among adolescents. The purpose of this study was to examine the association between exercise and mood among United States adolescents responding to the Youth Risk Behavior Survey (YRBS) 2017.

Methods: YRBS is a nationally representative sample of 9th through 12th grade students (N=14,765), and was restricted to an analytic sample (N=10,789). The outcome of interest was depressed or low mood (yes/no to feeling sad or hopeless in the past 12 months), and the exposure was physical activity (yes/no to being physically active for at least 60 minutes on five or more days in the past week). Covariates included: age, sex, race/ethnicity, physical education class attendance, sports team participation, and hours of sleep. SAS version 9.4 was used to perform survey-weighted descriptive estimates and crude and adjusted logistic regression models.

Results: Overall, 47.5% of participants reported being physically active, and 31.3% reported feeling sad or hopeless in the last year. Respondents who reported physical activity were less likely to have reported feeling sad or hopeless when compared to those who were not physically active (OR=0.68, 95%CI 0.59, 0.79). When adjusting for age, sex, race/ethnicity, physical education class attendance, sports team participation, and hours of sleep, the association was no longer statistically significant (aOR=0.93 95%CI 0.80, 1.10).

Conclusions: While an association between exercise and depressed mood was not observed in this cross-sectional study, further research is needed into the risk and protective factors for depression in adolescents due to the rising prevalence of the disorder.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-104

1204 - Poster
Classification: School of Public Health Student
Presenter: Noah C. Peeri
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Noah Peeri; Ashvita Garg; Bingchun Wan; Karabi Nandy, Ph.D.

Factors Associated with Electronic Cigarette Use in a Population-Based Sample in the US.

Purpose: Electronic cigarettes (e-cigarettes) are lithium-ion battery powered devices that deliver nicotine vapor by heating a coil immersed in a solution of nicotine, propylene glycol, or some other humectant, delivering nicotine and flavor to the users' lungs. They are often marketed as devices for cessation of traditional cigarette smoking. However, they are not considered an entirely safe option because they contain nicotine, lead, volatile organic compounds, and known carcinogenic agents. This work examined the prevalence and patterns of electronic cigarette use in a recent population-based sample of the US.

Methods: Utilizing data from the 2017 Behavioral Risk Factor Surveillance Survey (BRFSS), 529,714 participants aged 18 and older were included in the analysis. E-cigarette user status was defined as current, former and never. Weighted multinomial logistic regression was used to estimate odds ratios (ORs) and 95% confidence intervals (CIs).

Results: Prevalence of current, former and never users of e-cigarette were 3.2%, 12.3% and 84.5%, respectively. Females had higher odds of being current e-cigarette users, compared to being former (OR: 1.17; 95% CI: 1.06,1.30) and never users (OR:1.52; 95% CI:1.38,1.67). Older age was associated with higher odds of current use, with a significantly increasing trend with age (p_{trend}

Conclusions: Utilizing data from a cross sectional nationally representative sample of the united states, we identified factors associated with current, former and never users of e-cigarette. This information could inform intervention strategies for groups at highest risk of e-cigarette use.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-104

1205 - Poster
Classification: School of Public Health Student
Presenter: Cassidy LoParco
Department: School of Public Health: Health Behavior & Health Systems
Authors: Cassidy LoParco; Ashley Lowery; Marcela Leon; Annalynn Galvin; Dana Litt; Melissa Lewis

Examining Willingness and Intentions to Drink Alcohol as Predictors of Protective Behavioral Strategies

Purpose: Willingness and intentions are components of the Prototype Willingness Model (PWM), which predicts adolescent and young adult health-risk behaviors. However, research has yet to examine intentions and willingness as predictors of health-protective behaviors, such as alcohol-related protective behavioral strategies (PBS). PBS are behavioral strategies to reduce the amount of alcohol consumed or risk for negative consequences. Longitudinal and daily-level findings have shown PBS to be associated with alcohol-related consequences. As such, we hypothesized that willingness and intentions to drink any alcohol or engage in heavy-episodic drinking (4+ women, 5+ men) will be associated with subsequent PBS use.

Methods: A total of 1,034 participants (mean age 19.5, 45% male) completed longitudinal data as part of a larger experimental study. Linear regressions controlling for age and sex were used to test all models.

Results: Study findings indicated that the harm reduction PBS subscale was significantly predicted by intentions of heaviest drinking day ($\beta = 0.027$, $t = 2.261$, $p < 0.05$). The manner of drinking PBS subscale was predicted by willingness to drink any alcohol ($\beta = -0.178$, $t = 2.974$, $p < 0.005$), willingness to engage in heavy-episodic drinking (HED) ($\beta = -0.179$, $t = -4.012$, $p < 0.001$), intentions to engage in HED ($\beta = -0.115$, $t = -4.3$, $p < 0.001$), and intentions for heaviest drinking day ($\beta = -0.051$, $t = -3.956$, $p < 0.001$). The limiting drinking PBS subscale was predicted by willingness to drink any alcohol ($\beta = -0.133$, $t = -2.379$, $p < 0.05$) and intentions to engage in HED ($\beta = -0.066$, $t = -2.607$, $p < 0.05$).

Conclusions: Willingness and intentions, the primary components of the PWM, were shown to predict the health-protective behaviors of alcohol-related PBS. A targeted intervention among those who are more willing to drink may promote the use of PBS, which in turn may reduce alcohol-related consequences.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-008

1206 - Poster
Classification: School of Public Health Student
Presenter: Ashley Lowery
Department: School of Public Health: Health Behavior & Health Systems
Authors: Ashley Lowery; Cassidy LoParco; Annalynn Galvin; Marcela Leon; Melissa Lewis; Dana Litt

Late Night Social Networking Use and the Associations with Adolescent and Young Adult Sleep Quality, Substance Use, and Anxiety

Purpose: Research has shown social networking site use to be associated with adolescent and young adult health and risk behavior generally, but less is known about whether late night use is related to health and well-being. The purpose of this study is to examine late night use (between the hours of 11pm and 5am) of specific social networking site platforms (Snapchat, Instagram, Facebook) in relation to sleep quality, substance use (alcohol, marijuana), and anxiety.

Methods: Adolescents and young adults ages 15-20 (mean age of 18.39, (SD = 1.32), 47% male) completed a survey from which the current data are drawn as part of a larger experimental study (N=306). Linear regressions were carried out, controlling for age, sex, education status, race, alcohol and marijuana use, and anxiety in all models.

Results: Findings indicated that past week late night use of Instagram was associated with fewer hours of sleep at night on average (t = -2.02, $p < .05$), poorer perceived sleep quality (t = 3.44, $p < .001$), and waking up more often after having gone to sleep (t = 2.11, $p < .05$) in the past month. Linear regression results indicated that past week late night use of Instagram was positively associated (t = 2.78, $p < .01$) and past week late night use of Facebook was negatively associated (t = -2.12, $p < .05$) with higher number of drinks per occasion on average in the past month. Late night use of Facebook, Instagram, and Snapchat was not associated with marijuana use (all p-values > .05). Finally, linear regression results indicated that past week late night use of Snapchat was positively associated with past month anxiety (t = 2.102, $p < .05$).

Conclusions: Together, these findings contribute to the growing literature supporting the association between social media use and various aspects of well-being in adolescents and young adults. The present findings suggest that late night social networking site use by platform is an important factor that warrants further investigation in the context of adolescent and young adult sleep, substance use, and anxiety.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-009

1207 - Poster
Classification: School of Public Health Student
Presenter: Jialiang Liu
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Jialiang Liu; Sumihiro Suzuki

Early detection of influenza outbreaks: an application of a Bayesian online change point detection algorithm with optimal hyperparameter estimation using the CDC Influenza-Like Illness Surveillance Network (ILINet) data

Introduction: Each year, the incidence of influenza (flu) and its financial costs are substantial in the United States (US). The Centers for Disease Control and Prevention (CDC) indicates that approximately 25 million people in the US were infected with influenza during the 2015-2016 flu season, leading to 11 million flu-related medical visits, and 12,000 flu-associated deaths. Although flu outbreaks occur every year, the timing and severity of these outbreaks vary from year to year. A critical component in averting the spread of the flu and its adverse consequences is early detection of imminent flu outbreaks. The earlier the detection, the more time there is to implement proactive prevention strategies against the spread of the disease. However, under the current gold standard for flu surveillance, the US Outpatient Influenza-Like Illness Surveillance Network (ILINet) conducted by the CDC, flu activity is estimated and monitored based on clinical and laboratory data. As such, there is always a delay of up to three weeks between the occurrence of the outbreak and dissemination of this information. Thus, there is an urgent need for improving and strengthening the flu surveillance system to provide timely outbreak information for guiding public health decisions that seek to prevent and control the disease.

Purpose: To test the feasibility for early detection of imminent flu outbreaks by applying a Bayesian online change point detection (BOCPD) algorithm with optimized hyperparameter estimation to the CDC's ILINet data.

Method: CDC ILINet data from the week of 1/16/2010 through 4/29/2017 (N = 380 weeks) were used in the analysis. The CDC ILINet data consist of weekly number of people seeking medical attention with symptoms of influenza-like illness (ILI). Change points were detected using the BOCPD algorithm with a 1-year (52 weeks) rolling window. That is, instead of using a constant set of hyperparameters for the machine learning process, new hyperparameters were used every week when detecting change points, where the new hyperparameters were estimated using the data from the previous 52 weeks. CDC declares flu outbreaks using ILINet data when the percent of ILI during that week exceeds a predetermined threshold. For each season, the first change point that satisfied the following conditions was considered informative in early detection of the subsequent outbreak: (1) its percent of ILI visit was higher than that of the last change point, (2) its percent of ILI visit was less than the predetermined CDC threshold for an outbreak, and (3) the relative change between its percent of ILI and the CDC threshold was less than 50%.

Results: Except for the 2011-2012 flu season, we were able to detect the imminent outbreak, on average, 6 weeks prior to the actual outbreak.

Conclusion: Results suggest that the BOCPD algorithm may be effective in detecting flu outbreaks weeks prior to the start of the outbreak.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-104

1208 - Poster
Classification: School of Public Health Student
Presenter: Jialiang Liu
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Jialiang Liu; Shande Chen; Kimberly Fulda; Yuhan Huang; Meng-Hua Tao

Trends in dietary and total magnesium intake of Hispanic Adults, National Health and Nutrition Examination Survey (NHANES) 1999 – 2014

Purpose: Magnesium is an essential mineral that plays important roles in hundreds of physiologic activities; however, intake of magnesium has been histologically low in Americans. The 2015-2020 Dietary Guideline for Americans particularly identified magnesium as one nutrient of concerns. The purpose of this study is to report trends in magnesium intake from foods and total magnesium intake (from foods and supplement) between 1999 and 2014 among US Hispanic adults, overall and stratified by gender, race, age, family income level, and education level.

Methods: Data on 9,690 Hispanic adults aged 20 years or older from eight National Health and Nutrition Examination Surveys (NHANES) cycles (1999 – 2014) were included in this study. The sample size per cycle ranged from 957 to 1,651. In NHANES, daily dietary magnesium intake was collected through 24-hour dietary recalls, and supplemental intake of magnesium was obtained from a dietary supplement questionnaire. For each survey cycle, survey-weight, energy-adjusted average dietary and total magnesium intakes were estimated, and the prevalence of dietary and total magnesium intake below the Estimated Average Requirement (EAR) were estimated using the National Cancer Institute (NCI) method. Linear regression was used to test trends in mean intake and prevalence of inadequacy over time.

Results: Among Hispanic adults, overall both dietary and total magnesium intake increased significantly between 1999 – 2000 and 2013 – 2014, from 269 mg/day to 285 mg/day for dietary intake and from 289 mg/day to 305 mg/day for total intake (p-quadratic trend < 0.001 for each). In all time periods, dietary and total magnesium intakes tended to be lower among women, other Hispanics, adults with lower education level, lower family income or aged ≥ 65years. The overall prevalence of intake below the EAR for both dietary and total magnesium intake decreased between 2003 – 2004 and 2013 – 2014 (p trend < 0.001). However, approximately 40% of Hispanic adults remained to have magnesium intake below the EAR in 2013-2014.

Conclusions: Our results indicate mild improvements in magnesium consumption level among U.S. Hispanic adults between 1999 and 2014, while the prevalence of magnesium inadequacy remained high, which suggesting the necessary to improve magnesium intake in this population through appropriate public health educations on nutrition and supplementation.

1209 - Poster
Classification: School of Public Health Student
Presenter: Ann M. Adams
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Ann Adams; Sumihiro Suzuki; Patrick Clay

Number of interventions identified in the initial comprehensive medical review for HIV patients and its association to patient complexity

Background: Over the past decades, there has been a marked decrease in HIV infection and morbidity rates, which has resulted in a growing and aging population of people living with HIV (PLWH) worldwide. In comparison to the general population, PLWH experience an increased risk of age-related morbidity. Among these, hypertension, hyperlipidemia, and endocrine disease (including diabetes) have been identified as the three most common comorbidities for this population, not including HIV. Furthermore, previous projections have indicated that the growth of the workforce providing HIV care is not enough to meet the needs of the growing PLWH population.

To address the concerns associated with the care of this population, the patient-centered HIV care model designed to enhance medication therapy management (MTM) services provided by community-based pharmacists through partnerships with medical providers, has been suggested as a possible effective strategy. MTM are pharmacist-driven interventions (action plans) that aim to resolve medication-related issues. First, a systematic review of the patient's entire medication regimen is conducted. After the review, the pharmacist will compile a medical action plan that consists of recommended actions for the patient, his/her care provider(s), or the pharmacist themselves to resolve the issues identified in the medication review process.

Previous studies have noted the benefits of MTM for both HIV and certain chronic conditions. Despite this, there appear to be barriers to implementing these services on a regular basis. Surveyed pharmacists often cite lack of time as their top barrier to integrating MTM services within their practices and carrying out the actions plans identified. A few published studies have documented the amount of time that is allocated to providing MTM services, but no study has investigated the amount of time necessary to provide MTM to PLWH, a subpopulation whose needs are unique and complex. As most pharmacies have established industry standards for the time it takes for each intervention, a crucial first step for the regular adaptation of MTM services for PLWH is to quantify the number of interventions that they require to determine the time that would be required to care for these patients.

Purpose: The purpose of this research is to determine the relationship between the three most common comorbidities for PLWH (i.e., hypertension, hyperlipidemia, and diabetes) and the number of interventions (as a proxy for time) identified on the comprehensive medication review at the baseline of a patient-centered HIV care model study.

Methods: Data for this project were obtained from a patient-centered HIV care model study which was built as a part of a collaboration project between the CDC, Walgreens, and UNTHSC. Patients were recruited into the study across 10 different sites across 8 different states. Regression analysis was conducted for the analysis.

Results and Conclusions: The analyses are still being conducted. We expect to find that there is an association between the complexity of the patient, i.e., more comorbidities, and the number of interventions. Such findings will help practitioners determine the amount of time that should be allocated for PLWH.

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1210 - Poster
Classification: School of Public Health Student
Presenter: Laura Mayfield
Department: School of Public Health: Health Behavior & Health Systems
Authors: Laura Marie Mayfield; Erika Thompson

An Assessment of Obesity and Sleep Sufficiency Among Adolescents in the United States

Purpose: Obesity is increasing among adolescents in the US, and understanding co-factors is needed. Insufficient sleep may contribute to obesity among adolescents. The purpose of this study was to assess the association between sufficient sleep and obesity among 9th-12th grade students in the United States.

Methods: This study used the 2017 Youth Risk Behavior Surveillance System data (N=14,765). The sample was further restricted as a complete case analysis (N=10,350). The outcome was obesity, which was categorized dichotomously (obese, not obese) based on participants' Body Mass Index. The exposure was sleep: those who got 8 or more hours of sleep on the average school night (sufficient sleep) and those who did not (insufficient sleep). Covariates included physical activity, sex, age, and race/ethnicity. All analyses were completed using survey- weighted procedures in SAS 9.4. A survey logistic regression model was used to calculate adjusted odds ratios and 95% confidence intervals modeling odds of obesity.

Results: Among participants, 14.7% were obese and 74.5% had insufficient sleep. The association between sleep and obesity was not statistically significant (OR=0.91, 95% CI 0.76, 1.08). However, participants who were physically active for 60 minutes, 5 or more days each week, were less likely to be obese compared to participants who were not physically active, while controlling for sleep, sex, age, and race/ethnicity (OR=0.65, 95% CI 0.55, 0.76)

Conclusions: Multiple factors are associated with obesity among American adolescents. Further research on obesity trends and associated factors is needed to help inform public health efforts to prevent and reduce obesity among adolescents. Keywords: YRBSS, Sleep, Obesity

1211 - Poster
Classification: School of Public Health Student
Presenter: Mahbuba Khan
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Mahbuba Khan; Karabi Nandy, PhD; Rajesh Nandy, PhD; Scott T. Walters, PhD

Factors Associated with Medication Adherence Among Persons in Permanent Supportive Housing

Purpose: Nonadherence to medication is associated with poor health outcomes, worsening of disease and frequent hospitalization. People living in permanent supportive housing (PSH) may be at greater risk of medication nonadherence because of a history of chronic homelessness, increased prevalence of mental disorders and other vulnerabilities. Understanding factors associated with medication nonadherence in this vulnerable population may help alleviate an important deficiency in their life and advance them towards stability.

The objective of this study was to estimate the prevalence of medication adherence among PSH residents and to identify factors associated with low medication adherence.

Methods: Adult PSH residents voluntarily participated in the mobile community health assistance for tenant (m.chat) project during 2014-2017 in Fort Worth, Texas. The Morisky medication adherence scale was used to classify participants as having low, medium or high adherence to medication. Self-reported data on demographic variables, alcohol consumption, quality of life, substance use, and depression were collected. Multinomial logistic regression was used to identify factors associated with participants' levels of medication adherence.

Results: A total of 598 participants were included in the sample. The prevalence of low, medium and high medication adherence were 54.5%, 29.9%, and 15.6%, respectively. In unadjusted analyses, binge drinking (p-value=0.001), quality of life (p-value

Conclusion: A majority of PSH residents were in the low medication adherence category. To better address the issue of medication noncompliance, intervention programs may want to target PSH residents who have depression, binge drinking habit, and have a poor quality of life.

Sponsor: N/A
IRB/IACUC/IBC#: Protocol 2014-125 (PI: Walters)

1212 - Poster
Classification: School of Public Health Student
Presenter: Chinelo Edochie
Department: School of Public Health: Health Behavior & Health Systems
Authors: Chinelo S. Edochie, MPH Candidate, CPH; Erika L. Thompson, PhD, MPH, CPH

Relationship Between Sexual Dating Violence and Feeling Sad or Hopeless Among High School Students

Purpose: Sexual dating violence among high school students is estimated to be on the rise. Effects of sexual dating violence in teenage years can carry on to adulthood and result in depression and suicidality, but there is a need to examine both conditions during adolescence. The purpose of the study was to assess the relationship between sexual dating violence and feeling sad or hopeless among 9th-12th graders in the U.S.

Methods: The Youth Risk Behavior Survey (YRBS) 2017 is a nationally representative survey of 9-12th graders in the US (N=14,765). The analytic sample size for this study was limited to a complete case analysis (N=8,244). The outcome variable was feeling sad or hopeless in the past 12 months (yes/no). The exposure variable was experience of sexual dating violence in the last 12 months (yes/no). A survey-weighted adjusted logistic regression model estimated the association of sexual dating violence with feeling sad or hopeless while controlling for covariates (age, sex, race/ethnicity and binge drinking), using SAS 9.4.

Results: In the sample, 18% reported feeling sad or hopeless and 4% experienced sexual dating violence. Students who experienced sexual dating violence were significantly more likely to feel sad or hopeless while controlling for age, sex, race and binge drinking (OR=4.58, 95% CI 3.63, 5.80). Additionally, females were nearly three times more likely to feel sad or depressed compared to the males (OR=2.98, 95% CI 2.61, 3.41).

Conclusions: The findings indicate that there may be an association between sexual dating violence and feeling sad or hopeless when controlling for gender, binge drinking and race among adolescents. Promoting safe, healthy relationships through social-emotional programs for high-schoolers may also promote positive mental health. Next steps would be to examine the association using a longitudinal study design among adolescents.

1213 - Poster
Classification: School of Public Health Student
Presenter: Pushan Prabhakar
Department: School of Public Health: Health Behavior & Health Systems
Authors: Pushan Prabhakar; Emily Spence-Almaguer; Jessica Grace; Shlesma Chhetri

Being Data Driven: Visualizing program data to aid stakeholder comprehension and decision-making in the TESSA project.

Purpose: Programs within the community gather large volumes of raw data on their target populations. Representing these data to stakeholders in a presentable format and customized to suit their varying needs poses a challenge. Data visualization may help streamline complex datasets for audiences. The Technology Enhanced Screening and Supportive Assistance (TESSA) project serves primary care clinics and interpersonal violence agencies in Tarrant County with a tablet-based screening and health advocacy component. The objective of this project is to determine the effectiveness of data dashboards for stakeholder decision-making from clinics and agencies.

Methods: Data obtained from the TESSA project were visualized into dashboards using the software Tableau. Two dashboards were created based on the sources from which they were obtained (Computerized Intervention Authoring Software [CIAS] and FileMakerPro). These dashboards were then presented to the respective stakeholders from seven organizations and/or health systems for iterative feedback and also to aid in decision-making (e.g., referral process, client needs).

Results: The two dashboards started with a baseline of what the evaluation team deemed necessary at the onset. The FileMakerPro dashboard details the interpersonal violence agency data and the health advocate encounters. The FileMakerPro dashboard went through multiple iterations based on stakeholder feedback before culminating in the current version. The CIAS dashboard, which details the primary care clinic data, had to be modified with a password protected feature to allow clinics to have online accessibility. The CIAS dashboards are also customized according to the individual clinics.

Conclusion: Data visualization in the form of dashboards have helped influence stakeholder decision-making in the TESSA project. These findings are evident from the multiple iterative processes and feedback received from the stakeholders regarding the respective dashboards. Data visualization serves as an essential tool in breaking down complex streams of data into more digestible formats for community collaborators.

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IRB/IACUC/IBC#: N/A

1214 - Poster
Classification: School of Public Health Student
Presenter: Ambriale Davis
Department: School of Public Health: Health Behavior & Health Systems
Authors: Ambriale Davis; Erika Thompson

Adolescent Health Data: Feelings of Depression and Marijuana Use

Objective: The purpose of this study is to examine an association between feelings of depression and marijuana use amongst high school students in the United States.

Methods: Data were analyzed based on the Youth Risk Behavior Surveillance System (YRBS), 2017. SAS 9.4 was used to apply survey weighting procedures to the bivariate and logistic regression models as well as to calculate univariate and bivariate descriptive statistics, and crude and adjusted odds ratios for the outcome, exposure, and covariates (n=13,916). Outcome was measured as "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities" and operationalized by yes/no. Exposure was measured by "during your life, how many times have you used marijuana" and operationalized as no if zero and yes if any other number.

Results: Students who had feelings of depression were more likely to have ever used marijuana (49.1%) than those who did not have feelings of depression (29.4%). Also, females were more likely to have experienced feelings of depression when compared to males, 67.2% and 32.8% respectively. High school students who ever tried marijuana had 2.46(95% CI:2.15-2.82) times the odds of feeling depressed compared to those who had never tried marijuana. Female students had 2.73(95% CI:2.37-3.13) times the odds of feeling depressed compared to male students. Black or African American, 0.83(95% CI:0.69-0.99), and 15 year old, 0.78(95% CI:0.64-0.96), students had less odds than whites and those 17 years and older respectively.

Conclusions: This study revealed that students who had feelings of depression were more likely to have ever used marijuana compared to students that did not. Race and age were protective factors for depression. Female students had almost three times the odds of feeling depressed than males. Results can inform future research surrounding attitudes of marijuana use among high school students with feelings of depression in order to prevent or delay marijuana use in this population.

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IRB/IACUC/IBC#: 2017-104

1215 - Poster
Classification: School of Public Health Student
Presenter: Nistha Shrestha
Department: School of Public Health: Health Behavior & Health Systems
Authors: Nistha Shrestha; Smriti Maskey; Rajesh Nandy, Dr.

Bullying Involvement and Adverse Childhood Events: Should We be Concerned?

Purpose: Bullying is one of the public health priorities in the United States. While most of the current literature focuses on the relationship between school environment and bullying involvement, research shows that adverse child events play an important role in developing bullying behavior. Hence the aim of this study is to examine if adverse child events increase the likelihood of bullying involvement among children aged 6-17 years.

Methods: The National Child Health Survey (NCHS) data from 2016 was used in this study. The survey included a total of 50,212 participants, who were chosen by the household at random. Eight questions from the NCHS 2016 survey related to adverse childhood experiences were used for this study. The bullying involvement was studied in terms of being bullied and bullying others.

Results: A logistic regression analysis was conducted after adjusting for all the variables of interest. Presence of adverse childhood events such as past racial or ethnic discrimination showed a statistically significant increase in the tendency to be victims of bullying others (OR=2.30, CI=2.00-2.60). History of the child experiencing domestic violence showed an increase in the tendency of bullying others (OR=2.05, CI=1.71-2.46) and the tendency of being bullied (OR=1.76, CI=1.55-2.00). History of living with mentally ill caregiver showed a protective effect against being bullied (OR=0.54, CI=0.50-0.60) & bullying others (OR=0.66, CI=0.55-0.73).

Conclusion: The results indicate that the presence of adverse childhood events increases the likelihood of bullying involvement. More research should be conducted to strengthen this relationship. In order to address bullying at large, screening for adverse childhood events should be conducted and counseling should be provided.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-104

1216 - Poster
Classification: School of Public Health Student
Presenter: Leslie Allsopp, MSN, MPH
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Leslie Allsopp, MSN, MPH; Subhash Aryal, PhD; David A Sterling, PhD, CIH, ROH, FAIHA; Emily Spence-Almaguer, MSW, PhD

Dissemination and Implementation of School-Based Asthma Initiatives: The Asthma 411 Pilot

Purpose: The dissemination and implementation (D&I) of evidence based practices (EBIs) has been identified as one of the most critical barriers to improvement of the public's health. The Asthma 411 EBI was developed, implemented and evaluated in St. Louis, MO from 2002-2008; Asthma 411 was disseminated, adapted, and piloted in Fort Worth, TX from 2013-2015. The evaluation of the pilot was designed to examine processes and outcomes of the program's dissemination, inform ongoing expansion, and identify approaches that may support dissemination of other school health EBIs.

Methods: In 2013, an engaged process was used to retain core components of Asthma 411 while adapting peripheral program elements. The pilot was implemented in one elementary (n=567) and 1 middle school (n=791). Three service categories were included: 1) access to rescue medication through standing orders; 2) support for enhanced school asthma services; and 3) support for communication with parents and health care providers to support comprehensive, prevention oriented care. Data collected included 1) school day EMS calls one year prior and both years of the program, 2) logs of aggregated nursing services, 3) individual level school absence and demographic data, 4) availability of medication provided through existing policies, and 5) informal interviews.

Results: The pilot was positively received by schools and parents. During the pre-implementation year, there were 19 asthma-related EMS calls from the pilot schools. During the two years of the pilot, school day, asthma-related EMS calls were eliminated. Across the two year study, there was an increase in documented asthma self-management education, use of Asthma Control Tests, proportion of students with asthma that have authorization for rescue medication, and documented efforts to communicate with parents and health providers. Evaluation of absences was limited by the lack of pre-implementation data, small numbers, large variance, and short duration. Between year 1 and year 2, the gap between unadjusted, weighted absences among students with and without asthma was reduced 1.1 day. However, this difference was not seen in a fully adjusted negative, binomial regression analysis which provided a modeled mean difference of 1.28 absence days between children with and without asthma (95%CI 1.10, 1.50, p = .002) during year one, and 1.24 days (95% CI 1.07, 1.47, p = .006) in year two.

Conclusions: The Asthma 411 case study identifies important characteristics of interventions, interventionists, contextual factors, and processes that may support effective dissemination of school based health initiatives. More research is needed to clarify impacts on absenteeism, and to determine if observed benefits are sustained.

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1217 - Poster
Classification: School of Public Health Student
Presenter: Kimberly Morris
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Kimberly Morris; Erika Thompson

Association between Cyber-Bullying and Weapons Carrying at School: Analysis of the 2017 Youth Risk Behavior Survey

Objective: Previous research has found that victims of bullying are more likely to carry a weapon and say that it is "not wrong" to take a gun to school. Moreover, studies have shown that cyberbullying and traditional bullying are highly correlated. With the rate of online harassment nearly doubling from 2000 to 2010 further research is needed to study the link between cyberbullying and weapons carrying. The objective of this study was to examine the association between cyberbullying and weapons carrying at school among adolescents participating in the 2017 Youth Risk Behavior Survey (YRBS).

Methods: The YRBS 2017 is a representative dataset for 9th through 12th graders in both public and private schools in the United States (N = 14,765). The analytic sample was restricted to a complete case analysis for the variables of interest (N = 13,944). The outcome variable was weapon carrying on campus (yes/no). Predictor variables included: cyberbullying, sex, grade, race/ethnicity, and bullying. A survey-weighted adjusted logistic regression model was estimated for the association between cyberbullying and weapons carrying using SAS 9.4.

Results: 14.84% of students surveyed reported experiencing cyberbullying and 3.51% reported ever carrying a weapon on school ground. Students reporting weapons carrying were 74.7% male, 32.8% 11th graders, and 56.0% white; 27.7% reported experience bullying, and 22.2% cyberbullying. In the multivariable model predicting the outcome of weapon carrying on school grounds, exposure to cyberbullying, (Adjusted Odds Ratio (AOR) = 1.70, 95% CI: 1.27, 2.29), being a male student (AOR = 3.60, 95% CI: 2.91, 4.44), being in 11th (AOR = 2.29, 95% CI: 1.64, 3.19) or 12th (AOR = 1.97, 95% CI: 1.27, 2.64) grade and being bullied on school grounds (AOR = 1.56, 95% CI:1.21, 2.00) were significantly associated.

Conclusions: Although a statistically significant correlation between cyberbullying and carrying a weapon on school grounds was found, results should be interpreted with caution due to the temporality of the data, and correlation between bullying and carrying a weapon on school grounds. Regardless, the results show that additional research is needed to investigate the affect cyberbullying has on eventual weapons carrying to ensure schools remain safe in the modern era.

Sponsor: N/A
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1218 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Brandon Hoff
Department: School of Public Health: Health Behavior & Health Systems
Authors: Brandon M Hoff; Ali Al-Nahi; Justinne Certeza; Jazmin Fernandez; Katherine E Hoffman; Erika Thompson

The Association Between Human Papillomavirus Vaccination and State Medicaid Expansion

Purpose: The human papillomavirus (HPV) vaccine is recommended for US adolescents 11-12 years of age. The HPV vaccine is currently covered for children enrolled in Medicaid through age 20. After the passage the Affordable Care Act in 2010, states were given the option to expand Medicaid eligibility to 138% of the federal poverty level, yet as of December 2017, only 36 states have elected to expand their Medicaid program. This study examines the association between Medicaid expansion and HPV vaccination among US adolescents.

Methods: This cross-sectional study was conducted using data from the National Immunization Survey – Teen, 2017 (N=20,949). Logistic regression was used to model provider-reported HPV vaccination up-to-date status predicted by state Medicaid expansion while adjusting for the effects of sex, race/ethnicity, maternal education level, household income, and type of health insurance. All analyses were conducted using SAS Studio 3.7 Enterprise Edition with survey weighting procedures.

Results: 52% of adolescents in this study were up-to-date on the HPV vaccine. Adolescents who lived in states that expanded Medicaid [OR = 1.51, (95% CI: 1.36, 1.68)] were more likely to be up-to-date on the HPV vaccine than adolescents who lived in states that did not expand Medicaid. Females [OR = 1.50, (95% CI: 1.35, 1.66)], Non-Hispanic Blacks [OR = 1.23, [95% CI: 1.09, 1.54)], and Hispanics [OR = 1.67, (95% CI: 1.42, 1.96)] were more likely than to be up-to-date on the HPV vaccine than males and Non-Hispanic Whites, respectively. Individuals who were enrolled in Medicaid [OR = 1.19, (95% CI: 1.02, 1.39)] were more likely to be up-to-date than those with private insurance.

Conclusion: The results of this study indicate a positive association between Medicaid expansion and HPV vaccination. However, Medicaid expansion is only one of many health policy initiatives that can affect HPV vaccination. Recent research has suggested that state-level policies (e.g., school-entry requirements, policies permitting vaccination in pharmacies, classroom sex education policies, and parental education mandates) are significantly associated with uptake of the HPV vaccine in adolescents. Further research should be conducted to analyze the combinatorial effects of multiple health policies on HPV vaccination.

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1219 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Mackenzie John Ewart
Department: Non-UNTHSC
Authors: Mackenzie John Ewart; Clayton Rabbe; Harinder Singh

McLennan County Mosquito Research: Diversity and Disease-Vector Potential

Purpose: A multitude of vector-obligate diseases are increasingly becoming a greater importance to the United States of America. As climate change generates novel weather patterns, vector-mosquito ranges are expanding, and more suitable habitats are sustained - many in regions previously not possible. Furthermore, international trade has permitted the migration of vector mosquito species, which facilitate the emergence of dengue virus (DENV), chikungunya virus (CHIKV), zika virus (ZIKV), and west nile virus (WNV), in human populations previously unafflicted. A standing quantification of all mosquito species within an area can lead to better prevention tactics, and awareness before epidemic disease rates are observed. This experimental setup is designed to obtain field data describing the respective quantities of the local mosquito populations. This data has not been established for the McLennan County since 2004. Therefore, this data collected from the field will provide a contemporary baseline for the quantitative analysis of mosquitoes for the region

Methods: Our experimental design utilized CDC light traps (CDC-LT), coupled with CO_2 bait (dry ice). Following the mosquito collection, species cataloging was done using reference materials previously established, and proven via dissection microscope analysis of mosquito characteristics. The Shannon-Weiner Index, and species richness values were generated from the samples. After establishing these statistical analyses, the disease-vector potential was postulated.

Results: The results for the disease-vector potential of McLennan County, Texas, gave the potentials for major mosquito-borne diseases: 2% LaCrosse Encephalitis, 7% Malaria, 8% Chikungunya, 8% Dengue Fever, 8% Yellow Fever, 8% Zika, 12% St. Louis Encephalitis, 13% Western Equine Encephalitis, 13% West Nile, and 21% Eastern Equine Encephalitis. Both the diversity index and the the evenness plot resulted in positive linear progressions, with polynomial spreads.

Conclusion: The disease-vector potential of the McLennan County, Texas, region supports the possibility of various mosquito-borne diseases via the local vector species present. The major diseases accounted for in the results of this experiment have been well established to be reliant upon the 26 species cataloged. Understanding the mosquito disease-vector potential for Texas remains crucial, as climate change, and other factors continue the spread of diseases throughout the world.

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IRB/IACUC/IBC#: N/A

1220 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Max Guan
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Max Guan; Stephen Chabot; Tiraj Parikh; Revanth Madina; Krishna Gorrepati

Assessing the scope and equity of Medicare to determine policy improvements

Purpose: The purpose of this study was to determine the effectiveness of Medicare in providing universal access to equitable healthcare for those 65 and older. Medicare went through iterations to adapt to changes in medical practice, and today is organized into parts that cover hospital insurance, health insurance, and prescription drug coverage. It is funded by a combination of payroll taxes, premiums that beneficiaries pay, and general revenues.

Methods: Through a literary analysis, we compiled data to illustrate a statistical presentation of Medicare's current population and the disparities present within it.

Results: 46% of Medicare recipients are age 65-74. 16% of recipients are under age 65 and qualify for Medicare for other reasons. Roughly 80% of recipients live in urban settings, in line with population demographics. Roughly half of recipients live with a spouse, almost 30% of beneficiaries live alone. 15% of recipients are under the poverty line, slightly higher than the United States census poverty rate of 12.7%.

Despite widespread effectiveness, disparities are still present. There is a sizable difference in the coverage of white beneficiaries against their minority counterparts. Female beneficiaries outnumber male beneficiaries by a significant amount, despite a near equal gender ratio at the population level. Furthermore, while Medicare was designed for the aging, 65+ population, theexpenditure, due to the impact of end stage renal disease patients. Costs also rise as recipients' ages increase, though the number of recipients in the upper echelons of age decrease.

Medicare recipient numbers are expected to increase rapidly in the next decade, until 2030. At the same time, the number of recipients enrolled in Medicare Advantage continues to rise as well, in both absolute and relative terms, easing some of the government's burden onto private contractors' shoulders.

Conclusion: An important question to answer is how much to spend on Medicare, and how effective an increase in funding would be. For many, Medicare does not fully cover their health-related costs, and this is expected to worsen in the coming years. Since poverty is correlated with increased liability, targeting that group may present opportunities for improvement. Though outside the scope of Medicare, it is crucial to consider other programs that may work in tandem to achieve its goal of providing universal, equitable health care.

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1221 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Claire Kunkel
Department: TCOM: Pediatrics
Authors: Claire E Kunkel, OMS-II; Daniel D Guzman, M.D.; Tyler Hamby, Ph.D.; Kristy Reyes, B.S.

Retrospective Analysis of Unintentional Firearm Injuries Presenting to CCMC

Background: An estimated 110 children die each year in the US due to unintentional firearm accidents. Studies show that current educational strategies are ineffective long-term and have called for more research towards improving children's safety.

Purpose: The purpose of this study was to determine trends among victims of unintentional firearm injuries to identify potential risk factors.

Methods: This was a retrospective chart review of Cook Children's Medical Center (CCMC) electronic medical records. Patients ages 0-18 years presenting with unintentional gunshot injuries to the CCMC Emergency Department between January 1, 2011 and June 27, 2018 were included. We excluded injuries deemed to be intentional and patients over age 18. Data were stored in REDCap.

Results: There were 140 patients who met inclusion criteria, and 30 of these were excluded (25 for intentional shooting, 2 for being over age 18, and 3 for intentional shooting in patients over age 18). Of the remaining 110 (84.5% male) patients, percentages by type of gun were as follows: BB gun, 50.0%; handgun, 20.0%; pellet gun, 13.7%; other, 16.3%. We also collected data on who pulled the trigger, which was by a friend in 34.7% of cases, a sibling in 26.9% of cases, and the patient in 24.0% of cases. Most injuries (73.8%) occurred at patient's home, with the second most common location being a friend's house (15.0%). Locations of injuries included 39.0% to the face, 35.0% to an extremity, and 11.0% to the abdomen. Only 50.0% of the patients were discharged home from the ED, while the other 50.0% were either admitted to CCMC or transferred for further care. Most injuries (60.9%) were considered minor, followed by moderate (23.6%) and serious or critical (15.5%).

Conclusions: In the present study of unintentional gunshot injuries, most were considered to be minor or moderate, but almost half still needed a hospital admission. Most of the injuries occurred at the patients' homes, so we suggest that many of these accidents could be prevented by proper gun storage when not in use and proper safety equipment when in use. Several other injuries also occurred at friends' homes, and we suggest that many of these injuries could be avoided by encouraging parents to talk to other parents about guns in the home. The most common location for these injuries was the face, so we encourage wearing eye protection when using guns recreationally. Further research should be done to corroborate these possibilities.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

1222 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Abhinaya Ganesh
Department: TCOM: Medical Education
Authors: Abhinaya Ganesh; Haylie L. Miller, Ph.D.; Shravan Mupparapu, BHMS

Autism Spectrum Disorder Service Utilization and Satisfaction in the DFW metroplex

Purpose: The prevalence of Autism Spectrum Disorder (ASD) has risen rapidly to 1 in every 59 children. Being one of the fastest growing developmental disorders, the need for services outpaces availability for individuals with ASD. Texas is ranked 50th (out of the 51 states included) in providing community-based services for people with developmental disabilities. In order to make community- and state-level policy recommendations to address this issue, it is important to understand the specific landscape of met and unmet needs of individuals with ASD. By identifying gaps in service availability and use of services, policymakers, healthcare providers, and community advocates will be better equipped to design programs that facilitate access to appropriate and timely interventions.

We aimed to identify patterns of service utilization among individuals with ASD and their families in the Dallas/Fort Worth (DFW) area, a large population center in northeast Texas. We predicted that service navigation and financial burden would be among the most difficult challenges caregivers faced.

Methods: We conducted a cross-sectional study to assess the services used by individuals with ASD in the DFW area, and satisfaction with these services. We created the Autism Service Utilization and Satisfaction survey by combining new items with adaptations of two existing instruments, the Pathways in ASD and the Community Services Outcomes for Families and Children with ASD. The survey was delivered to caregivers of individuals with ASD and adult self-advocates with ASD using REDCap, an online secure project management service. The survey captured family demographics, services utilized (e.g., type, setting), and associated satisfaction. Preliminary analysis included 26 caregiver respondents.

Results: Preliminary qualitative analysis revealed several notable trends in caregivers' self-reports of the most challenging issues they faced after a diagnosis was made. Caregivers reported difficulty navigating services: 47% struggled to find the appropriate services for their child, 29% did not know where to start, and 24% had difficulty scheduling and maintaining appointments with providers. Overall, 29% reported that affording services and qualifying for help was one of their three most challenging issues. Additionally, 82% of caregivers affirmed that they identified a resource but could not pay for it, 67% were satisfied with the diagnostic services provided by their school district, and 71% were satisfied with education programs meeting the recipient's behavioral and emotional needs. Finally, 88% either disagreed or were neutral about overall satisfaction with available services and providers.

Conclusions: Preliminary examination of responses suggests that caregivers in the DFW area have difficulty navigating their child's diagnosis and case management. Participants confirmed our hypothesis that they were satisfied with the diagnostic and educational services the school provided; however, they had trouble paying for the services and qualifying for help through insurance and other means. This further emphasizes the importance of identifying resources that families are using, and where the gaps lie in their access to these resources. Data collection is ongoing through partnership with clinics, schools, and community organizations in the DFW community.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-068

1223 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Anusha Hussain
Department: TCOM: Medical Education
Authors: Anusha Hussain; Thaddeus L Miller; Sarah Grebennikov; Erica L Stockbridge

A Bigger View: US public TB prevention initiatives with a broader health systems perspective

Background: Tuberculosis (TB) is a complex disease and persists as a greater threat than most understand. Responsibility for TB treatment and control has generally fallen to public health agencies. Unfortunately, important limitations to the public health sector's of TB control are beginning to show. UNTHSC recently hosted a "systems thinking symposium" with the goal of helping public health authorities view their work in broader context. This project presents an analysis of industry perspectives on public TB control initiatives drawn from symposium discussions.

Purpose: We analyzed 36 hours of discussions to better understand how CDC's messaging around TB prevention and managing latent TB infection (LTBI) in particular is heard, accepted, and potentially acted on in various health care sectors.

Methods: Approximately 30 participants from across the US healthcare system discussed how incentives and disincentives within their industry might affect TB-related public health initiatives. Discussion sessions focused on how at-risk patients self-identify and seek care; how providers identify potentially at-risk patients; how clinical evaluation is initiated and conducted; treatment initiation; and treatment completion. We analyzed discussion transcripts to identify industry perspectives, opportunities and barriers, and potential gaps in TB control initiatives. The unit of study was the program or industry represented by responses, not individual respondents, and the North Texas Regional IRB determined the project not to be human subjects research.

Results: We identified the 15 most commonly used context appropriate words from a 78,604 word transcript. These were mapped to broad themes such as improving screening target populations, continuity of care, and potential roles of the non-public health sector. Notable barriers were identified within the clinical and managed care sectors, including consistent questioning of TB prevention as a priority activity, including potential risks, benefits, and the value proposition.

Conclusions: CDC's promotion of targeted LTBI screening and treatment, and TB prevention in general, is not well reflected in the attitudes of the non-public healthcare sector in our sample. Most health care professionals would choose not to prioritize LTBI due to the logistics of insurance and more urgent and emergent diseases. It may be important for CDC to consider who and how they target TB elimination messaging in order to enhance impact.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1224 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Sameera Muqueet
Department: TCOM: Pediatrics
Authors: Sameera Muqueet; Bryan Baker; David Farmer; Martha Rew; Nusrath Habiba

Application of an Interprofessional Team in Pediatric Nutritional Wellness

Purpose: Childhood obesity poses a significant health risk to children in the United States and has been increasing in recent years. Childhood obesity is associated with increased risk of hyperlipidemia, diabetes, and hypertension manifesting later in life. Early intervention is crucial in preventing these health problems. Therefore, it is important that parents receive early education on nutritional wellness as well as the most accurate information possible. A team-based application of health care delivery is one possible way of achieving this patient education. This study aims to evaluate patient satisfaction with the use of an interprofessional healthcare team in delivering nutritional wellness information to parents in an outpatient pediatric clinic.

Methods: Patients were seen by a three member interprofessional team consisting of a Physician or Physician Assistant (PA), medical student or PA student, and dietetic intern. At the end of the visit, patients were given a survey to assess their satisfaction with the visit. The survey evaluated patient satisfaction with the interprofessional team with, how helpful and how likely they were to use the nutritional advice given to them during the visit, and their perception on whether the interprofessional team improved the quality of their visit. Patients were asked to rank these factors on a scale of 1-5 with 1 being unsatisfied and a 5 being highly satisfied.

Results: Out of 95 patients, 96.8% rated their happiness with the interprofessional team as a 5/5; 95.7% rated the helpfulness of the nutritional advice 5/5; 94.7% rated their likelihood of utilizing the nutritional advice 5/5; 94.7% rated the improvement in the quality of their visit 5/5.

Conclusions: Overall, patients were satisfied with the nutritional information they received from the interprofessional team and viewed being seen by a team as an improvement in the quality of their visit. Utilizing an interprofessional team has the potential to be an efficacious method of delivery of nutritional information to patients and improve wellness and prevention. In future studies, the likelihood of patients to implement this nutritional advice will be tracked via EMR and compared to groups that were not seen by an interprofessional team in order to assess the efficacy of team-based healthcare.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-119

1225 - Poster
Classification: School of Public Health Student
Presenter: Roslin Jose
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Roslin Jose; Shlesma Chhetri; Eleena Dhakal; Erica Stockbridge; Thaddeus Miller

Developing Tuberculosis Prevention Strategies via Interdisciplinary Systems-Thinking: Latent Tuberculosis Infection Risk Recognition and Care

Background: Tuberculosis (TB) remains a threat to public health, both globally and within the US. An estimated 80% of active TB cases in the US are from reactivation of latent TB infection (LTBI). Reactivation is preventable with proactive, targeted LTBI screening and treatment but public health agencies lack the capacity to mitigate this threat. Recent guidelines recommend that LTBI-related services be rendered by private sector healthcare providers. In order to identify systemic barriers to appropriate LTBI-related care in the private sector and brainstorm new strategies to facilitate this care, UNTHSC hosted an LTBI Systems Thinking Symposium.

Aims: 1) To identify barriers and facilitating factors that influence patient and provider recognition of LTBI risk and subsequent care-seeking or care-recommending behavior, as articulated by symposium participants. 2) To determine whether the factors identified by attendees varied by attendee profession.

Methods: Thirty healthcare and public health professionals were divided into 6 interdisciplinary groups. Participants identified barriers to care and opportunities to facilitate care by discussing each step in the LTBI care continuum. We used Grounded Theory approach to code participants' distinct ideas. Each open code was systematically categorized into axial codes by two independent coders. A third coder calculated inter-coder reliability; the two coders agreed 80% of the time. Coders collaborated on the remaining 20% to create a final list of axial codes, which were further categorized into selective themes.

Results: Barriers (78%) to targeted LTBI screening and treatment were mentioned more frequently than strategies to facilitate care (22%). The top three barriers were lack of awareness among patients, lack of ideal testing tools, and lack of health insurance among high-risk persons. Facilitators included increasing patient awareness, health insurance that covers LTBI services, community outreach, and population-level health communication. Variations in perceived barriers and facilitating factors based on the industries our participants represented were observed.

Conclusion: Both patient and health systems-related factors present barriers to the initial identification of LTBI in the private sector healthcare setting, but there are opportunities to overcome these barriers. The facilitating factors identified by symposium participants can serve as beacons for prevention strategies and future health policies.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

Health Disparities (Abstracts in 1300s)

1300 - Poster
Classification: School of Health Professions Student
Presenter: Kole Knutson
Department: School of Health Professions: Physician Assistant Studies
Authors: Kole Knutson; Jordan Stellato; Kelli Vogler; Jourdan Whorley; Vic Holmes; Jessica Hartos

Do COPD Rates Differ by Veteran Status in Males 50-79 Years of Age?

Purpose: With little research that compares the rate of Chronic Obstructive Pulmonary Disease (COPD) status between the veteran population and the general population, the purpose of this study is to assess whether COPD rates differ by veteran status in males 50-79 years of age in the general population.

Methods: This study was a cross sectional analyses using 2016 BRFSS data for males ages 50 to 79 in Arkansas (N=1,283), Montana (N=1,586), New Jersey (N=1,842), Tennessee (N=1,473), and West Virginia (N=1,854). Multiple Logistic Regression analyses were performed by state to determine whether COPD rates differed by veteran status when controlling for age, ethnicity, tobacco use, weight status, general health, asthma, income, education, and employment.

Results: Across states, few participants reported having COPD (9-18%) and about one third were veterans (25-40%). After controlling for socioeconomic, demographic, and health influences, there was a significant consistent relationship between COPD and veteran status in three out of five states. There was also a significant consistent relationship between COPD and tobacco use, general health, and ever being diagnosed with asthma in five out of five states.

Conclusion: The results found that in males ages 50-79, COPD rates were higher in veterans when compared to non-veterans. In addition, COPD was highly related to smoking, asthma, and general health. Providers should screen and treat COPD and any other health conditions to make sure they are managed properly. Most importantly, educate and refer smokers for treatment to assist with smoking cessation.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

1301 - Poster
Classification: School of Public Health Student
Presenter: Jonathan Moore
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Jonathan Moore; David Sterling

Are There Racial Differences in Hepatitis C Virus Infection among the Baby Boomer Birth Cohort? An Examination of the National Health and Nutrition Examination Survey (NHANES) from 2007-2016

Background: Hepatitis C Virus (HCV) infection disproportionately affects those in the baby boomer birth cohort which includes those born between 1946 and 1964. Additionally, those who are African-American have an unequal burden of HCV infections and disease outcomes. Previous studies have found a relationship between race and HCV infection specifically within the baby boomer birth cohort. However, no study to our knowledge has investigated this relationship with data from a national sample using laboratory test results to identify HCV infection.

Methods: Data from 2007 to 2016 were obtained from the National Health and Nutrition Examination Survey (NHANES), which included 3358 participants in this analysis. SAS 9.4 and G*Power were used for analysis and logistic regression was used for inferential analyses.

Results: After controlling for selected covariates, Non-Hispanic Blacks had a higher odds of HCV infection compared to both Non-Hispanic Whites (aOR: 4.28 (95% CI: 1.87, 9.79)) and those of other races (aOR: 3.39 (95% CI: 1.38, 8.34)). Gender also remained significant in the multivariable analysis (p

Conclusions: Race appears to be a significant predictor of HCV infection among baby boomers in the NHANES population. Programs interested in the prevention or improvement of Hepatitis C should focus on African-American baby boomers as an especially high-risk group. Due to the exclusion of those who are homeless and incarcerated in the NHANES data, future research needs to be conducted on baby boomers from these groups.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-104

1302 - Poster
Classification: School of Public Health Student
Presenter: Adrianna Tirloni
Department: TCOM: Pediatrics
Authors: Adrianna Tirloni; Shane Fernando, PhD MS FRSPH

Is Free Effective? An Analysis of HPV Vaccines and Hispanic Caregivers in the Outpatient Setting

Purpose: The Human Papillomavirus (HPV) is the primary cause of cervical cancer in the United States, with Hispanic women suffering disproportionately from cervical cancer incidence and mortality. While the HPV vaccine has shown great success in the prevention of cervical cancer, vaccination rates among Hispanics remain low nationwide. This study's purpose was to identify barriers among Hispanic caregivers and different vaccination opportunities.

Methods: A paper-based multiple-choice survey consisting of 32 questions were given to caregivers of patients from the UNT Health Science Center Department of Pediatrics, while they were in the waiting room. Upon survey completion, a brief education session was conducted on HPV and the HPV vaccine. Logistic regression, controlled for income and education, was performed to assess the relationship between vaccination intent and vaccination options among Hispanic caregivers.

Results: Hispanic caregivers were more likely to pay $25 for an HPV vaccination (OR 1.793, p=0.093) than participate in a free vaccination program (OR 1.392 p=0.377) or the federally funded Vaccine for Children program (OR 1.394, p=0.349). As income increases, the likelihood of paying $25 for an HPV vaccination increases (OR 1.138, p=0.132). The inverse effect was observed as education increased (OR 0.725, p=0.077).

Conclusions: The results showed that Hispanic caregivers were more likely to pay for their children's HPV vaccinations than participate in a free or federally funded program. A priori literature identifies cost as a barrier to minorities, often suggesting providing free vaccines, contrary to study findings. Further research is needed to determine if results remain in diverse populations.

Sponsor: N/A
IRB/IACUC/IBC#: 2015-148

1303 - Poster
Classification: School of Public Health Student
Presenter: Ashley Lamar
Department: TCOM: Pediatrics
Authors: Ashley Lamar; Dr. Maya Nair; Jamboor Vishwanatha; Riyaz Basha

Potential Factors Affecting the Human Papillomavirus (HPV) Vaccination: Health Disparities Perspective Analysis

Background: Annually, 14 million people of all ages are infected with the Human Papillomavirus. Around 17,500 women and 9,300 men are affected by cancers related to HPV each year. Vaccinations are recommended for females aged 26 and under and for males under the age of 21. For both males and females, it is recommended that vaccination begins at aged 11 or 12. There are several factors that contribute to parent or guardian's unwillingness to vaccinate their children. Our interest was to understand the association of HPV vaccination rates with race, sex, ethnicity, socioeconomic status, environment, or social factors. The other objective was to study characteristics specific to Texas that affect vaccination rates.

Methods: Information was gathered through review of literature and accessing the databases such as Center for Disease Control and Prevention (CDC) and National Immunization Surveys (NIS Teen data). The collected information/data were analyzed focusing on HPV knowledge, attitudes and cultural beliefs.

Results: Across the data sources investigated, women are shown to have higher vaccination rates than males. Non-Hispanic black males were found to be more likely to get vaccinated compared to their female counterparts. Groups of individuals with higher than a high school level education were shown to have lower HPV vaccination rates. The perception of the threat of HPV affected vaccination rates as well. Hispanic women were more likely to associate HPV with cancer, while their male counterparts associated HPV with infidelity. African Americans were seen to believe they had less of a chance of getting cervical cancer in comparison to White Americans. Socioeconomic status was shown to negatively affect HPV vaccination coverage, with adolescents below the poverty line having higher vaccination rates.

Conclusion: Overall, significant disparities exist in relation to HPV vaccination rates. The disparities experienced depend primarily on the maternal figure and are affected by age, race, sex, income, and education. Assessment of data specific to Texas area and comparing with the national trends is underway. There is significant room for improvement with HPV vaccination rates that need to be addressed in the community as well as the health care setting.

1304 - Poster
Classification: School of Public Health Student
Presenter: Desiree Lakey
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Desiree E Lakey; srikantha thyagarajan; Desiree Lakey Lakey; M. Harvey Brenner; Jamboor Vishwanatha

Impact of race and socioeconomic status on breast cancer mortality in USA: A cross-sectional time-series analysis.

Purpose: Racial, ethnic, and socioeconomic (SES) disparities in incidence and mortality exist among all breast cancer types and stages, particularly between African American (AA), Caucasian American (CA), and Hispanic American (HA) women. The goal of our study is to investigate all three dimensions of SES to identify occupation, education, and income as predictors for breast cancer mortality among racial groups.

Methods: A pooled cross-sectional time-series analysis is used to determine the statistical significance of the variables predicting age-adjusted breast cancer mortality in the 50 U.S. states from 1999-2015.

Results: This study used beta coefficients, b, as indicators to determine the strength of the association between the dependent variables (race/ethnicity, income, education, and occupation) and breast cancer mortality. African American women showed the greatest statistical significance and strongest beta coefficient (p=0.000, b=0.061). Caucasian women exhibited a p-value of 0.007 and a beta of 0.037. The positive coefficients exhibited in both AA and CA women suggests that the probability of dying from breast cancer increases as the number of women in each racial group increases. The high beta coefficient shown in AA women illustrates a stronger relationship among this racial group, signifying the AA race alone may independently predict breast cancer death. Hispanic women demonstrated intermediate effects with statistical significance (p=0.004) and produced a negative beta coefficient (b=-0.057). The HA statistics illustrate an increase in this ethnic group would decrease breast cancer mortality, implying the presence of a protective factor. When analyzed independently, race or ethnic group alone showed significant relations to total age-adjusted breast cancer mortality, holding constant influences of education, income and employment. Also, under control were health care expenditures and lifestyle risks.

Conclusion: This is the first breast cancer study to include all 50 U.S. states longitudinally and cross-sectionally to provide a large scale, population-based analysis. Additionally, this study is one of the first to consider all three dimensions of SES as predictors for breast cancer mortality. The results found that race and SES independently serve as strong predictors of breast cancer mortality, and when both are exhibited, the strength of the association is greater than having one characteristic alone.

IRB/IACUC/IBC#: 2017-104

1305 - Poster
Classification: School of Public Health Student
Presenter: Ashvita Garg
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Ashvita Garg; Annalynn M Galvin; Sarah Matthes; Erika L Thompson

Examining Disparities in HPV Testing Knowledge among Women in the United States

Purpose: Human papillomavirus (HPV) is the cause of 99% of cervical cancers. In the US, HPV testing has recently been adopted as an option for cervical cancer screening in women over 30 years of age. Knowledge of HPV testing is important in influencing the acceptance of HPV testing among women. This study examined the association of sociodemographic covariates in relation to the knowledge of HPV testing among women in the United States.

Methods: Women, ages 30 to 65 years, without hysterectomy, completed an online survey (N=812). The analytic sample was restricted to 507 women who were aware of HPV testing. The outcome, HPV testing knowledge, was calculated using a six-item validated scale. Sociodemographic covariates included: age, race, ethnicity, education level, income level, insurance status, relationship status, religious affiliation, and if previously had HPV vaccination. Multiple regression was used to identify variables that were uniquely associated with greater HPV testing knowledge using SAS 9.4.

Results: The average age of women in the sample was 44 years, and there was a mean HPV testing knowledge score of 2.8 (out of 6). The multiple regression analysis revealed four independent correlates related to HPV testing knowledge. Lower knowledge was observed in older women compared to younger women ($\beta = -.02$, $p = .01$). Lower knowledge was also observed in women who did not have any health insurance ($\beta = -.56$, $p = .02$) or who did not know if they had ever received the HPV vaccination ($\beta = -.83$, $p < .01$). Higher education level was associated with greater HPV testing knowledge ($\beta = .59$, $p < .01$). The variables accounted for 12% of the variance.

Conclusions: Findings from the study can be used to develop targeted prevention strategies and initiatives to improve HPV testing knowledge among women with HPV knowledge disparities. Improving HPV testing knowledge may promote uptake of this screening tool, and ultimately prevent cervical cancer morbidity and mortality.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-089

1306 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Andrew Thomas
Department: TCOM: Medical Education
Authors: Madeline Carson; Andrew Thomas; Jacob Scribner; Olivia Tomasco; Ashley Brodrick

Health Disparities in the United States with a Focus on Tarrant County

Purpose: Health disparities across racial, socioeconomic, gender, and age groups are well documented across the United States. This study seeks to review health disparity data and provide resources addressing these disparities on the local, state, and national level, with a focus on socioeconomic status, access to care, and insurance coverage.

Methods: Sources such as Data USA, United States Department of Agriculture (USDA), and Healthy People 2020 were used to gather information regarding specific health disparities and resources available to combat the growing disparities.

Results: Resources in Tarrant county promoting the health and well-being of the community include organizations such as the Mercy Clinic and the Healthy Tarrant County Collaboration. The state of Texas is also helping to promote healthier individuals by providing Medicaid and CHIP (Children's Health Insurance Program). However, Texas voted to not expand their Medicaid coverage, leaving a group uninsured which is now known to be called the Medicaid gap. Programs on the national level include the Affordable Care Act of 2010, WIC, and the Healthy People 2020 campaign, all of which strive to improve access to care and insurance coverage.

Conclusion: This gap can be closed and better quality of care can be provided by increasing awareness, promoting currently available resources, conducting further research, and by addressing influential factors that lead to health disparities.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1307 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Jonathan Hughes
Department: Other
Authors: Jonathan Hughes; Dallas Miller; Christine Lin; Kelly Gee; Shannon Chang

A Student-Run Clinic as an Approach to Refugee Health

Background: Texas is one of the top U.S. states for refugee resettlement, receiving 9% of the country's refugees from October 2018 to February 2019 alone. The Congolese and Burmese comprise most of the refugee populations in Texas, holding 57% and 21% of state arrivals, respectively. Within Texas, Tarrant county is currently one of the top counties where refugees are resettled. Before a refugee resettled in the U.S., they must undergo a tedious resettlement process that consists of biographical data collection, medical and security screenings, and interviews. Once approved, refugees are assigned to a non-governmental organization that aids in the often difficult transition to their new lives in the U.S. Many challenges during the resettlement process may prevent the individual from obtaining adequate medical care. Language, cultural beliefs, and socioeconomic factors are the major barriers to accessing health care services resulting in the underutilization of resources. Access to community health resources is often also hindered by I-485 form processing times approaching 2 years. As a result, many refugees do not seek out care until medical emergencies arise. Refugee Health Initiative's goal is to establish continuity of care by connecting refugees seen at our health clinics with pertinent healthcare resources.

Case Information: From October 2018 to February 2019, we have held 4 clinics at 2 locations and have seen a total of 67 refugees, of which, 23 were males and 44 were females. The average age of patients seen was 41.73 years. While all were seen for a general screening, common co-occurring complaints included cold and flu symptoms, blood glucose screening, abdominal pain, headache, and dysuria. Patient medical histories included diabetes, hypertension, nephrolithiasis, hyperlipidemia, and hypothyroidism.

Conclusions: Refugee experiences in the clinic setting reveal problems in navigating the health care system. Language barriers prevent many from understanding diagnoses and medications, while those who are unsure of their insurance status are often lost to follow-up. Although breakthroughs are being made in outreach, continued innovation in approaching these populations is essential in developing a relationship of trust with Western health care methods. The Refugee Health Initiative's clinic has the potential to become an entry point of care that can improve health promotion and deconstruct cultural misunderstandings of the healthcare system.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1308 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Molly Farrell
Department: TCOM: Medical Education
Authors: Molly Farrell; Naomi Swanta; Kathleen Borgmann; Anuja Ghorpade

Proviral DNA Integration in Human Peripheral Blood Mononuclear Cells: Biomarkers of HIV Associated Neurological Impairment

Purpose: Historically, HIV decreased an individual's survival due to opportunistic infections and malignancy. Since the introduction of antiretroviral therapy, many complications of HIV have declined. However, half of HIV+ individuals still experience cognitive impairments. These conditions are classified as HIV-associated neurocognitive disorder (HAND). This is a significant portion of the HIV population with issues maintaining daily functioning. While there are current objective measurements of disease progression with markers such as HIV viral load and CD4 cell counts, these have been found to be poor indicators of neuropsychometric performance. Therefore, there is a need for objective measures that could serve as prognostic biomarkers for the development HAND progression, stability or regression of disease. This could lead to further discovery of therapies and interventions for HAND. This research project focuses on peripheral blood mononuclear cells (PBMCs). The amount of HIV DNA integration may serve as a potential biomarker alone or in correlation with other inflammatory proteins from 121 male and female human subjects across three highly affected races.

Methods:Enrolled participants enrolled underwent thorough evaluations, including a blood draw and full battery of neurocognitive functional tests. To determine the level of integrated of HIV, PBMCs were isolated from participant blood samples. Genomic DNA was isolated using DNAzol reagent. HIV DNA integration was then determined and quantified with a nested Alu-Gag PCR.

Results: The levels of HIV DNA integration were correlated with measures of neurocognitive dysfunction and previously identified plasma biomarkers that are associated with neurocognitive dysfunction. The level of HIV DNA integration may serve as a prognostic biomarker of HIV-associated neurological impairment.

Conclusions:These results may correlate with modifications of cellular function by the HIV DNA integration. Future directions will include self-report questionnaires regarding the participant's perception of neurocognitive decline affecting their everyday living. Correlations between perception of neurocognitive impairment, discovered plasma, and HIV DNA integration biomarkers of neurocognitive decline could improve prognostic outcomes of HAND.

Sponsor: N/A
IRB/IACUC/IBC#: 2010-063

1400 - Poster
Classification: GSBS Student
Presenter: Rachel Thomas
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Rachel Thomas; Jiyoung Oh; Weikan Wang; Dong-Ming Su

Atrophied thymus creates tTreg repertoire holes diminishing an antigen-specific population in the periphery

Purpose: We have shown that there is an increased ratio of total thymic T regulatory (tTreg) cells to thymic T conventional (tTcon) cells generated by the atrophied thymus related to aging. This observation, coupled with the accumulation of peripheral Treg (pTreg) cells with age, poses the difficult question of why Tregs in the periphery of the elderly are unable to suppress amplified self-reactivity-induced inflammaging.

Methods: We utilized a chimeric mouse model with immune system reconstitution in which lethally irradiated rat insulin promotor-driven (RIP) mOVA host mice received mixed OT-II TCR transgenic and wild-type bone marrow, each expressing distinct congenic identifiers (CD45.1 vs CD45.2). In this system, OVA serves as a mock self-antigen, which is expressed mainly in the pancreas of the host mice. Further, our mOVA host mice carried a FoxN1-floxed gene, for induction of conditional FoxN1 knock-out, resulting in thymic atrophy analogous to age-related thymic atrophy.

Results: We observed that chimeric mice with induced thymic atrophy exhibited significantly decreased OVA-specific (OT-II) Tregs, but not total (pan) Tregs, in the spleen and pancreas. The specific Treg cells of mice with thymic atrophy were also more instable, showing relatively decreased FoxP3 expression, and had greater plasticity, showing an increased Th1-like (IFNγ+FoxP3+) Treg phenotype.

Conclusions: Overall, our preliminary results suggest that thymic atrophy creates changes in the antigen-specific repertoire during tTreg generation resulting in potential "holes" that may contribute to inflammaging in the elderly and negatively impact Treg cell-mediated regulation in the aged immune system.

1401 - Poster
Classification: GSBS Student
Presenter: Weikan Wang
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Weikan Wang; Rachel Thomas; Jiyoung Oh; DongMing Su

MOG-specific Treg generation is potentially affected by thymic atrophy

Purpose: Increased chronic inflammation in the elderly is partially attributed to the disruption of central immune tolerance, comprising thymocyte negative selection and regulatory T cell (Treg) generation due to age-related thymic atrophy. Mechanistically, decreased self-antigen expression by thymic epithelial cells (TECs) in the atrophied thymus is unable to induce strong T cell receptor (TCR) signaling so that thymocyte negative selection is defective and polyclonal Treg generation is relatively enhanced. However, it was reported that certain specific clonal Treg generation is defective. Given the fact that aging aggravates relapsing-remitting multiple sclerosis (mouse model experimental autoimmune encephalomyelitis, EAE) and myelin oligodendrocyte glycoprotein (MOG) specific Treg is a key to resolve EAE, we ask whether the generation of monoclonal MOG-specific Treg cells are defective during thymic atrophy.

Methods: We used inducible thymic atrophy mice reconstituted with MOG-specific TCR transgenic bone marrow to investigate the alteration of generation and function of MOG-specific Treg cells.

Results: We found that the mog gene expression in TECs is decreased in the atrophied thymus, implying a potential contributor to the alteration of MOG-specific T cell development. At the peak stage of EAE, the ratio of MOG-specific Treg cells to MOG-specific conventional T cells in the central nervous system of thymic atrophy mice is decreased, with a decreased trend of Foxp3 expression in these Treg cells. Although we did not find obvious clinical differences in EAE between the thymic atrophy and normal thymus groups at the small sample numbers, we will continue to investigate the clinical and pathological differences via increasing animal numbers.

Conclusion: This study suggests that even though in the aged thymus the generation of polyclonal Treg cells is enhanced, certain tissue-specific Treg cell generation could be reduced, leaving holes in the Treg-TCR repertoire.

Sponsor: RN0144
IRB/IACUC/IBC#: 2018-0014; IBC/rDNA/DS-2019-1

1402 - Poster
Classification: GSBS Student
Presenter: Yuanhong Sun
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Yuanhong Sun; Joseph D Malaer; Porunelloor A Mathew

Chemotherapeutic drugs increase CS1 (CD319) expression on multiple myeloma cells enhancing NK cell mediated killing

Background: Multiple myeloma (MM) is characterized by malignant plasma cells. The clinical diagnosis includes end-organ damage, such as hypercalcemia and renal insufficiency. CS1, a member of the Signaling Lymphocyte Activation Molecule (SLAM) family of receptors, is expressed on natural killer (NK) cells as an activation receptor. CS1-CS1 binding could activate natural killer cell cytotoxicity. In multiple myeloma cells, CS1 is highly expressed and therefore offers a remarkable target for antibody dependent cell-mediate cytotoxicity (ADCC) by NK cells. Elotuzumab (Empliciti), is a humanized monoclonal antibody against CS1. Clinical trials suggest Empliciti combined with chemotherapeutic drugs has increased efficacy than using Empliciti only. In this study we investigated the mechanism of enhanced killing of MM by NK cells.

Hypothesis: Chemotherapeutic drugs up-regulate the CS1 expression on multiple myeloma cell surface and enhance NK cell mediated ADCC.

Material and Methods: Multiple myeloma cells, NCI-H929 were treated with vehicle control, lenalidomide and anti-CS1 mAb, doxorubicin and dexamethasone, or dexamethasone and anti-CS1 mAb for 24h and 48h. NCI-H929 cells were labeled with antibody to detect CS1 expression on cell surface by flow cytometry. CS1 mRNA expression in multiple myeloma cells were investigated by RT-qPCR. NK cell mediated killing was determined by chromium release assay.

Results: Compare with vertical group, CS1 expression levels are increased in all experiment groups, but only doxorubicin and dexamethasone treatment 24h group show significantly increase, same results in anti-CS1 mAb and lenalidomide treatment 48h group. After treating NCI-H929 cell with dexamethasone and anti-CS1 mAb for 24h and 48h, mRNA expression levels are significantly decreased. No statistically variation is observed among the other groups. Natural killer cell killing abilities are significantly improved in chemotherapeutic drugs combination with anti-CS1 mAb treatment groups, no significant increase in doxorubicin and dexamethasone group.

Conclusion: In conclusion, our results suggest chemotherapeutic drugs could increase the CS1 expression on NCI-H929 cell. Combining clinical trial observations and our data, it appears chemotherapeutic drugs may increase the anti-mAb treatment efficacy by up-regulating the CS1 expression level in multiple myeloma cells resulting in enhanced NK cell mediated cytotoxicity.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1403 - Poster
Classification: School of Public Health Student
Presenter: Adrianna Tirloni
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Adrianna Tirloni; Harlan P Jones, PhD; Colette Ngo Ndjom, M.S.

Conceptualizing Stress as a Mediator of Lung Microbiota's Influence on Respiratory Health

Purpose: Stress responses have been shown to alter the microbial ecosystem along the respiratory tract affecting the elimination and migration of microbes. However, to date little is known about the mechanisms through which bacteria function as a resident flora within the respiratory system, especially when confronted to stress. Using an experimental murine model, the purpose of the current study was to assess whether bacteria could be recovered from the lower respiratory tract (e.g. lung tissue), as well as assess the quality and quantity of bacterial species given stress exposure.

Methods: C57 B6 mice strain were assigned to either a control group or a stress group and were subjected to a restraint stress paradigm reported to elicit a neuroendocrine stress response. Mice weight was recorded daily as an indicator of stress sensitivity over the course of the study. Following the stress paradigm, mice lungs were harvested, homogenized, and plated onto prepared Brain Heart Infusion agar plates. Eighteen (18) hours later, bacterial numbers were quantified by colony forming unit (CFU) techniques. Gram staining methods were also performed on lung bacterial isolates to access Gram (+) and Gram (-) species. In addition, 16S DNA amplification of lung bacterial isolates was performed for future bacterial sequence analysis.

Results: The weights recorded throughout the stress paradigm showed stressed mice had greater variations in weight fluctuations than non-stressed mice. Quantification of bacteria isolated from the lungs demonstrated that while bacteria were recovered from both stressed and non-stressed mice; 8 of 9 stressed mice demonstrated quantifiable colonies where only 3 of 9 non-stressed mice had bacterial counts above the limit of detection. Qualitatively differences in the proportion of Gram (+) and Gram (-) bacteria were observed in the lungs of stressed mice compared to non-stressed mice. Amplification of 16S Illumina V4 primer and gel electrophoresis confirmed the presence of bacterial DNA necessary for downstream sequence analysis to identify species-specific differences present in the lungs of stressed and non-stressed mice.

Conclusions: Initial data indicates that stress could be a factor that regulate lung microbiota. Future research will investigate microbiota diversity in the lung and how changes due to stress impact asthma disease pathogenesis.

1404 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Jamie Y. Choe
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Jamie Y. Choe; Pankaj Chaudhary; Harlan P. Jones

Radiation-mediated effect on exosomal and non-exosomal-derived microRNA-21 (miR21) gene expression by Triple Negative Breast Cancer cell line MDA-MB-231

Background: Triple negative breast cancer (TNBC) is an aggressive breast cancer subtype which lacks estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor-2 receptor (HER2). TNBC is therefore not responsive to hormonal treatment and currently lacks targeted therapies. Overexpression of miR21 is routinely observed with TNBC and correlates with advanced tumor stage and lymph node metastasis. MDA-MB-231 is a metastatic human TNBC cell line with high recurrence rate via metastasis to secondary sites. Specialized extracellular vesicles called exosomes are involved in intercellular communication and have been postulated to have roles in tumor metastasis.

Objective: In this study, we evaluate the effect of high-dose radiation on viability of MDA-MB-231 and identify changes in miR21 expression in cells and exosomes released in response to ionizing radiation.

Methods: MDA-MB-231 cells (obtained from American Type Culture Collection) were cultured and irradiated with single dose exposure to 8.6 Gy (low dose) and 17.2 Gy (high dose). At 24h post-irradiation, cells were assessed for viability, proliferation, and wound healing. Exosomes were isolated from culture medium at 48h post-irradiation using differential ultracentrifugation method and evaluated for size and purity. Western blot confirmed isolation of exosomes by determining expression of established exosome membrane protein markers CD81 and TSG101. RT-qPCR evaluated expression of miR21 in cells and exosomes.

Results: High-dose (17.2 Gy) radiation suppressed MDA-MB-231 proliferation based on MTT and wound healing assays. MDA-MB-231 cells exposed to 8.6 Gy showed marked upregulation of cellular miR21 and relative downregulation of exosomal miR21; exposure to 17.2 Gy resulted in downregulation of both cellular and exosomal miR21 relative to the control.

Conclusion: This pilot study demonstrated that tumor cells may display compartmental differential expression of miRNA in response to radiation and suggests that miRNA expression in cells may not be predictive of exosomal cargo.

Sponsor: N/A
IRB/IACUC/IBC#: IBC/p/HJ-2017-1

1405 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Erika Rudolph
Department: GSBS: Physiology & Anatomy
Authors: Erika Rudolph, BS OMS-II; Sara House, BS; Lisa Hodge, PhD

The Effect of Lymph Isolated during Osteopathic Lymphatic Pump Treatment on the Immune Response against Acute Pneumonia

Purpose: Community acquired pneumonia (CAP) accounts for over 1,000,000 hospital admissions yearly. Osteopathic physicians use lymphatic pump techniques (LPT) as a tool to mobilize lymph and treat infectious disease, such as CAP. Recent research supports LPT as an adjunctive therapy in the treatment of CAP, such as streptococcal pneumonia; however, the exact mechanism by which LPT is protective in this setting is unknown. As the first line of defense, resident alveolar macrophages respond to pathogens by engulfing bacteria and secreting antimicrobials such as nitric oxide and inflammatory mediators such as TNF-α. Thus, alveolar macrophages are key regulators in the immune response to airway pathogens. The overall objective of this study is to identify the biological effect of the thoracic duct lymph (TDL) mobilized during LPT on the immune response against streptococcal pneumonia. In this study, we hypothesized that lymph mobilized during LPT would suppress the inflammatory effect of alveolar macrophages against lipoteichoic acid (LTA), a component of the cell wall of S. pneumoniae.

Methods: To test our hypothesis, TDL was collected from 6 mongrel dogs during 4 minutes of baseline (baseline TDL), during 4 minutes of LPT (LPT TDL), and during 10 minutes following LPT (post-LPT TDL). The murine alveolar macrophage cell line, MH-S, was cultured in media or media plus 5% phosphate buffer saline (PBS), 5% baseline TDL, 5% LPT TDL, or 5% post-LPT TDL and co-cultured with or without LTA. After 24 hours of culture, the supernatant was collected to measure the production of nitrite and TNF-α. Alveolar macrophage viability was measured by flow cytometry using the markers annexin V and propidium iodide.

Results: Alveolar macrophages did not produce nitrite or TNF-a in the absence of stimulation with LTA. During culture with LTA, the addition of baseline, LPT, or post-LPT TDL significantly (P0.05). Furthermore, there were no differences in TNF-α and IL-10 production by MH-S macrophages cultured with baseline, LPT, or post-LPT TDL with or without LTA.

Conclusions: In vitro, TDL reduced some of the inflammatory activity of macrophages that are associated with the immune pathology caused by S. pneumoniae. By mobilizing lymph into circulation, LPT may mobilize protective factors to the lung to reduce inflammation, thereby protecting from pulmonary disease. A better understanding of the physiological effects of LPT will allow us to expand translational and clinical research and guide osteopathic practitioners in their clinical practice.

1500 - Poster
Classification: GSBS Student
Presenter: Obed Paundralingga
Department: GSBS: Physiology & Anatomy
Authors: Obed Paundralingga; Steve Wayne Mifflin

Sex Differences in Responses of Nucleus Tractus Solitarii Neurons to Acute Tissue Hypoxia

Obstructive sleep apnea (OSA) is a risk factor associated with cardiovascular diseases, such as hypertension. Females are protected from the hypertensive and tachycardia effects of chronic intermittent hypoxia model of OSA. The present study examined the change in nucleus tractus solitarius (nTS) intracellular calcium level response to exposure to acute hypoxia in male rats and in female rats and the role of voltage gated calcium channel (VGCC) in mediating the response. Adult rat brainstem slices (250 μm thick) containing commissural and caudal nTS were incubated for 45 min with 10 μM Fura-2AM and 30 μL of F127 at room temperature and then washed for 20 min in artificial cerebrospinal fluid (aCSF) bubbled with 95% O_2/5%CO_2. A single slice was transferred to the recording chamber on an upright epifluorescent microscope and superfused with normal aCSF bubbled with 20% O_2/5%CO_2 balanced with N2 at a rate of 2.5 ml/min. Acute hypoxia was established by exposing hindbrain slices to aCSF bubbled with 95% N_2/5% CO_2. In slices where the role of VGCC was being studied, the slice was preincubated with 20 μM nifedipine in aCSF before the recording and was exposed to hypoxia in the presence of the same drug during the recording period. Fluorescence of Fura-2AM was excited by epi-illumination with light filtered alternatively at 340 or 380 nm while the emitted light passed through a barrier filter (510 nm). Pairs of 340 and 380 nm images were acquired at intervals of 5 s and analyzed off-line with NIS-Elements AR 3.2 software to yield 340/380 ratio. A total of 22 sections were examined from 3 male and 3 female rats and an average of 6 cells/slice were analyzed in each section. Five minutes of hypoxic aCSF triggered a greater increase from baseline in slices from male rats compared to female rats (males: 3±0.16%, n=49 vs females: 2.2+0.19%, n=40; P2+]i as a response to acute tissue hypoxia in caudal NTS is differentially regulated between male and female rats and is also dependent, at least in part, upon Ca^{2+} influx through L-type voltage gated calcium channel in the males. As hypoxia-induced elevations in intracellular Ca^{2+} are likely to alter caudal NTS neuronal function under hypoxic conditions, its differential regulation in males and females might mediate some of the protection seen at organismal level.

1501 - Poster
Classification: GSBS Student
Presenter: Haley J. Barnes
Department: GSBS: Physiology & Anatomy
Authors: Haley J. Barnes; Garen K. Anderson; Alexander J. Rosenburg; Flora S. Park; Justin D. Sprick; Caroline A. Rickards

Peak Analysis of Cerebral Blood Velocity Responses to Forced Low Frequency Oscillations during Simulated Hemorrhagic Stress in Humans

Purpose: Tolerance to blood loss injuries (actual and simulated) varies across individuals. Higher amplitude of low frequency oscillations (10-s cycle; ~0.1 Hz) in brain blood flow and arterial pressure have been associated with higher tolerance to simulated hypovolemic episodes using lower body negative pressure (LBNP). We have previously demonstrated that forcing oscillations in cerebral blood flow and arterial pressure at 0.1 Hz and 0.05 Hz with oscillatory LBNP (OLBNP) protects cerebral oxygenation during central hypovolemia. However, there was no protection of mean cerebral blood flow (indexed via mean middle cerebral artery velocity, MCAv) with these oscillatory conditions. We hypothesize that the peak mean MCAv will be higher in the 0.05 Hz and 0.1 Hz OLBNP conditions compared to the 0 Hz condition, which may account for the protection of cerebral tissue oxygenation.

Methods: Fourteen healthy human subjects (3 female/11 male) were randomly exposed to 10-min of non-oscillatory (0 Hz) and oscillatory (0.05 Hz and 0.1 Hz) LBNP conditions with an average LBNP chamber pressure of -60 mmHg. Measurements included MCAv via transcranial Doppler ultrasound, frontal lobe cerebral oxygenation (ScO$_2$) via near infrared spectroscopy, and stroke volume and arterial pressure via finger photoplethysmography. Peak analysis was performed in 10-s and 5-s windows for the 0.05 Hz and 0.1 Hz profiles, respectively. Peak responses to the three LBNP conditions were compared using a linear mixed model for repeated measures with Tukey post hoc tests.

Results: As previously reported, tolerance to the two OLBNP conditions was higher compared to the 0 Hz condition ($P \leq 0.09$ for both vs. 0 Hz). In partial support of our hypothesis, when compared to the 0 Hz profile, the peak MCAv was higher with 0.05 Hz OLBNP (51.0±4.2 cm/s vs. 46.3±3.4 cm/s; P = 0.004) but not with the 0.1 Hz profile (49.0±3.9 cm/s; P = 0.11 vs. 0 Hz).

Conclusions: The higher peak MCAv during the 0.05 Hz OLBNP profile may contribute to the attenuated decrease in cerebral oxygenation. These findings demonstrate the potential contribution of oscillatory peaks in cerebral blood flow to the protection of cerebral oxygenation and increased tolerance to simulated hemorrhage.

1502 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Flora Park
Department: GSBS: Physiology & Anatomy
Authors: Flora S Park; My-Loan Luu; Victoria L Kay; Justin D Sprick; Alexander J Rosenburg; Robert T Mallet; Caroline A Rickards

Examining the Sex Effect on Oxidative Stress during Simulated Hemorrhage Induced by Lower Body Negative Pressure

Purpose: Traumatic hemorrhage is one of the leading causes of death in both the military and civilian settings. Massive blood loss is known to elicit an increase in oxidative stress as a consequence of tissue ischemia and hypoxia. We have recently demonstrated that simulated hemorrhage via application of lower body negative pressure (LBNP) also elicits an increase in oxidative stress (indexed by circulating F_2-isoprostanes). It is not clear, however, whether oxidative stress responses to stimulated hemorrhage are differentiated based on sex. The aim of this study was to assess sex differences in the oxidative stress response during simulated hemorrhage via application of pre-syncopal LBNP.

Methods: Fifteen healthy human subjects (11 M, 4 F) participated in a LBNP step protocol until presyncope (-15, -30, -45, -60, -70, -80, -90, -100 mmHg LBNP for 5-min each). Venous blood samples were collected at baseline and at presyncope then analyzed for F_2-isoprostanes. Stroke volume and mean arterial pressure were obtained via finger photoplethysmography, while muscle oxygen saturation was measured via a near infrared spectroscopy device attached to the forearm. Time to reach presyncope was measured in seconds.

Results: The following results are only preliminary based on the small number of female subjects tested (N=4). There was no difference in tolerance to LBNP between males and females (Males: 1616 ± 132 s vs. Females: 1486 ± 216 s; P=0.63). F_2-isoprostane concentrations were similar between the sexes at baseline (P=0.27), and there was no statistical difference in the % change in concentration with application of maximal LBNP (Males: 37.0 ± 15.4 % vs. Females: 5.0 ± 10.1; P=0.11). The decreases in stroke volume (Males: -52.4 ± 5.3 % vs. Females: -56.5 ± 5.5 %; P=0.50),mean arterial pressure (Males: -11.9 ± 3.4 % vs. Females: -14.6 ± 4.2 %; P=0.63), and muscle oxygen saturation (Males: -9.1± 1.7 % vs. Females: -9.4 ±2.3 %; P=0.91) were also similar between males and females.

Conclusions: These preliminary data indicate that there is no effect of sex on the oxidative stress response induced by application of simulated hemorrhage with maximal LBNP. This analysis is limited and inconclusive, however, as there were only 4 females and 11 males in this group of subjects. In our current study, we plan to recruit equal numbers of males and females to further explore whether biological sex plays a role in the oxidative stress response to blood loss injuries.

Microbiology/Infectious Disease (Abstracts in the 1600s)

1600 - Poster
Classification: GSBS Student
Presenter: Sahar Rezaei
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Sahar Rezaei; Johnny He

Metformin Enhanced HIV Gene Expression and Production

Purpose: HIV-1 adopts several factors of host machinery to generate a permissive environment for viral replication and transmission. HIV-1 enhances the activity of mTORC1 which appears to be necessary for the optimal expression of the structural viral protein Gag. In addition, HIV-1 hijacks the Rag GTPase/mTORC1 complex to modulate host cell function for optimal virus trafficking, assembly and/or budding. Exosomal release of HIV proteins primes cells for new infection. Metformin (1,1-dimethyl biguanide hydrochloride) is a USA Food and Drug Administration (FDA)-approved biguanide derivative and the most widely prescribed antihyperglycemic drug which is used as first-line therapy for diabetes mellitus type 2. Metformin inhibits mTORC1 by activation of AMPK. It has recently been shown that metformin can exert antiviral effects against Hepatitis B, Dengue, and Zika viruses. In this project, we aim to determine the effect of metformin on HIV replication/release using HIV transfected/infected cells.

Methods: MTT (Methylthiazolyldiphenyl-tetrazolium bromide) was used to determine cell viability. Reverse transcriptase assay (RT) activity assay was used to determine the levels of virus replication and production in cells. Western blotting was used to determine intracellular protein expression. Western blotting followed by semiquantitative protein band detection was performed using a Bio-Rad ChemiDoc imaging system (Bio-Rad). Band intensities were calculated by measuring the ratio between the protein of interest to beta-actin. HIV LTR promoter-driven luciferase reporter cell line TZM-bl was used to determine the LTR promoter activity.

Results: No effects on cell proliferation were noted in both 293T and TZM-bl treated up to 4 mM Metformin. Metformin did not alter HIV promoter activity. Metformin increased HIV virus production. Consistent with this finding, Metformin increased intracellular HIV gene expression, specifically Gag expression and Tat expression. In addition, Metformin did not appear to have any effects on the activity of HIV reverse transcriptase.

Conclusion: These findings demonstrated that Metformin enhances HIV gene expression and production and suggest that Metformin may regulate steps of the HIV life cycle other than reverse transcription and HIV LTR promoter transcription. These findings also provide evidence to support metformin as a potential, low cost supplementary therapeutic agent for the elimination of latent viral reservoirs.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-0065

1601 - Poster
Classification: GSBS Student
Presenter: Suresh Kandel
Department: GSBS: Microbiology, Immunology & Genetics
Authors: SURESH KANDEL; Johnny J. He

The HIV-1 negative regulatory factor (Nef) is important for efficient virus production from astrocytes

Purpose: The HIV-1 negative regulatory factor (Nef) is a membrane associated myristoylated protein with a molecular weight of 27-32 KDa. It downregulates immune molecules such as MHC-I/CD4 receptors on CD4$^+$ T lymphocytes and is indispensable for AIDS progression and high level of viremia. Additionally, Nef plays important roles in the virus production from immune cells and the infectivity of viruses released from these cells. However, much remained undefined about the involvement of Nef for virus production and infectivity in the context of CNS, particularly in astrocytes. Astrocytes are the most abundant long- lived cell types in the brain. HIV-1 infection leads to restrictive virus replication and establishes latency in these cells. Therefore, the main objective of this study is to determine the role of HIV-1 Nef in the virus production from astrocytes and the infectivity of viruses released from astrocytes.

Methods: We transfected pNL4-3 and pNL4-3Nef$^-$ plasmids in astrocytic cell line LN299. Non-astrocytic cell line HEK 293T was used as a control. The virus production was determined using reverse transcriptase assay, while the infectivity of viruses was determined using a LTR-driven luciferase stably expressing cell line, TZM-BL.

Results: In HEK 293T, the virus production was high and showed no difference between NL4-3 and NL4-3Nef$^-$. In comparison to HEK 293T, the virus production was lower in LN299. There was more virus production in pNL4-3 transfected cells than pNL4-3Nef$^-$ transfected cells. There were no differences in infectivity of the viruses produced between pNL4-3-transfected cells and pNL4-3Nef$^-$ transfected cells in both HEK 293T and LN299.

Conclusion: The results demonstrated that Nef expression gave rise to differences in virus production in astrocytes and suggest that Nef plays an important regulatory role in HIV gene expression in astrocytes. Further studies are underway to investigate the underlying mechanisms.
Keywords: Nef, HIV-1, Astrocytes, budding, Infectivity

1602 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Steven Mai
Department: UNT System College of Pharmacy: Pharmacotherapy
Authors: Steven Mai; Dr. Marian Gaviola

A Systematic Review of the Utility of Procalcitonin in Bacterial Meningitis

Purpose/Objective: To review the utility of procalcitonin (PCT) in the management of bacterial meningitis (BM).

Methods: An English-language MEDLINE search from 1964 through June 20, 2018 was completed using the following search terms: calcitonin, calcitonin gene-related peptides, meningitis: bacterial/diagnosis, and meningitis, bacterial/blood. Primary literature that evaluated the diagnostic value of PCT in adult patients for separating BM from viral or aseptic meningitis and studies comparing PCT with other biomarkers were included. Studies that did not consider antibiotic pretreatment as an exclusion criterion were excluded.

Results: A total of 15 studies were identified for inclusion in this review. Ten studies evaluated the utility of PCT in distinguishing BM from non-bacterial meningitis (NBM) in a total of 1022 patients. Eight of these were prospective studies and two were retrospective. All 10 studies showed that PCT is significantly elevated in cases of BM compared to NBM, with the average elevation ranging from 0.5 ng/mL to 4.714 ng/mL in the serum and 0.2 ng/mL to 1.88 ng/mL in the cerebrospinal fluid (CSF). Three studies compared the diagnostic value of serum PCT versus non-serum PCT. All three studies were prospective clinical studies and included a total 502 patients. Two studies showed that serum PCT had a higher diagnostic value compared to CSF PCT and only one showed that CSF PCT is superior. Finally, no studies reviewed the use of PCT in guiding antibiotic de-escalation and no studies reviewed whether to use PCT in parallels or in series. However, two studies considered the use of PCT in guiding antibiotic usage and one study examined the use of PCT in conjunction with lactate. These studies showed that there are higher levels of CSF PCT in patients with gram-negative infections compared to those with gram-positive infections and explored the possibility of using PCT in addition to glucose to guide antibiotic therapy. Lastly, one study showed that there is higher specificity when using PCT with lactate in series and higher sensitivity when used in parallel.

Conclusions: PCT is a useful biomarker in identifying cases of BM and serum PCT may be better than CSF PCT in identifying BM. However, larger studies are necessary to confirm these results and identify a standardized threshold. Additionally, more studies are necessary to explore the best way to utilize PCT and in diagnosing BM and the utility of PCT in guiding antibiotic therapy for BM.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1700 - Poster
Classification: GSBS Student
Presenter: Talisa Silzer
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Talisa Silzer; Gita Pathak; Robert Barber; Nicole Phillips

Mito-nuclear compatibility in risk for cognitive decline in admixed populations

Background: The issue of missing heritability has vexed the study of many complex diseases, Alzheimer's disease (AD) not excluded. Only ~35% of the heritability of AD has been accounted for, the majority of which lies in APOE allele e4, which has a less-pronounced effect in certain admixed populations. There are few genetic and/or mitochondrial studies of admixed populations, and our understanding of mitochondrially-related cognitive decline has largely been based on studies of highly homogenous populations (by design). The concept of mito-nuclear compatibility states that optimization of mitochondrial DNA (mtDNA) with nuclear genetic background is a source of significant selective evolutionary pressure. Evidence for this phenomenon in human populations is emerging (Zaidi and Makova, 2019), and opens the door for studies in the context of human disease.

Purpose: The purpose of this study is to determine whether divergent nuclear and mitochondrial genomes confer risk for cognitive impairment and decline in admixed populations.

Methods: Participants in the Texas Alzheimer's Research and Care Consortium (TARCC) were used for this study. DNA extracts from peripheral blood buffy coat were genotyped on the Multi-Ethnic Genotyping Array (Illumina) which types 1.7 million SNPs and includes ancestry specific genetic variation. The top 10 eigenvectors (smartpca via Eigensoft) were generated via principle component analysis of nuclear DNA (nDNA) and used to cluster subjects with the 1000 Genomes population data in order to ascertain global, ancestral nDNA background. Mitochondrial DNA variants from the array were analyzed using HaploGrep/MitoTool for mtDNA haplotype assignment. Non-concordance of mtDNA:nDNA ancestry will be identified and scored as in Zaidi and Makova, 2019 and tested for association with cognitive state (normal, mild cognitive impairment, or Alzheimer's disease) as well as cognitive decline between time points.

Results: Preliminary studies indicate that cognitive decline is associated with mitochondrial phenotypes in Caucasian subjects; these results were dependent on sex. Mitochondrial copy number was a main driver in the predictive model in both males and females, but to a differing degree.

Conclusion: Discrepancy between mtDNA and nDNA genomic backgrounds has been previously correlated with mtDNA copy number (Zaidi and Makova, 2019); similar discrepancy may explain health disparities in complex diseases that are more prevalent in particular admixed populations.

Sponsor: N/A
IRB/IACUC/IBC#: 2016-090

1701 - Poster
Classification: GSBS Student
Presenter: Talisa Silzer
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Talisa Silzer; Nicole Phillips

Mitochondrial RNA Sequencing Variation in Age-Related Pathologies

Background: Mitochondrial function has been implicated in a number of age-related disease pathologies, and post-transcriptional sequence modifications in mitochondrial RNA (mtRNA) have been correlated with variation in the mitochondrial function. One of the most significant modifications is methylation of mitochondrial transfer RNAs (tRNA) at their 9th position (termed "p9 sites"). Post-transcriptional modifications to these tRNAs are known to alter efficiency of translation and protein synthesis, affecting downstream mitochondrial function. The impact that these modifications to the mitochondrial transcriptome have on risk for age-related disease has not been previously explored.

Purpose: The purpose of this study was to determine if altered post-transcriptional modification rates to mitochondrial p9 tRNA sites is associated with risk for age-related disease pathologies.

Methods: RNA sequencing and genotyping data was analyzed from cerebellar tissue of 275 Caucasian subjects consisting of elderly controls, and individuals with diagnosed AD, progressive supranuclear palsy or pathological aging. Data were obtained through the Synapse data repository and were collected by the Mayo RNAseq study, led by Dr. Nilüfer Ertekin-Taner, Mayo Clinic, Jacksonville, FL as part of the multi-PI U01 AG046139 (MPIs Golde, Ertekin-Taner, Younkin, Price). Heteroplasmy in mtRNA was measured using the VarScan software tool. Variants in the nuclear-encoded gene MRPP3 were analyzed for association with altered p9 methylation rates.

Results: Average number and rate of heteroplasmy at the 13 sites were compared across control and case groups. A higher rate of heteroplasmy was observed at the p9 sites, indicating the presence of methylation within these tRNAs.

Concluding Remarks: Post-transcriptional modification of mtRNA occurs under normal, non-pathologic states; alteration of methylation rate at the p9 site of mitochondrial tRNAs may be associated with aging pathology. The rate of p9 methylation has been associated with genetic factors encoded in the nuclear DNA (Hodgkinson et al., 2014). Targeting methylation of mitochondrial tRNA could prove to be a viable therapeutic approach for deficits in mitochondrial function.

Sponsor: N/A
IRB/IACUC/IBC#: 2016-090

1702 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Shweta Bhatnagar
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Shweta Bhatnagar; Gita Pathak; Subhash Aryal; Nicole R Phillips; John Licciardone

Candidate Gene Association Study of Low Back Pain Using SNP Derived Gene Expression Profiling: A PRECISION PAIN Research Registry Study

Objective: The Global Burden of Disease Study estimated that 632 million persons worldwide are affected by low back pain (LBP), making it the leading cause of disability worldwide. Furthering our understanding of genetic-based risk for LBP may allow for development of targeted gene therapy for pain which may help mitigate the healthcare and financial burden.

Inflammatory genes have been implicated in pain disorders. Variability in how these genes are expressed may determine their association in low back pain. This study aims to predict the expression of candidate genes and their association with pain in participants of the PRECISION Pain Research Registry.

Hypothesis: Elevated self-reported pain intensity and disability from LBP is associated with the higher expression of inflammatory genes.

Methods: The DNA was collected, extracted, and genotyped using the Infinium® Global Screening Array (Illumina). Data were filtered based on standard quality control protocols (Anderson et al., 2010). Gene expression data of monocytes from the Multi-Ethnic Study for Atherosclerosis (MESA) was used for gene expression imputation using PrediXcan. Twenty-six candidate genes involved with inflammation and immune response processes (based on Gene Ontology Analysis) were analyzed. The imputed gene expression levels were transformed to dichotomized gene expression levels, over-expressed and under-expressed. The highly expressed gene levels were then tested for association with PRECISION participant outcomes data, including Roland-Morris Disability Score and a pain intensity score using SPSS.

Results: Seven genes showed positive correlation between their predicted expression levels and scores on the Roland-Morris Questionnaire and the pain intensity scale for LBP: STAT-1, STAT-2, HLA-A, CD48, CD209, CLEC4G and SLAMF8. Also, as expected, many of these genes demonstrated co-expression patterns due to their common role in immune mediation.

Conclusions: The results demonstrate a positive correlation between the increased expression of inflammatory genes and how the subjects perceived and reported LBP. Understanding the relationship between pain and variability in inflammatory genes could play a role in future precision medicine and pain management.

Sponsor: N/A
IRB/IACUC/IBC#: IRB 2015-169 and 2017-102 IBC-2019-0106

1703 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Jonathan Lopez
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Jonathan Lopez; Nicole Phillips; Subhash Aryal; John Licciardone

Examining SLC6A4 Variations in the PRECISION Pain Research Registry

Purpose: Chronic low back pain is the leading cause of disability globally and has been linked to comorbidities such as depression. Common pathways involving serotonin and norepinephrine may play a role in both pain and mood disorders. The SLC6A4 gene, encoding a serotonin reuptake transporter, has been heavily studied with regard to depression. Polymorphisms within the gene are thought to influence the expression of the transporter, thereby modulating serotonin transmission. More recently, this gene has been studied in the context of chronic pain. This study seeks to further our understanding of chronic pain with respect to depression and other outcome measures in participants with chronic low back pain to aid in the development of better treatments.

Methods: Participants with chronic low back pain in the PRECISION Pain Research Registry provided DNA samples that were genotyped on the Infinium Global Screening Array (Illumina). Long and short length polymorphisms of the SLC6A4 gene were predicted using an eight single nucleotide polymorphism (SNP) machine learning model. Of the eight, one SNP was collected from the array, and the other seven were imputed. Additionally, the rs25531A>G SNP was imputed. Using the length of the polymorphism and the rs25531 SNP, subjects were divided into high, intermediate and low expression groups. Participants also reported clinical status measures such as low back pain intensity, back-specific functioning, PROMIS quality of life, levels of pain self-efficacy, and pain catastrophizing.

Results: There was no significant association between self-reported depression and expression levels (high, intermediate, low) of SLC6A4. No correlation was found between PROMIS depression scores and SLC6A4 expression. Analyses for depression values were conducted using logistic linear regression and non-parametric ANOVA respectively. There were no observed correlations between transporter expression level and the outcome variables of back-related disability, pain, pain catastrophizing, or pain self-efficacy. Disability was analyzed using ANOVA. Pain, pain catastrophizing, and pain self-efficacy were investigated using non-parametric ANOVA analyses.

Conclusion: No correlations were found between serotonin transporter expression level and depression or other outcome variables. Similar previous studies investigating SLC6A4 used homogenous populations. We recommend conducting a larger study that takes into account race.

Sponsor: N/A
IRB/IACUC/IBC#: IRB 2015-169 IBC-2019-0106

1800 - Poster
Classification: Dual Degree Student
Presenter: Jessica Hersh
Department: GSBS: Pharmacology & Neuroscience
Authors: Jessica M Hersh; Luokun Xie; Wenjun Li; Ran Liu; Shaohua Yang

IMPACT OF T-CELLS ON ASTROCYTES IN VIVO & IN VITRO: IMPLICATIONS POST-ISCHEMIC STROKE

Purpose: Post-ischemic stroke, T-lymphocytes enter the brain. The role of T-cells in the progression of cerebral infarction or repair mechanisms is unclear. We hypothesized that T-cells interact with astrocytes directly leading to an anti-inflammatory response.

Methods: In vivo, ischemic stroke was induced by middle cerebral artery occlusion in young adult C57/B6 male mice. Mice were sacrificed at 3 days or 1-month post-ischemic stroke. Paraffin-embedded brain sections demonstrated co-localization of astrocytes and CD4$^+$ and CD8$^+$ T-cells in the ischemic region 1 month after stroke. T-cells were harvested from the brain by digestion; percoll enriched, and incubated with anti-CD3 and CD25 antibodies. T-cells were sorted via flow cytometry. The cytokine profile of brain infiltrated CD4$^+$ and CD8$^+$ T-cells were compared to spleen T-cells using QT-PCR.
In vitro, C8-S murine astrocyte type II clone cell line (ATCC$^®$ CRL-2535™), and T-cells extracted from the spleens of 3-month-old C57/B6 female mice were placed in co-culture at a 1:1 for 48 and 72 hours and compared to individual cell cultures. Anti-CTLA-4 antibodies were added to each culture condition as another experimental group. Astrocytes and T-cells were collected separately for QT-PCR analysis.

Results: In vivo, the following cytokine gene expressions poststroke, were found to be elevated: IFNγ, IL-10, IL-17, TNFα, and perforin.

In vitro, IL-10 gene expression was elevated in astrocytes and T-cells individually harvested from 1:1 co-cultures compared to astrocytes and T-cells alone at 48 and 72 hours respectively. IL-10 was produced primarily by T-cells stimulated by direct contact with astrocytes. Anti-CTLA-4 antibodies blocked the direct cell-to-cell interaction by reducing IL-10 gene expression in both astrocytes and T-cells.

Conclusions: Our data suggests that T-cells release pro- and anti- inflammatory cytokines while in close proximity to astrocytes after ischemic stroke. In co-cultures, astrocytes directly interact with T-cells increasing their IL-10 gene expression by 72 h., implying a neuroprotective mechanism exists via astrocyte stimulation of T-cell IL-10 production.

IRB/IACUC/IBC#: IACUC – 2017-0021

1801 - Poster
Classification: GSBS Student
Presenter: Hongxia Zhang
Department: GSBS: Pharmacology & Neuroscience
Authors: Hongxia Zhang; Kunlin Jin

Differential Effects of Young and Old Serum Exosomes on Ischemic Stroke Outcomes in Aged Rats

Background: Aging is associated with striking increases in the incidences of stroke and neurodegenerative diseases, both of which are major causes of disability among those age 70 years and older in the United States. Despite progress in understanding molecular mechanisms of neuronal cell death after stroke, effective treatment remains elusive. Recent studies showed that systemic factors in the blood can profoundly reverse aging-related impairments, and our study show that aging systemic milieu could worse outcome after ischemic stroke in rats. However, the underlying mechanism remain unclear. Exosomes are extra-cellular microvesicles that play important roles in intercellular signaling and in regulating various physiological and pathological conditions. Here, we explore the role of young and old serum-derived exosomes on ischemic outcome in aged rats.

Method: The exosomes were isolated from serum of young or old rats, and then were intravenously injected into aged ischemic rats via tail for 3 days, respectively. Infarct volume was determined with triphenyltetrazolium chloride (TTC) staining and motor function was assessed with neurobehavioral tests including running ladder and cylinder tests. To elucidate the potential mechanism underlying the functional improvement or deterioration, neuroplasticity was examined after treatment of young and old serum exosomes using Golgi-Cox staining and data were analyzed using Imaris software.

Results: We found that injection of young serum exosomes into aged ischemic rats reduced infarct volume and improved motor functional deficits. On the contrary, injection of old serum exosomes increased infarct volume and worsened motor function. We also found that the dendritic length and spine numbers were significantly increased after injection of young exosomes, while decreased after injection of old exosomes.

Conclusion: Our data suggest that young and old serum exosomes differentially affect functional outcome in aged rats after ischemic stroke, which potentially be translated into novel therapeutic intervention by minimizing the destructive potential of detrimental molecules and enhancing the beneficial contributions to repair the damaged brain.

1802 - Poster
Classification: GSBS Student
Presenter: Anthony Oppong-Gyebi
Department: GSBS: Pharmacology & Neuroscience
Authors: Anthony Oppong-Gyebi; Daniel Metzger; Fen Sun; Nathalie Sumien; Derek Schreihofer

Influence of ovarian hormone deprivation length on the neuroprotective effects of genistein in stroke

Purpose: Advancing age increases women's susceptibility to stroke compared to men, especially after the menopausal transition. Among the reasons proposed for high stroke incidence in postmenopausal women is a significant decrease in estrogen (E2) concentration, based on well-established evidence that E2 is neuroprotective during ischemia in animal studies. While E2 treatment can be beneficial, extended delays in its replacement can result in detrimental actions on the brain which contributes to widespread mistrust of menopausal hormone therapy. Interest in the beneficial effects of soy isoflavones has grown as a viable alternative for E2. However, results from clinical trials have been inconsistent as there seems to be no consensus on the benefits of soy isoflavones in menopausal women. Notwithstanding, evidence suggests a time-dependent benefit of soy isoflavones, even though there is no systematic assessment in preclinical studies to identify the window of opportunity for their proposed optimal benefits. Hypothesis: After long-term hormone deprivation, the soy isoflavone genistein will maintain the ability to provide neuroprotection in the brain following aging and the loss of endogenous E2 in an experimental stroke model.

Methods: Young adult and retired proven breeder Sprague-Dawley rats (>9 mo) were bilaterally ovariectomized, divided into 2 post-ovariectomized time points (2 and 12 weeks) and fed with an isoflavone free (IF) diet. At the end of each time point, rats were continued on IF diet or switched to genistein diet. Two weeks later, rats underwent transient middle cerebral artery occlusion for 60 mins. After stroke rats were subjected to a series of behavioral tests including neurological function, cylinder test, rotarod, and the Morris Water Maze (MWM).

Results: Our results demonstrated a significant effect (p

Conclusion: Dietary genistein had little effect on the sensorimotor outcomes but holds a promise in improving cognitive function post-stroke in the long term.

1803 - Poster
Classification: GSBS Student
Presenter: Daniel L De La Cruz
Department: GSBS: Pharmacology & Neuroscience
Authors: Daniel Del La Cruz; Vien Nguyen; Laszlo Prokai; Katalin Prokai-Tatrai

Brain-Targeting Prodrug Design for Thyrotropin Releasing Hormone

Purpose: Thyrotropin releasing hormone (TRH) has many neuromodulatory effects throughout the brain, however, treatment using this peptide induces unwanted peripheral side-effects. Based on our novel prodrug design that synergistically employs lipoamino acid residues (LAAs) and a brain-enzyme sensitive linker for prolyl oligopeptidase (POP), we have developed a set of lead compounds in silico. Computationally assessing lipophilicity and POP-binding affinity of our virtual prodrugs led to the selection of a representative, termed Prodrug (1), for membrane affinity studies to predict brain access from circulation.

Method: Prodrugs with different LAAs and POP-sensitive linkers were designed in silico for docking with POP's binding site using SCIGRESS and AutoDock Vina software. The prodrugs' calculated logP (clogP) and POP-binding affinity were determined with built-in SCIGRESS applications. AutoDock results were represented as Gibbs free energy of binding (ΔG). The molecules with the most negative ΔG and adequate clogP were selected for synthesis. Prodrug (1) was compared to TRH in membrane affinity studies via immobilized artificial membrane chromatography (IAMC), an established method to predict membrane affinity (i.e., BBB permeability) with a chromatographic column comprised of immobilized synthetic lipids that mimic biological membranes. A high IAMC retention time correlates to a greater membrane affinity, with IAM Chromatographic Hydrophobicity Index (CHI_{IAM}) values being the quantitative measure of retention. A range of reference compounds with known CHI_{IAM} values were selected; plotting these values against their experimentally determined gradient retention times through the IAM column provided the linear relationship equation used to convert Prodrug (1)'s gradient retention time into its CHI_{IAM} value.

Results: A virtual library of prodrugs having various LAAs and POP-sensitive linkers were designed and docked to POP's binding site. The binding of Prodrug (1) was comparable to the calculated ΔG of POP's published, co-crystalized ligand. This prodrug also showed favorable clogP for transport into the brain and a significantly increased CHI_{IAM} compared to TRH.

Conclusion: Based on the prediction of POP-binding, using in silico docking and the favorable membrane affinity of Prodrug (1), we expect this prodrug to efficiently deliver TRH into the brain and serve as a template for fine-tuning future prodrug constructs for the efficacious brain-delivery of TRH.

IRB/IACUC/IBC#: N/A

1804 - Poster
Classification: GSBS Student
Presenter: Ella A. Kasanga
Department: GSBS: Pharmacology & Neuroscience
Authors: Ella A Kasanga; Parker Kelley; Katy Venable; Jennifer Terrebonne; Donald Ingram; Michael Salvatore

Caloric restriction attenuates motor function decline in rats: Evidence from an advanced middle-aged cohort

Purpose: The maintenance of physical function is a hallmark of successful aging. This is, however, not achievable for every individual. In the rapidly aging elderly population, between 30-50% may suffer from locomotor impairment as a function of aging, a phenomenon known as aging-related parkinsonism. This motor impairment is a serious public health concern as it greatly compromises the ability to perform daily life activities, further contributing to loss of independent living, frailty, and mortality. In this population, lifestyle strategies could prove beneficial for reducing aging-related parkinsonism. Caloric restriction (CR) can reduce aging-related locomotor decline when instituted either as a lifelong intervention or during middle age in rats. This study seeks to determine if there is an aging-related limit of caloric restriction efficacy to attenuate motor decline and if nigrostriatal dopamine regulation is associated with motor effects.

Method: Male Brown-Norway/Fischer 344 F1 hybrid (BNF) rats (18 months old) previously maintained on a lifelong ad libitum (AL) diet were grouped into CR and AL groups. CR was gradually introduced with a 30% restriction being achieved 3 weeks after initiation of the study. This was maintained for 6 months with open-field locomotor assessments conducted every 6 weeks.

Results: CR prevented decreased motor function as a function of aging; an effect that was observed in the AL group. There was an increase in movement number and horizontal activity which are both indices of the ability to initiate movement. Significant decline in motor function was observed in the AL group 12 weeks after initiation of the study and this effect was sustained till the end of the study.

Conclusion: Caloric restriction initiated in advanced middle-aged rats leads to a preservation of motor function suggesting that there may be no aging limit to its beneficial effect on motor performance. Identifying the molecular mechanisms can reveal targets for pharmacological or genetic approaches to mitigate motor impairment in individuals where CR would be contraindicated.

1805 - Poster
Classification: Postdoctoral Fellow
Presenter: Hamed S. Hayatshahi
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Hamed S Hayatshahi; Robert R Luedtke; Jin Liu

What makes subtypes of dopamine receptor different?

Purpose: Selective targeting of different subtypes of dopamine receptors is a strategy for fighting many neurological disorders such as Parkinson's disease and drug addiction. It has been shown that simultaneous targeting of the dopamine orthosteric binding site and a nearby allosteric site with "bitropic" ligands can enhance the selectivity of ligands for a specific receptor subtype. We hypothesize that there are regions and residues in each receptor structure, which makes it targetable for selective compounds. We aim to identify these regions and residues with molecular dynamics (MD) simulations.

Methods: We have generated over 360 microseconds of MD simulations of free D2 and D3 receptor subtypes and their complex with five different compounds. The structure and dynamics of the receptor and ligands, and their interactions are analyzed in atomistic level to highlight the differences.

Results: The MD simulations highlighted some differences in dynamics of the receptor subtypes in free form. Also, it is shown that the binding affinities of the bitropic ligands are enhanced compared with their orthosteric counterparts with both 1) excluding more solvent from the binding sites, and 2) making interaction with more residues in the allosteric site. The first extracellular loop (ECL1) is a very important site of allosteric interaction in D2 subtype vs. the second extracellular loop (ECL2) for D3 subtype. A specific interaction that makes ligands selective for D2 receptor is the pi-stacking interaction and hydrogen bonding with a tryptophan residue located in the ECL2, whereas in D3, hydrogen bonding with a cysteine and a serine in ECL1 is important.

Conclusions: We have identified important residues and regions in D2 and D3 that make these receptor subtypes respond differently to various ligands. We have also shown how two very closely related and similarly structures GPCR receptors have different dynamics in free form and in complex with drug-like compounds.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1806 - Poster
Classification: Postdoctoral Fellow
Presenter: Samantha M. Brewer
Department: GSBS: Pharmacology & Neuroscience
Authors: Samantha Ochoa; Vien Nguyen; Katalin Prokai-Tatrai; Laszlo Prokai, PhD

Analysis of Acetylcholine in Cerebrospinal Fluids by Liquid Chromatography–Tandem Mass Spectrometry

Purpose: Acetylcholine (ACh) is a neurotransmitter whose decreased levels have been associated with several diseases impacting the central nervous system. Quantification of extracellular ACh in cerebrospinal fluid (CSF) is difficult due to its low concentration (owing to its rapid hydrolysis to choline) and matric effects upon employing liquid chromatography coupled with tandem mass spectrometry (LC-MS/MS) for quantification. The purpose of this study was to develop and validate an LC-MS/MS method for the high-throughput determination of ACh in rat brain microdialysates and possibly in clinical samples in the future.

Methods: All analyses were performed on a TSQ Quantum Ultra mass spectrometer connected to a Surveyor MS high-performance liquid chromatography system (Thermo Scientific, San Jose, CA). Atmospheric spray ionization was used, and analytes were detected after fragmenting their intact cations through collision-induced dissociation. Deuterium-labeled ACh (ACh-d_4) was used as an internal standard for quantification. Several solvent systems were compared to identify the best conditions for the preparation of ACh and ACh-d_4 stock solutions to calibrate the assay. The optimized method was used to determine the extracellular ACh levels in rat brain microdialysates using the calibration curve obtained in aCSF.

Results: In order to set-up a reliable assay, the MS signals for ACh and deuterium-labeled ACh (ACh-d_4) used as an internal standard had to be optimized, along with optimizing the solvent systems for the preparation of their stock solutions. The optimal solvent system afforded linear calibration and resisted signal suppression by artificial cerebrospinal fluid (aCSF). Artificial cerebrospinal fluid is used as perfusion fluid upon microdialysis as it matches the composition of actual CSF. We have established that the use of purely aqueous stock solutions of ACh and ACh-d_4 afforded the best calibration in aCSF. With these measures, reliable analyses of ACh in aCSF were achieved. The obtained linear calibration could be used for quantitation of low (physiological) ACh levels in samples obtained upon in vivo intracranial microdialysis from rat cortex.

Conclusions: The method presented here allows for reliable quantification of ACh in cerebrospinal fluids, and may be used to evaluate the efficiency and mode of action of potential cholinergic agents.

IRB/IACUC/IBC#: 2018-0006

1807 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Nadia Ahmed
Department: TCOM: Medical Education
Authors: Nadia Ahmed, M.S.; Sohail Siraj, M.S.; Natalia Lucia dos Santos; Lucien Tres Thompson, PhD

Analyzing the Sex-Dependent Effects of Intranasal Insulin on Memory Impairment Secondary to High-Fat Diet

Purpose: Insulin can improve memory by enhancing the intrinsic excitability of hippocampal CA1 pyramidal neurons during memory consolidation. Chronic high-fat diet (HFD), however, can significantly impair spatial memory via reduction in excitability of these same neurons in both male and female rodent models. Interestingly, sex-dependent experimentation in these models has also shown that CA1 neurons from HFD females retain insulin-sensitivity while those from HFD males do not. Combining these findings from previous studies, it can be hypothesized that insulin therapy would improve memory deficits in females but not males fed a HFD. The following study aims to explore these sex-dependent responses to insulin therapy, as well as the use of intranasal insulin as an alternative and novel method of insulin administration that could potentially eliminate the harmful peripheral side effects of insulin via injection.

Methods: Spatial memory of male and female Long-Evans rats fed control vs high-fat diet (HFD) was assessed in a spontaneous alternation task (SAT) using a four-arm radial maze (plus maze). Normally, rats will remember which arm of the maze they last visited and will attempt to sequentially explore new arms. The ability of the rats to do this is scored, with a low score indicating hippocampal impairment. Following behavioral experimentation, insulin tolerance testing was performed in order to rule-out peripheral presence of elevated insulin.

Results: Intranasal delivery of insulin reversed memory impairments secondary to high-fat diet in both male and female rats. This was demonstrated by improvement in SAT scores of HFD rats treated with intranasal insulin therapy vs saline. These results were not as expected, but may be explained by the lack of a significant difference in fasting blood glucose levels of control vs high-fat diet animals. This indicates that high-fat diet animals were not showing symptoms of diabetes. It is possible then, that the animals in this experiment were in a pre-disease state where impairments were more readily reversible in both sexes and not just females. Additionally, lack of a decrease in peripheral glucose levels following intranasal insulin administration indicates that intranasal insulin did not have peripheral effects.

Conclusions: This study highlights the possibility of the intranasal route as a novel method of insulin administration. Further studies should be conducted to explore the viability of this option compared to the current method of injecting insulin. For example, CSF extraction could be performed to confirm the presence of elevated insulin levels in the brain following intranasal insulin administration, as well as studies that provide further evidence that intranasal delivery bypasses the harmful peripheral side-effects of injected insulin. Lastly, although this study failed to reproduce diabetic responses, future experimentation in aged animals that have been on a HFD for >12 weeks could better elucidate whether sex-dependent responses to chronic HFD would have an effect on insulin therapy and reversal of memory impairment.

1808 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Karolina Kata
Department: Other
Authors: Karolina Kata, MBS, OMS-III; Jenna Anderson, PA-C; Thomas S. Ellis, MD

A rare case of primary germinoma in corpus callosum.

Background: Primary intracranial germinoma is a rare lesion which accounts for approximately 0.5–2% of all central nervous system (CNS) tumors. Generally, this neoplasm occurs in the midline structures with the majority located in the pineal and suprasellar regions. Germinoma presenting primarily in the corpus callosum is highly unusual and reportings of similar cases in scientific literature are limited. The aim of this case report is to describe clinical features, imaging findings, and management of a primary germinoma uniquely presenting in the corpus callosum.

Case Information: 21-year-old man with Parinaud syndrome, gait instability, altered mood, and remote history of orbital trauma presented initially for an ophthalmology evaluation of vision change. These symptoms prompted intracranial imaging, including MRI which revealed an enhancing lesion in the corpus callosum, evidence of obstructive hydrocephalus, and an arachnoid band in the region of the aqueduct of Sylvius. The lesion was believed to potentially represent either a primary CNS lymphoma, glioblastoma, anaplastic astrocytoma, or tumefactive demyelinating disease. The patient underwent a right frontal stereotactic brain biopsy and third ventriculostomy. Pathologic evaluation with immunohistochemistry and tumor marker analysis confirmed a diagnosis of primary germinoma. Post-operative plan included oncology consultation to establish chemotherapy and radiation treatment. Additional imaging showed corpus callosum mass with evidence of diffuse extension in the surrounding structures. Interestingly, in contrast to pre-operative imaging, enhancement of the pineal gland area was noted and provided additional rationale for development of obstructive hydrocephalus.

Conclusion: Primary germinoma of corpus callosum has not yet been extensively described in literature. The present case demonstrates that primary germinoma can occur in uncommon midline structures and present with unique imaging findings. This report contributes to improving recognition and further understanding of clinical presentation and course and potentially to optimize the treatment in similar future case.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

Other (Abstracts in the 1900s)

1900 - Poster
Classification: Resident (Not for Competition)
Presenter: Hannah Kim
Department: Other
Authors: Hannah Hyunhee Kim; Addison Wood; Arshad Seyed; Donald Stewart

Three-Dimensional Comparison of Fibular Motion After Syndesmosis Fixation Using Combined Suture-Button and Internal Brace Constructs

Purpose: The purpose of this study was to evaluate the ability of an internal brace to add sagittal plane translational and transverse plane rotational constraint to suture-button constructs with syndesmosis injuries.

Methods: 11 Fresh frozen cadaver ankles were stressed in external rotation using a custom-made ankle rig. Each ankle had simultaneous recording of ultrasound video, 6 DOF kinematics of fibula and tibia, and torque as the ankle was stressed by an examiner. The ankles were tested in 6 different states:
1. Native uninjured
2. Injured with IOL and AITFL sectioned
3. 1x Suture-button
4. 2x Suture-buttons, divergent
5. 1x Internal Brace with 2x Suture-buttons, divergent
6. 1x Internal Brace with 1x Suture-buttons

Results: Only the internal brace + 2x suture-buttons and internal brace + 1x suture-button constructs were found to be significantly different than the injured state (P=.0003, P=.002) with mean external rotation of the fibula.

Conclusion: Overall, the most important finding of this study was the addition of an internal brace to suture-button constructs provided a mechanism to increase external rotational constraint of the fibula. This study provides a mechanistic understanding of how the combined suture-button and internal brace construct provides an anatomically similar reconstruction of constraints found in the native ankle. However, none of the constructs examined in this study were able to fully restore physiologic motion.

Sponsor: Arthrex
IRB/IACUC/IBC#: N/A

1901 - Poster
Classification: School of Health Professions Student
Presenter: Gabriela Camacho
Department: School of Health Professions: Physician Assistant Studies
Authors: Gabriela Y. Camacho, PA-S; Alyssa B. Brion, PA-S; Justin J. Comrie, PA-S; Grant R. Michalak, PA-S; Jeffrey C. Mott, DHSc; Jessica L. Hartos, PhD

Does General Health Differ by Number of Health Conditions and Use of Special Equipment in Veterans Ages 35-64?

Purpose: About one third of veterans return to the Veterans Affairs (VA) from war with health issues. The purpose of this study was to assess the relationship between health conditions and use of special equipment with general, mental, and physical health of veterans ages 35-64 in the general population.

Method: This cross-sectional analysis utilized data from the 2016 Behavioral Risk Factor Surveillance System (BRFFS) for veterans ages 35-64, from Florida, Maryland, New York, Texas and Washington. Ordered logistic regression analysis by state and outcome was used to determine the relationship between general, physical, and mental health by number of health conditions and activity limitations after controlling for demographic factors and substance use.

Results: A low proportion of veterans reported poor/fair general health, low physical health, and low mental health. Additionally, about one-third reported having 1 or more health conditions, and a low proportion reported medical conditions that required special equipment. Adjusted statistics showed that across states, general health, physical health, and mental health were all significantly related to number of health conditions and use of special equipment after controlling for all other variables in the model.

Conclusion: The purpose of this study was to assess the relationship between health conditions and use of special equipment with general, physical, and mental health of veterans ages 35-64 in the general population. The results may generalize to veterans ages 35-64 in primary care settings. A low proportion of veterans may have poor or fair general health, low physical health, or low mental health, which were all moderately to highly related to number of health conditions and use of special equipment. If veterans present with one, they should be screened for all and treated concurrently.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-169

1902 - Poster
Classification: School of Health Professions Student
Presenter: Audrey Coleman
Department: School of Health Professions: Physical Therapy
Authors: Audrey Coleman, SPT; Crystal Lu; Stephanie Beasley, SPT; Charles Nichols, PT, DPT, OCS, MEd; Howe Liu, PT, PhD, MD

Coordinated Movement of Diaphragm and Pelvic Floor Muscles in Relation to Respiratory Function

Background: It is known that the diaphragm affects pulmonary function, trunk stabilization, and other systems found in the thoracic and abdominal cavities. The pelvic floor muscles (PFM) aid in function and stabilization of the urinary, excretory, and reproductive organs. The purpose of this literature review is to determine the connection between the function of the diaphragm and PFM and the role that the PFM may play in common thoracic and abdominal diagnoses.

Methods: The review was conducted using databases and specific keywords from peer-review articles between 2008 and 2018. Many of the studies used real time magnetic resonance imaging (MRI) and electromyography (EMG) to determine activation and function of the diaphragm and PFM during different activities.

Results: The diaphragm and pelvic floor muscles (PFM) have been shown to work together in many aspects of respiration and postural control and move in parallel during quiet breathing. It was noted that stronger PFM resulted in faster respiratory rates due to increased muscle recruitment and strength of respiratory muscles. In a different study, EMG results showed that the anterior diaphragm contributes more to respiratory function, while the middle and posterior diaphragm assist with trunk stabilization. Subjects with larger and stronger diaphragms had better postural stability and experienced less low back pain. The diaphragm and PFM also contribute to intra-abdominal pressure (IAP). When the diaphragm and PFM move cranially during expiration, abdominal muscles contract and thicken causing an increase in IAP.

Discussion: The results showed that the diaphragm and PFM are vital in respiration, organ support, bladder and bowel control, and postural support. The diaphragm and PFM move synchronously in healthy individuals but can become dysfunctional with many pathologies. These two muscle groups, along with abdominal muscles, form a bridge and work synergistically, which could explain the association of symptoms between the three.

Clinical Implications: It is important during diagnosis and treatment of the thoracic and abdominal cavity that the diaphragm and pelvic floor muscles should be assessed. Use of real time MRI and EMG can help increase strength and decrease irregular contractions in the bridge of the abdominal muscles, the diaphragm, and PFM. Focusing on all three muscles as a group instead of isolating one can increase postural stability in patients.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1903 - Poster
Classification: School of Health Professions Student
Presenter: Gene Paez
Department: School of Health Professions: Physical Therapy
Authors: Gene Paez; Natalee Rokayak; Salem Yasser; Howe Liu

Effects of Strength Training on Bone Mineral Density in Adult Women: A Systematic Review

In the recent years, exercise has been proposed as a treatment strategy for obtaining an optimal peak bone mass. Moreover, several studies have shown that participating in exercise program can prevent osteoporosis and decrease the risk of fracture. High load exercises such as weight lifting, and strength training provide loading exercises that may improve bone mineral density. To our knowledge, there is no study that have compiled the evidence for the role of strengthening exercises in the prevention and treatment of osteoporosis.

Purpose: The purpose of this systematic review is to evaluate the effectiveness of strengthening exercises on bone mineral density in adult women.

Subjects: This systematic review of literature included 17 published studies that met our inclusion criteria. In total, 1210 adult women participated in those articles and were studied in our final included studies.

Methods: Electronic databases used were PubMed, Physiotherapy Evidence Database (PEDro), CINAHL, Web of Science Search and Scopus. Key words included osteoporosis, bone mineral density, and strength. Our inclusion criteria included population (adult women 18 years and older), and intervention (strength training is the main exercise program). The initial search yielded 1073 potential articles. These studies were then screened for duplications and selection criteria. Of those 1073 studies, 17 studies were considered to meet all of the required inclusion criteria.

Data Analysis: This is a systematic review study. Quality of the included studies was rated using the Centre of Evidence-Based Medicine: Levels of Evidence and the PEDro scale.

Results: In total, 17 research studies were examined and met our inclusion criteria. All of the included studies were randomized controlled trials. Across all 17 studies, 1210 adult women were participants. Sample size for each study ranged between 20 and 226 adult women. The age range of the participants was between 18 and 70 years old. All studies showed beneficial effects of strength training in bone mineral density in adult women. No adverse effects were reported in those studies. Dosing of intervention varied in terms of frequency (ranged 2 to 5 sessions per week), duration (ranged from 15 to 75 minutes), length of the exercise program (ranged from 6 weeks to 2 years) and mode/type of strength training used.

Conclusion: The results of this study showed that strength training programs are safe and effective to improve bone mineral density in adult women and can be used as a treatment strategy to prevent Osteopenia and Osteoporosis in postmenopausal women. Further studies are needed to determine the appropriate mode and dosage of the exercise program.

Relevance: The findings of this study suggest that strength training has beneficial effects on bone mineral density in adult women and can be used as a strategy to prevent and minimize osteoporosis in postmenopausal women.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1904 - Poster
Classification: School of Health Professions Student
Presenter: Janci Burns
Department: School of Health Professions: Physical Therapy
Authors: Janci Burns; Tiffany Horn; Danielle Blankenship; Gabriela Sherrod; Nicoleta Bugnariu; Haylie Miller

Visual context relates to impairments in both dynamic and static postural control in individuals with Autism Spectrum Disorder (ASD) relative to typical development

Purpose: Currently, 1 in 59 children are diagnosed with Autism Spectrum Disorder (ASD). Children with ASD rely more on visual input for balance compared to typically-developing (TD) children, but balance assessment is not part of the standard diagnostic process. Under challenging conditions (e.g., quiet standing with eyes closed), children with ASD have higher sway. Given the critical role of static and dynamic postural control as building blocks to higher-order skills, we aimed to identify differences between ASD and TD. We hypothesized that individuals with ASD would have lower postural control than TD individuals, especially when visual context was impaired or visuomotor integration was required.

Methods: 60 individuals participated in this study, 30 with ASD (M = 23, F = 7), and 30 TD (M = 16, F = 14). Participants were aged 7-36; groups did not differ in mean age ($p > 0.05$). The ASD group had a mean age of 13.77 (SD = 5.89) and the TD group had a mean age of 13.83 (SD = 6.26). We conducted this study in community locations using portable eye-tracking and balance-testing systems to administer the Clinical Test of Sensory Integration in Balance (CTSIB; static) and a Limits of Stability task (LOS; dynamic). The CTSIB had 3 conditions: eyes open, eyes closed, and eyes open with visual context removed. The LOS task had 8 eccentric targets.

Results: Individuals with ASD showed increased sway during the CTSIB task in comparison to TD. During the LOS task, individuals with ASD demonstrated decreased postural control and increased time to complete task when compared to Individuals of TD. Individuals with ASD also demonstrated increased saccades, fixations and blinks throughout each task compared to TD participants.

Conclusion: The CTSIB and LOS tasks yielded lower static and dynamic postural stability in the ASD group. For the LOS task, this led to a longer time-to-complete for the ASD group. The eye movements of individuals with ASD were also not optimal for efficient intake of visual information. Visual information may play a larger role in sensorimotor control for ASD than TD individuals than previously suspected. Balance testing and intervention is not provided in most clinics and educational settings serving individuals with ASD, but given the level of impairment observed in our study and others, it may be warranted for individuals who struggle with motor control.

Sponsor: N/A
IRB/IACUC/IBC#: 2015-010

1905 - Poster
Classification: School of Health Professions Student
Presenter: Zachary Denais
Department: School of Health Professions: Physical Therapy
Authors: Zachary Denais; Patrick Clay; Sam Onchiri

Pharmacological Management of Comorbidities in Patients with HIV/AIDS: Implications for the Physical Therapist

Purpose: The purpose of this study is to inform physical therapists of the medications that patients with HIV or AIDS may be taking in addition to antiretroviral treatment (ART) to control comorbidities, discuss the implications for physical therapy treatment, and help guide clinical decision making when working with this patient population.

Subjects: Patients in this study were primarily male (73%; n = 555) with 25% (n = 193) female and 2% (n = 17) transgender. The average age was 46.9 ± 12.1 years.

Methods and Materials: Secondary analysis of a completed North Texas Regional Institutional Review Board approved demonstration project dataset examining medication therapy management in 765 patients aged ≥ 18 years diagnosed with HIV or AIDS. Patients' medications were analyzed for those that could alter blood pressure, blood sugar, pain perception, and mentation.

Analyses: Descriptive analysis of data was performed.

Results: Of the 765 patients, 692 (90%) patients were taking an average of five medications for management of comorbidities. There were 294 (38%) patients taking at least one antihypertensive agents. ACE inhibitors (27%) and beta blockers (21%) comprised nearly half of the antihypertensive medications. There were 79 (10.3%) patients taking at least one antidiabetic medication. A total of 328 (43%) patients were taking at least one medication for management of a psychological condition. Antidepressants (57%) and anxiolytics (23%) comprised the majority of antipsychotics. There were 329 (43%) patients taking at least one medication for pain management. Non-steroidal anti-inflammatory drugs (48%) and opioid analgesics (32%) comprised the majority of the pain medications. There were 128 (17%) patients taking an opioid for pain management. Of the four medication categories analyzed, 177 (23%) patients were taking a medication from two categories, 113 (15%) taking three, and 21 (3%) taking a medication from all four.

Conclusions: Our data help to describe and quantify the complex medication regimens to which patients with HIV/AIDS may be adhering in order to manage their comorbidities. Physical therapists should be aware of the high rates of antihypertensive, psychoactive, and analgesic medication prescription in this patient population, perform thorough screenings of adverse effects, and provide physical therapy treatment that contributes to comorbidity management. It is also important to note the high rate of opioid use in this patient population, suggesting that treatments emphasizing pain management through modalities, gentle aerobic exercise, and education may be beneficial.

1906 - Poster
Classification: School of Public Health Student
Presenter: Esther Annan, MBCHB, MPH
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Esther Annan; Erica Stockbridge; Thaddeus Miller; Eun-Young Mun

Opportunities for Tuberculosis Prevention in Private Sector Healthcare: Health Insurance and Usual Sources of Healthcare in Foreign-Born Persons with Latent Tuberculosis Infection

Background: Preventing TB in the foreign-born US population is a priority, as over two-thirds of active TB cases in the US occur among foreign-born persons. With 90% of incident active TB cases among foreign-born persons stemming from reactivation of latent TB infections (LTBI), there is a need to increase targeted LTBI testing and treatment in foreign-born persons. It may be feasible to conduct these activities within the US private healthcare sector, but LTBI-positive foreign-born persons' use of healthcare and ability to pay for care will facilitate or impede such a strategy. These characteristics are not well-described in current literature.

Aims: (1) Estimate LTBI prevalence among foreign-born individuals by health insurance status and usual source of healthcare (USHC); and (2) examine patterns of insurance coverage and USHC among foreign-born persons with LTBI.

Methods: We analyzed 2011-12 National Health and Nutrition Examination Survey (NHANES) self-reported health insurance and USHC data for foreign-born individuals in combination with markers for LTBI. The sample was restricted to civilian, noninstitutionalized, foreign-born persons ages 6 years or older with interferon gamma release assay (IGRA) results and self-reported insurance and USHC data (N=1,793). We used Stata /SE 15.1 to conduct analyses and adjust for complex sampling design.

Results: Overall, 15.9% of our sample were LTBI-positive. Of LTBI-positive persons, 37.0% had some form of insurance and 76.9% had a USHC. LTBI prevalence was highest in persons who used a clinic or health center as a USHC (17.3%), but 44.6% of persons with LTBI use a physician's office or HMO as a USHC. Insured persons had a slightly higher prevalence of LTBI than uninsured persons (16.2% and 15.3%, respectively). While LTBI prevalence was highest in persons with Medicare, persons with LTBI were most likely to be uninsured (37.0%) or have private insurance (33.1%). In total, 56.7% of persons with LTBI had both health insurance and a USHC, while 20.2% had neither insurance nor a USHC.

Conclusion: Both health insurance and USHC were common within foreign-born individuals with LTBI residing in the US. Although different strategies are needed to address LTBI within the vulnerable population of foreign-born persons without health insurance or USHC, our results suggest that targeted LTBI testing and treatment within the US private healthcare sector could reach the majority of foreign-born individuals with LTBI.

1907 - Poster
Classification: School of Public Health Student
Presenter: Sujita Adhikari
Department: School of Public Health: Health Behavior & Health Systems
Authors: Sujita Adhikari, MPH Candidate; Erika L. Thompson, PhD, MPH, CPH

A Systems Approach to Postpartum Depression: Opportunities for Prevention and Treatment

Background: Postpartum Depression (PPD) is a common mental health issue that occurs in women after childbirth. The depressive symptoms in affected mother are often manifested as a feeling of extreme sadness, guilt, helplessness, insomnia, excessive crying, extreme concern about child, fatigue and suicidal thoughts. Biological factors (e.g. hormonal changes) and psychological factors (e.g. stress, lack of social support, low socio-economic status, abusive relationships, greater work pressure, the occurrence of adverse life events, previous history of depression) are risk factors for PPD. In 2018, 14.7% of women in Texas who gave live birth experienced postpartum depression. Due to the complexity of this health issue, systems thinking is necessary to identify organizations aligned with addressing PPD, which can then help design effective interventions to minimize the potentially harmful effects of PPD.

Objective: The main objective is to identify organizations in the Fort Worth region that are involved in postpartum depression prevention or treatment and map organization connections.

Methodology: A web search was conducted in November 2018 to identify organizations and government bodies who address postpartum depression. Interconnection was established amongst these organizations to analyze using a system thinking approach.

Results: Three national-level organizations (e.g. Medicaid), four state-level organizations (e.g. Texas Department of Health and Human Services) and three local level organizations (e.g. MHMR of Tarrant County) were identified in the Fort Worth region. These organizations when analyzed were found connected with each other forming a system which operated to address PPD in this region.

Conclusion: These major ten organizations that are dedicated to working on postpartum depression are interconnected. The organizations operate at different levels to form a complex system. While organizations are making a positive impact on this issue, it is still necessary to dive deeper and understand the underlying factors for this problem. By understanding the complex system for PPD prevention and opportunities for integration, better mental health outcomes can be achieved.

1908 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Joy Mong
Department: Other
Authors: Apollo Tran; Joy Mong; Lianne Wagner; Matthew Schultz; Skyler Hoelscher, MD; Brian Webb, MD

Biomechanic Evaluation of AC Joint Reconstruction Techniques: A Systematic Review

Background: Acromioclavicular (AC) joint disruption comprises 3.2% of all shoulder injuries, yet there is still broad debate on the optimal surgical approach. Over 150 surgical variations have been proposed, however the lack of common terminology and experimental standards make it challenging to draw any conclusions. For such predicaments, systematic reviews that provide a methodical approach for navigating the literature and have proven useful for identifying areas for improvement, standardizing protocols, and providing direction for a comprehensive analysis.

Objective: The purpose of this review is to: 1) systematically evaluate the current state of the literature concerning the biomechanical testing of AC reconstruction; 2) to summarize the surgical techniques and testing procedures; and 3) to identify biomechanical areas that are not well represented in the existing literature.

Methods: We completed a literature search to identify biomechanical studies on AC joint fixation using Medline, Scopus, and Excerpta Medica Database (EMBASE) following the 2009 PRISMA statement. Articles were independently reviewed by two investigators and any disagreements were reconciled by consensus in consultation with a third investigator. Investigators independently abstracted data from each study, focusing on surgical techniques and characteristics of the testing protocol.

Results: The most popular techniques were the Modified Weaver Dunn and suture button techniques with a tunnel through or looping under the coracoid. To assess construct performance, 28 out of 39 studies included a load to failure protocol to evaluate strength and stiffness of the construct. 18 studies measured vertical plane translation, 16 studies measured horizontal motion, and 5 studies measured rotation.

Conclusions: Overall, the most common techniques involved graft with suture augmentation. Techniques looping under the coracoid decreased the likelihood of fracture whereas techniques going through the coracoid improved stability and better maintained reduction. Free graft and hookplates have been found to be biomechanically or clinically inferior. Elastic stiffness serves as a reliable indicator for quantifying early construct stability while strength and translation better represent long-term functional stability. While general conclusions can be made from current biomechanic literature, a more objective verdict requires better standardization of terminology and testing procedures.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1909 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: John Burchfield
Department: Non-UNTHSC
Authors: Ernesto Lopez; Amit Srivastava; John Burchfield; Yao-Wei Wang; Jessica Cardenas; Charles Wade

Platelet-derived Extracellular Vesicles as an Alternative Therapy for Trauma-Induced Hemorrhagic Shock

Introduction: Traumatic injuries remain a major cause of death worldwide, with mass bleeding present in most cases. Fluid resuscitation with blood products to achieve hemostasis represents common treatment, with platelet transfusion linked to improved survival in trauma patients. But, limitations on platelet longevity, approximately 5-day shelf life, pose a therapeutic hurdle. Platelet-derived Extracellular Vesicles (PEVs) are vesicles (under 1 µm in size) released from platelets upon activation and/or mechanical stimulation, and PEV mediated response may be linked to platelet attributed benefits. We hypothesized that human PEVs transfusion would promote hemostasis, reduce blood loss, and attenuate progression to hemorrhagic shock.

Methods: Platelet units from 4 donors were centrifuged, separating platelets and PEVs. The pellets were washed to obtain plasma-free platelets, and supernatants were subjected to tangential flow filtration for isolation and purification of PEVs. We utilized Nanoparticle Tracking Analysis (NTA) to assess total count and particle size distribution of PEVs, and flow cytometry to characterize for cells of origin and expression of EV specific-surface markers. A rat model was used to compare the therapeutic effects of 8.7×10^8 fresh platelets (FPLT group, n=8), 7.8×10^9 PEVs (PEV group, n=8) or Vehicle (Control, n=16) following severe trauma. Under anesthesia and analgesia, rats were prepared to cannulate the femoral artery and jugular vein, and monitored for continuous mean arterial pressure (MAP). Uncontrolled hemorrhage was induced via approximate 1.1 gram middle hepatic lobe excision. Baseline and 60 minute post injury arterial samples were analyzed via blood gas analyzer and thromboelastography.

Results: The obtained pool of PEVs had a mean size of 101±47nm and expressed the platelet-specific surface marker CD41 and the EV specific-surface markers CD9 and CD61. In vivo, a demonstrated 24% reduction in abdominal blood loss following liver trauma in PEVs group compared to Control group (9.9 vs. 7.5mL). PEVs vs. Control also exhibited improved outcomes in blood pressure, lactate level, base excess, and plasma protein concentration. FPLT failed to improve these endpoints vs. Control.

Conclusion: Human PEVs offer a novel hemostatic effect following mass bleeding. PEVs also improve the outcome following severe trauma by maintaining hemodynamic stability, and mitigating the development of ischemia, base deficit, and cardiovascular shock.

Sponsor: N/A
IRB/IACUC/IBC#: AWC-13-132

1910 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Jake Powell
Department: TCOM: Medical Education
Authors: Apollo Tran; Jake Powell; Thuy Nguyen

Current research status on the treatment of veisalgia using Silybum marianum

Background: There is abundant anecdotal evidence for products claiming to reduce veisalgia after alcohol consumption. Among these products is milk thistle (Silybum marianum), a plant that has been widely touted for its hepatoprotective properties against toxins such as alcohol, venom and plant poisons. Companies commonly promote the use of milk thistle proactively and/or actively as a treatment to attenuate symptoms of veisalgia. However, none of these claims are substantiated by research.

Purpose: The purpose of this study is to evaluate the current state of the literature concerning the use of milk thistle for treating veisalgia. The supplement is commercially promoted as a cure for hangovers and we aim to assess the validity of these claims.

Methods: We completed a literature search on milk thistle and veisalgia using Medline, Scopus, and Excerpta Medica Database (EMBASE). Because there are currently no studies directly linking milk thistle with hangovers, we identified the main pathophysiological pathways implicated with veisalgia to cross examine the validity of using milk thistle for treatment.

Results: No studies directly examined the treatment of veisalgia with milk thistle. However, several studies demonstrated milk thistle to have antioxidant and antitoxin effects in the liver, small intestine, and stomach. Animal studies have found that milk thistle may contribute to hepatocyte regeneration and reduce inflammatory processes. Multiple clinical trials using milk thistle as treatment for a variety of liver diseases suggest that milk thistle may be a viable and biologically active supplement. However, most clinical trials assessed milk thistle's effects on liver related diseases such as hepatitis.

Conclusions: Veisalgia is a multifactorial pathological state that has been implicated with liver damage and inflammation. Milk thistle has been found to provide benefits for a variety of liver diseases, which share several pathophysiological processes that cause veisalgia. Based on this evidence it is possible that milk thistle could be effective in alleviating veisalgia symptoms in common with liver disease. However, there is not enough evidence in the current literature to definitively indicate milk thistle for the treatment of veisalgia.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1911 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: David Neal
Department: TCOM: Medical Education
Authors: David C. Neal, MD; Varun Sambhariya, MD; Apollo Q. Tran; Shawn K. Rahman; Thad J. Dean, DO; Russell A. Wagner, MD; Hugo B. Sanchez, MD, PhD

Single-stage bilateral distal femur replacement for traumatic distal femur fractures

Background: Treatment of periprosthetic distal femur fractures and comminuted intraarticular distal femur fractures remains a difficult challenge for orthopedic surgeons. Previous case series have shown distal femur replacement (DFR) can effectively compensate for bone loss, relieve knee pain, and provide stability. However, bilateral injury treated with single stage DFR is rarely encountered and to our knowledge, there are no case reports in the literature. We present a patient with traumatic open left Su III/Rorabeck III periprosthetic distal femur fracture and closed right comminuted intraarticular distal femur fracture with end-stage arthrosis treated with bilateral DFR. We suggest that in elderly patients with similar injuries bilateral DFR can be a viable treatment option.

Case Information: An 80-year-old female with past surgical history of left TKA in 2005 presented to our hospital after being involved in a motor vehicle collision resulting in open left periprosthetic distal femur fracture and a closed comminuted right intraarticular distal femur fracture with end-stage arthrosis. She also had a history of anemia and end-stage right knee arthritis for which she was planning a TKA in 2017. She was admitted by our geriatric trauma service for medical optimization prior to surgery.

The on-call operative team planned open reduction internal fixation of the open left periprosthetic distal femur fracture after obtaining XR and CT. After making a lateral approach to the femur her fracture was found to be more comminuted than anticipated and the bone-prosthesis interface was not intact. An intraoperative decision was made to place an external fixator with referral to the arthroplasty service for evaluation for possible DFR. For the right distal femur fracture, closed reduction was performed with placement of a knee immobilizer. The patient was taken to the operating room on the 7th day post-admission for bilateral DFR.

Postoperatively the patient was made weight bearing as tolerated to both lower extremities and worked with physical therapy daily. She is driving, maintaining her home, and living independently. On exam, her surgical incisions are well healed without evidence of infection. Knee range of motion is from 0-110 degrees bilaterally. One-year postoperative radiographs were obtained demonstrating unchanged alignment of her previously placed prostheses with no signs of loosening

Conclusion: Bilateral DFR is a viable treatment option for Su III periprosthetic distal femur fractures and comminuted intraarticular distal femur fractures with previous arthritis. We suggest that in elderly patients with similar injuries, bilateral DFR can effectively compensate for bone loss, relieve knee pain, provide stability, and allow for earlier mobilization resulting in satisfactory patient outcomes.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1912 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Nathan DeRon
Department: TCOM: Medical Education
Authors: Nathan G. DeRon, Jr.; Matthew E. Mayfield, MD

A Case Series Comparison of Treatment Techniques for Blount's Disease

Background: Blount's disease is disordered growth at the proximal tibial physis of pediatric patients causing leg bowing known as genu vara. Diminished growth of the medial physis causes leg bowing without natural correction. The high prevalence of comorbid obesity in patients is thought to contribute to destruction of growth cells at the physis. There are two common treatments: hemiepiphysiodesis involves arresting the lateral proximal tibial physis to allow increased growth at the medial proximal tibia. Osteotomy includes realigning the tibia and fibula such that the lower extremity mechanical axis becomes increasingly linear. This case series analyzes the optimal treatment choice based on patient age.

Case Descriptions:

Case 1
A 10-year-old male presented with bilateral leg bowing, bilateral knee pain, and obesity (BMI = 53.8). Treatment was bilateral hemiepiphysiodesis at the lateral tibial physis using eight-plates. This correction was insufficient. Bilateral tibia-fibula osteotomies with external fixation (ex-fix) were then performed with successful correction.

Case 2
An 8-year-old female presented with bilateral leg bowing, limp, knee pain, and obesity (BMI = 44.7). Treatment was bilateral hemiepiphysiodesis at the lateral tibial physis. The left hemiepiphysiodesis proved sufficient for correction, but the right hemiepiphysiodesis did not. A subsequent tibia-fibula osteotomy with ex-fix was performed and proved successful.

Case 3
A 12-year-old male presented with leg bowing, knee pain, and obesity (BMI = 38.6). Treatment was bilateral hemiepiphysiodesis at the lateral tibial physis. This proved insufficient, and treatment proceeded to a left tibia-fibula osteotomy with ex-fix and a right tibial osteotomy with internal fixation. These osteotomies were sufficient for correction.

Conclusion: This case series shows an indication for osteotomy as first-line treatment for Blount's disease in patients at a relative advanced age. The study also identified further potential research targets. A retrospective look at success rates of treatments in various age groups may help determine the age at which each treatment is preferred. A retrospective analysis may be performed to determine the infection rates in both types of treatment. Finally, additional research may be performed to determine the obesity threshold required to increase risk for Blount's disease. This data is potentially useful to pediatricians for patient education and prevention.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

1913 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Abigail Sprunger
Department: TCOM: Pediatrics
Authors: Abigail Sprunger; Luke Hamilton; Tyler Hamby; Don Wilson

A Novel Mutation of APOB in Two Siblings with Hypercholesterolemia

Background: Familial hypercholesterolemia (FH) is a common genetic disorder cause of premature atherosclerosis due to chronically elevated low-density lipoprotein cholesterol (LDL-C) levels from birth. Individuals with FH experience an increased risk of premature cardiovascular disease (CVD), and lack of early identification and treatment increases the risk of CVD-related coronary events later in life. We report two siblings with FH caused by a novel mutation in APOB.

Methods: Electronic medical records were reviewed for two patients with FH.

Case Information: Two biologically related siblings (male age 9, female age 11) were found to have LDL-C levels >95th centile for respective age and gender. Neither sibling had preexisting medical conditions nor a history of chronic medications. Both siblings were found to have the same missense variant in the APOB gene, a novel mutation causing hypercholesterolemia. Because of parental concerns regarding use of statins, both were treated with a cholesterol absorption inhibitor.

Conclusions: Despite the benefits of early identification of those at moderate-to-severe risk, several knowledge gaps impede successful cholesterol screening of children: misunderstanding goals of screening, the best screening method, and ideal age for screening and for intervention. Current guidelines recommend universal cholesterol screening and selective screening starting at 10 and 2 years of age, respectively. Although not routinely preformed, identification of a genetic mutation helps to 1) confirm the diagnosis of FH; and 2) serves as an additional risk factor for CVD, aids risk stratification and clinical-decision making, and helps determine the timing and intensity of treatment that would provide the best long-term health benefits. In addition to lipid-lowering medications, treatment should include global reduction of all CVD risk factors through health education, and adoption of life-long, heart-healthy living with a goal to reduce LDL-C levels to <100mg/dL or at least 50% or more.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

1914 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Samad Zia
Department: TCOM: Pediatrics
Authors: Samad Zia, OMS-II; Robin Henson, DNP RN CPNP-PC; Audra Collins, MPAS PA-C; Tyler Hamby, PhD

Pediatric Midstream Urine Collection Methods in the UCC: Post-Intervention Surveys

Purpose: Urinary tract infections (UTIs) are one of the most common bacterial infections in the pediatric population. Diagnosing UTIs requires a urinalysis and often a urine culture. Diagnosing a UTI in the toilet trained child requires consistent staff education and materials for specimen collection to avoid risk of contamination. Contamination of a urine sample can be reduced with a policy which includes consistent instructions to patients and provision of the correct materials. A quality improvement (QI) project conducted in June 2017 at Cook Children's Pediatric Urgent Care Center (UCC) in Fort Worth surveyed patients and parents regarding midstream urine collection (MSUC), and it showed that the MSUC policy was not consistently followed by the UCC staff. Online education and training were then provided to clinical staff to reinforce this policy. The objective of this QI project is to conduct the same patient/parent survey to determine if the staff education improved adherence to the MSUC policy.

Methods: The patient/parent survey, which was used in June 2017, was again administered to patients in June 2018. The survey included questions concerning Cook Children's MSUC policy. Patients (ages 4-18) who presented with signs of UTI were given the survey after staff instruction was given and urine was collected. The surveys were conducted at Cook Children's Pediatric UCC in Fort Worth, Texas.

Results: A total of 20 (2017) and 19 (2018) patients were surveyed. Patients in 2018 were significantly more likely to receive instructions to use 3 wipes, receive 3 or more wipes, and actually use 3 wipes. There was no significant difference in the likelihood of receiving gender-specific instructions, receiving MSUC instructions, following gender-specific instructions, or following MSUC instructions.

Conclusions: The distribution of pre-assembled packets of materials enabled all patients to receive the proper number or wipes. However, staff should be encouraged to provide pre-assembled packets as well as verbal instructions to each patient. Educational interventions for UCC staff should be re-evaluated and repeated throughout the year. Further educational interventions for the UCC staff may result in a greater adherence to the Cook Children's MSUC policy and a decrease in midstream urine contamination rates.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

1915 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Ben Bopp
Department: TCOM: Medical Education
Authors: Ben Bopp; Tyler Hamby; Todd Jarvis; Don Wilson; Luke Hamilton

Perceived Fatigue May Be an Overlooked Barrier to Successful Therapeutic Lifestyle Change

Purpose: Children and adolescents at-risk of developing premature cardiovascular disease (CVD) due to genetic disorders and acquired conditions, such as obesity and insulin resistance, are often referred to a pediatric lipid clinic. While adoption of a lifelong, heart-hearty lifestyle is encouraged, those with genetic disorders may benefit from lipid-lowering medications. Recommendations for therapeutic lifestyle change in those who are obese, especially the need for less sedentary time and 30-60 min/d of moderate-to-vigorous physical activity, may be hindered by a perception of fatigue. An increased perception of fatigue in obese youth vs healthy controls has previously been reported in those referred to an obesity clinic.

The purpose of this study was to examine perceived fatigue in a sample of obese youth (age; BMI $\geq$95th percentile) with acquired CVD risk factors, who were referred to a pediatric lipid clinic.

Methods: This study was a retrospective chart review of 237 youth referred to the Risk Evaluation to Achieve Cardiovascular Health (REACH) clinic at Cook Children's Medical Center between January 1, 2014 and August 31, 2018. During the initial clinic visit, each subject and the child's parent independently completed the PedsQL Multidimensional Fatigue Scale, a validated survey with 18 items divided into 3 subscales – General, Sleep/Rest, and Cognitive – each containing 6 questions. A total score was computed, the range of possible scores ranging from 0 to 100 for each subscale. Higher scores indicate less perception of fatigue. A t-test was used to compare study subjects to previously reported obese youth (N=43) referred to an obesity clinic and normal weight, healthy controls (N=157). A p-value

Results: The study population consisted of 200 subjects, 50.5% of whom were morbidly obese ($\geq$99th percentile). Study subjects had statistically significantly more perception of fatigue for each sub- and total scale for both self- and parent-reported scales (p

Conclusion: Obese youth with and without reported acquired CVD risk-factors experience greater perceived fatigue than healthy controls. It is important to consider barriers to implementation, such as perception of fatigue, when recommending lifestyle modification.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

1916 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Ayah Hamza
Department: TCOM: Pediatrics
Authors: Ayah Hamza; Chad Hamner, MD

Predictors of Mortality Following Traumatic Cardiopulmonary Resuscitation in Pediatric Patients

Background: Pediatric trauma patients developing pre-hospital cardiac arrest have a dismal prognosis; few survive, often with severe neurologic deficits. Withholding or terminating cardiopulmonary resuscitation (CPR) for an injured child can be very difficult. Therefore, injured children may be subjected to protracted, futile CPR attempts which may consume vital resources beneficial to other patients with survivable injuries. This study was conducted to better define mortality in pediatric trauma patients receiving CPR and identify predictors of mortality that may guide decisions to withhold or terminate CPR in injured children.

Methods: Pediatric (≤18 years) trauma patients who presented to Cook Children's Medical Center from Jan. 2006 – Dec. 2017 and received CPR in the pre-hospital or emergency room setting were included: 88 patients met these criteria. Variables studied included the total time of CPR performance (≥15 vs. <15 >minutes), type of underlying cardiac rhythm (possibly perfusing vs. non-perfusing), the best recorded Glasgow Coma Score (GCS; =3 vs. >3), and pupil reactivity (reactive vs. not reactive) present during the course of CPR. Fisher's exact test was used to determine whether these variables were associated with survival. A p-value

Results: Mortality in the 88 patients was 92%. Six of the 7 survivors had moderate (n=4) to severe (n=2) disability. Median total CPR time in the survivors was 5 minutes; only 2 surviving patients had CPR ≥15 minutes. The only survivor with no neurologic sequelae suffered a drowning event and had pre-hospital CPR for 5 minutes. Mortality following CPR performed only in the pre-hospital setting was associated with non-perfusing rhythm (p=0.001), GCS=3 (p=0.034), and CPR ≥15 minutes (p=0.022); pupil reactivity was not statistically associated with mortality. When CPR was performed in either the prehospital or emergency department setting, nonreactive pupils also were associated with mortality (p=0.003). There were no survivors who had CPR ≥15 minutes and a non-perfusing rhythm during the entire period of CPR.

Conclusion: The results support withholding or terminating resuscitation in pediatric trauma patients who have received longer than 15 minutes of CPR during which time they had a non-perfusing rhythm, either PEA or asystole, and no evidence of neurologic function (GCS=3).

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

1917 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Cole Romney
Department: TCOM: Pediatrics
Authors: Cole Romney; Sterling Blackham; Artee Gandhi; Meredith Brooks; Tyler Hamby

Efficacy of Sympathetic Nerve Blocks in Pediatric Outpatients with Central Sensitization of Pain

Purpose: Central sensitization (CS) is distinguished by an increased sensitivity to painful stimuli, due to a lower pain threshold or an altered response to pain. Clinically, CS frequently presents as enhanced sensitivity to a painful stimulus, triggering of pain by nonpainful events, and expansion of the receptive field.

There is currently no standardized treatment for CS. Therapy is normally attempted through medications, lifestyle modifications, stress management, cognitive-behavioral therapy, physical therapy, interventional pain procedures, and occasionally surgery but evidence supporting specific treatments is lacking. Interventional nerve blocks are relatively common for the relief of chronic pain in adults but not in pediatric patients. To the best of our knowledge, this is the largest report examining the use of sympathetic nerve blocks for the relief of chronic pain in children.

Methods: This study was a retrospective, chart review of pediatric patients treated between January 2009 and March 2018 for conditions that cause CS at Cook Children's Medical Center. Patients included were between ages 0-21 years at the time of the procedure. Demographics, diagnoses, pain scores (FACES, VAS, NAS, FLACC; each measured on 10-point Likert scales), patient report of complications, activities of daily living and improvements in limb function were reviewed for each patient. Though each patient had 1-5 procedures, study analysis was limited to the first procedure.

Results: There were 69 distinct patients (56 female; 63 white; median age 14.68 years, range 3.54-19.27). Common diagnoses treated include complex regional pain syndrome (45 patients) and abdominal pain (15 patients). Most patients demonstrated improvements in leg functionality (77%), hand functionality (76%), and overall functionality (71%). Pain scores improved after intervention for 74% of patients, and on average, patients reported a statistically significant improvement in the pain score from before (Mean=5.39; SD=3.02) to after (Mean=1.38; SD=2.08) intervention, P

Conclusions: Sympathetic nerve blocks are both effective and safe for the short-term treatment of CS in children. Additional research should be done to determine long-term effectiveness and safety in this population.

Sponsor: N/A
IRB/IACUC/IBC#: CCMC-IRB

1918 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Jacob Robinson
Department: TCOM: Pediatrics
Authors: Jacob Robinson; Tyler Roberts; Pamela Sherman

Chronic Dislocation of Radiocarpal Joint in two patients with Down Syndrome

Background: Down syndrome (Trisomy 21) is regarded as the most common human genetic disorder with a prevalence of about 1 in 660 live births. With the main effect being mental retardation, there are several orthopedic concerns that have raised awareness with this population. While subluxation at the atlantoaxial and hip joints have been more common orthopedic issues in patients with Down syndrome, chronic subluxation or dislocations at the wrist are not so frequently reported.

Cases: We present two cases of non-traumatic volar mid-carpal dislocations occurring in two separate patients with Down syndrome. The 12-year-old female patient presented with unilateral left sided pain and bilateral dislocations, while the 13-year-old male presented with unilateral pain and dislocation on the left. Of note, several commonalities aside from an extra chromosome exist between the patients. They were of similar age, showed arthritic changes on x-ray, and were previously diagnosed with hypothyroidism. One orthopedic condition of particular interest that could be related to the cases is arthropathy of down syndrome . A study investigating this condition reported a prevalence up to 6 times greater than that of juvenile idiopathic arthritis in the general population.

Conclusion: It's likely that many cases similar to those presented are more common that currently recognized or reported. With participation of Down syndrome patients worldwide in Special Olympic Sports and other activities, this raises the question is additional screening necessary for the safety of these individuals.

1919 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Theodora S. Browne
Department: TCOM: Medical Education
Authors: Theodora S Browne; Vinh Q Lu; Vishal K Patel; Emily Mire

Social Media Use by Medical Students: A Review

Purpose: Online social media platforms have become ubiquitous communication tools that allow for the nearly instantaneous distribution of information to a massive, broad audience. Within the general population of US millennials (individuals born between 1981-2000), 89.8% accessed social networking services in 2018. Notably, the proportion of medical students who accessed social media has been reported to be above 93%, even as early as 2011. This study aimed to determine whether potential risks or benefits have been identified within the literature regarding the use of social media by medical students.

Methods: A PubMed search was conducted using the following search terms: "medical students," "social media," and "social networking." One hundred and sixty-nine full-text articles in English were initially identified for further review. The articles were then grouped into three categories: professionalism, education, or mental health. Articles were excluded if the topic did not address one of the three aforementioned categories.

Results: Out of the 169 originally identified articles, 106 articles were included for further review. The oldest study identified was from 2007 and the majority of examined works were published in 2015 or later. Articles pertaining to the described categories were then quantified as follows to show the proportional distribution of research dedicated to each domain: professionalism (n=46, 43.4%), education (n=48, 45.3%), and mental health (n=12,11.3%).

Discussion: The lack of research regarding this subject reflects the need for further study to better learn how current online engagement might impact medical students and their lives as future medical professionals. In addition, upward trends of increasing use of social media among this demographic are predicted to continue in future years. As the usage of social of media has increased significantly since its inception, so too have the number of articles pertaining to professionalism and education. However, the growth of studies examining potential implications of social media on students' mental health has been relatively stunted. This study was limited by the fact that articles were excluded from the review if the full-text version could not be accessed through the UNTHSC library, thus a broadened review is warranted. Future study should address whether this discrepancy is significant and therefore a potentially neglected target for research.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1920 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Blake St. Louis
Department: Other
Authors: Cameron Beck; Blake St. Louis; Brian Nwannunu, MD; Victor Kosmopoulos, PhD; Jake Powell; Russell Wagner, MD

Patellar Component Fixation Strength with Varying Bone Defect Following Revision Total Knee Arthroplasty

Purpose: Total knee arthroplasty (TKA) is an effective surgical treatment with only an 8.2% revision rate. A revision TKA can be initiated for several reasons including prosthetic loosening, infection, and pain. During a revision TKA, the three pronged "patellar button" may need to be removed and replaced from the posterior aspect of the patella. After removal, the quality of the remaining patellar bone is evaluated to determine if another patellar component is a viable option. Anecdotally, orthopedic surgeons visually inspect the patella to evaluate the amount of bone defect present. They then have to decide whether to replace the patellar button or pursue another path of repair. Currently there is no scientific basis to assist them in deciding how to best proceed. This study aims to determine the maximum shear force prior to failure of a cemented patellar component with varying degrees of bone defect.

Methods: 60 pairs of patellae were harvested from embalmed cadavers. Each patella pair was visually inspected by an orthopedic surgeon and separated based on bone quality into a control (better bone quality) and experimental group (worse bone quality). Those within the experimental group were further divided into three groups, of 20 each, consisting of either a single defect, double defect, or triple defect. The patellae were then prepared as if performing an intraoperative revision TKA. Before cementing the patellar component, defects were created in each patella according to their experimental group (single, double, or triple defect) using a Dremel tool and metal washer to ensure each defect was the same size. A patellar component was then cemented to each patella using the same surgical procedure used during a revision TKA. After allowing the cement to cure, the patellae were potted into a mold using fiber glass resin. Maximum shear force was then tested with a material testing system (MTS).

Results: The 60 pairs of patella range in age from 56 years old to 99 years old with an average age of 80. Thirty-one patella pairs were male (51.67%) and 29 pairs were female (48.33%). Data is currently being collected and analyzed regarding the shear force of the patellar component with the 3 different varying bone defect sizes.

Conclusions: The further evaluation of the data will serve to provide physicians with clarity when faced with the question of what to do with the patella in the case of a revision TKA.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1921 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Nur-Alhuda Shahub
Department: School of Health Professions: Physical Therapy
Authors: Nur-Alhuda Shahub; Haylie L. Miller, Ph.D.

A comparison of Social Responsiveness Scores in patients aged 0-24 with Autism Spectrum Disorder or schizophrenia.

Purpose: Autism Spectrum Disorder (ASD) and schizophrenia share common features; past research demonstrates that these features include pathophysiology, social-cognitive impairments, possible genetic underpinnings, and risk factors. In both disorders, social cognition presents a key barrier to quality of life. One measure of social cognition designed for use in ASD, the Social Responsiveness Score (SRS), is also commonly used to assess social cognition and plan interventions in schizophrenia. We aimed to determine whether people with ASD and schizophrenia differ in the mean and range of their SRS scores.

Methods: We identified an age-matched sample of fifteen individuals with Autism Spectrum Disorder (Male = 13, Female = 2; M_{Age}= 22.71, SD_{Age}= 3.24) from the National Database of Autism Research and thirteen individuals with schizophrenia (Male = 10, Female = 3; M_{Age}= 22.07, SD_{Age}= 2.99) from the SchizConnect database. All individuals were between the ages of 0 and 24 years. Data were analyzed using Microsoft Excel and the Statistical Package for Social Sciences software. SRS T-scores < 59 are considered normal social cognition, 60-65 are considered mild social impairment, 60-75 are considered moderate social impairment, and 76 or higher is considered severe deficiency in social behavior.

Results: Mean SRS scores did not differ between the ASD (M = 80.50, SD = 14.32) and the schizophrenia (M = 89.78, SD = 39.37) groups (p = 0.22). Although the group means were not significantly different, the schizophrenia group had a notably wider range of SRS scores than the ASD group.

Conclusions: Although our groups did not differ in their mean SRS scores, there was wide variability in the schizophrenia group. The SRS was designed for ASD, and may not be an adequate measure of social dysfunction in other populations. At minimum, this wide variability suggests that when using the SRS as a tool for assessing social-communication skills in schizophrenia, the influence of other factors (such as age, behavior, or language) must also be considered. Further study is required to fully assess the clinical utility of this tool for non-ASD populations.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-144

1922 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Dane Eskildsen
Department: Non-UNTHSC
Authors: Dane Eskildsen; Todd Young, DO

A Case of Symptomatic Angiomyolipoma

Background: Renal angiomyolipoma (AML) are benign soft tissue neoplasms classically composed of blood vessels, smooth muscle cells and adipocytes. These masses are found in .3 to 2.1% of the population and can be strongly associated with genetic syndromes such as the Tuberous Sclerosis Complex. While most of these masses are found incidentally, they can, in rare cases, become symptomatic. Patients with symptomatic AML most commonly present with hematuria, flank pain and renal hemorrhage.

Case Presentations: A.H. is a 51-year-old obese female who presented 7 months ago to the emergency department with sudden onset left upper quadrant pain, nausea and emesis. On admission, her hemoglobin was found to be 9.1. Due to continued anemia she was transfused with 2 units of blood. CT scan of the abdomen and pelvis showed massive hemorrhage in the retroperitoneum surrounding the left kidney and a focus of fatty tissue likely representing a large AML. After Urological consult, left renal pole artery embolization was performed by interventional radiology. Over the next several months, after resolution of the hemorrhage, subsequent scans found that the symptomatic mass measured 4 cm and another 1.2 cm AML was found in the ipsilateral kidney. 6 months' post presentation it was determined that, due to size and history of hemorrhage that the patient would undergo a radical left nephrectomy. Upon surgical exploration of the abdomen the tissue around the kidney was found to still be incredibly inflamed and thick. Despite this, the surgery proceeded without complications.

Conclusion: Classic AML are the only benign renal masses that can confidently be diagnosed using imaging. As such, confirmed asymptomatic AML are often left untreated and actively observed over time. The consensus in literature indicates a size 4 cm as the cutoff for when AML are suspicious for symptomatic manifestation. Indeed, the risk of significant symptoms directly increases with size of the mass. This same 4cm size cutoff is used as a guideline for when treatment is warranted. Modern first line treatment includes embolization, with partial or radical nephrectomy coming into play when embolization fails to control symptoms or with excessively large masses. In this case, although embolization initially controlled the bleeding, patient comorbidities and tumor size warranted definitive removal of the mass.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1923 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Michael Alavi, MS-III
Department: Other
Authors: Michael Alavi, MS-III; Cathryn Coleman, MD; Sasha Still, MD; Carlos Rodriguez, DO, MBA, FACS

De Garengeot Hernia, Déjà Vu : A Unique Report

Background: The presence of a vermiform appendix incarcerated within a femoral hernia is known as a de Garengeot hernia (DGH). These hernias are extremely rare entities with less than 100 documented cases uploaded to PubMed's database. Most develop sporadically with no prior history of femoral herniation. We present the unique case of a 59-year-old female with a retrospectively suspected two-year history of a femoral hernia, who developed an acutely incarcerated and strangulated DGH requiring prompt surgical management.

Case Information: A 59-year-old female presented to the Emergency Department complaining of a three-day history of a painful right groin lump. She was clinically diagnosed with a right inguinal hernia two years prior. On presentation, she stated that she coughed and felt her hernia 'pop out' but was unable to reduce it. A round, firm mass was appreciated caudal to her inguinal ligament and was tender, irreducible and non-fluctuant. Overlying erythema and skin changes were identified. She had a low-grade fever (99°F), with a WBC of 13.73 x10^9/L and lipase of 162. CT imaging revealed a right groin hernia containing the appendix with significant inflammatory changes and suspicions for strangulation and superimposed primary acute appendicitis. The radiologist interpreted the groin hernia as inguinal (Amyand hernia), while the surgeon interpreted it as femoral (DGH). Intraoperatively, a femoral hernia was identified containing murky fluid surrounding an inflamed and necrotic appendix. An appendectomy followed by a natural tissue hernia repair (McVay) was performed. Histopathologic examination of the excised specimen revealed acute suppurative appendicitis with severe peri-appendicitis.

Conclusions: De Garengeot hernias are very rare entities and account for less than 1% of all femoral hernias. Though effective in other conditions, imaging plays a limited role in diagnosis and treatment of DGH due to its low sensitivity and specificity. These factors may result in varying interpretations of a single scan as seen by the radiologist and surgeon in this case. There are various surgical management options available. However, in this case an appendectomy followed by primary repair was performed as the strangulated appendix posed a high risk for post-operative complications. When evaluating a patient with a groin hernia and controversial CT result, it is important to use one's clinical suspicion to help guide the surgical approach and management options.

Sponsor: N/A
IRB/IACUC/IBC#: case report; though if needed have IRBnet

1924 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Suna Burghul
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Suna Burghul; Suguna Neelakantan, MD

Avascular Necrosis of the Femoral Head in a Healthy, Young, Adult Male

Background: Avascular necrosis (AVN) of the femoral head can be caused by a variety of factors including tobacco use, traumatic injury, or hypercoagulability. Hypercoagulability in the body can lead to the formation of thrombi in the microcirculation, resulting in many possible complications. This report will discuss a case of a healthy, young male who developed avascular necrosis of the femoral head as a result of Factor V Leiden.

Case Information: A 30-year-old previously healthy male presented to the outpatient family medicine clinic with a chief complaint of severe pain in his right hip. The pain had been present for eight months and was progressively getting worse. The patient's only past medical history was hyperlipidemia. He was not taking any medications, he exercised regularly, he worked as a sales representative, and he did not have any family history of clotting disorders. He had no history of trauma, tobacco use, alcohol consumption, or steroid use. On physical exam, he had extreme pain upon flexion of the right hip. An X-ray of the right hip showed equivocal broadening of the superolateral femoral head-neck junction suggesting mechanical impingement. He then presented two weeks later with more intense pain in his hip and was unable to walk. He was referred to orthopedic surgery, where an MRI was performed and showed Stage 3 avascular necrosis of the femoral head. He then saw hematology and testing revealed that he was heterozygous for a mutation in the r506q gene responsible for factor V, confirming his diagnosis to be Factor V Leiden. The patient had a right total hip arthroplasty and is doing well.

Conclusions: AVN of the femoral head is a debilitating condition. When left untreated, it is estimated that between 70-80% of patients will progress to bilateral AVN, making diagnosing the underlying cause vital. Hypercoagulability is believed to be a major and common cause of AVN; thus, systemic anticoagulation therapy should be considered to prevent further complications, especially when a patient is homozygous for the mutation on Factor V. While other treatment options for AVN of the femoral head are available, when the necrotic lesion has become too large or the femoral head has collapsed, total hip arthroplasty remains the best option. Although many patients discover that they have Factor V Leiden due to family history, this patient was unusual in that he presented with an irreversible complication of the disease.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1925 - Poster
Classification: TCOM DO Student (4th Year)
Presenter: Ranna Al-Dossari
Department: TCOM: Internal Medicine & Geriatrics
Authors: Ranna G Al-Dossari, 2159946; Stephen Weis, D.O.

Sporotrichoid Lymphocutaneous Spread of Metastatic Cutaneous Squamous Cell Carcinoma

Background: Sporotrichoid lymphocutaneous spread is a dermatologic pattern characterized by superficial cutaneous lesions that follow subcutaneous lymphatics. Typically, this is observed when an infection starts at a site of distal inoculation and leads to the development of ascending nodules. The most common causes are fungal and mycobacterial infections. Metastatic cutaneous squamous cell carcinoma (CSCC) typically presents with regional lymphadenopathy. Primary lesions of the external ear and lip have the highest risk of metastasis, followed by the temple, scalp, hands, and feet. Risk factors for metastasis of CSCC include immunosuppression, tumor recurrence, tumor thickness >4mm, and perineural or vascular invasion. However, metastasis of CSCC is rarely seen to follow a sporotrichoid lymphocutaneous morphology.

Case Information: A 64-year-old female with a past medical history of severe COPD requiring repeated courses of prednisone and continuous oxygen, presented for a rapid growing lesion on her left hand after trauma in the shower at a nursing home. Due to her poor medical condition, she declined recommended biopsy with follow-up surgery. Patient underwent electrodessication and curettage surgery (EDC) followed by imiqumod treatment as she desired the least aggressive treatment. She also complained of a growth on her forearm at the initial visit. She reported after starting imiquimod, the lesion on her left hand has bled, drained and deepened in appearance. She also reported that the previous growth on her left forearm has grown in size and new lesions appeared on her upper arm and armpit.

On exam, she had no healing at EDC site. She had developed an ulcer that exceeded the size of the original EDC. She had multiple erythematous, tender nodules of varying sizes on her left arm in a sporotrichoid lymphocutaneous pattern. She had left axillary lymphadenopathy. A biopsy performed of one of the nodules showed CSCC with intravascular and perineural invasion. Tissue cultures were negative for acid-fast bacilli, aerobic bacteria, mycobacteria and fungus. Chest X-ray did not show evidence of metastatic CSCC.

Conclusion: This case highlights a rare presentation of sporotrichoid lymphocutaneous spread secondary to CSCC. The differential diagnosis included infectious causes and metastatic CSCC. Surgical excision is the treatment of choice for high-risk CSCC. She presented with signs of metastasis at initial presentation but these were not recognized. At follow up, she rapidly developed signs of metastasis in an unusual pattern. As malignancy is a rare cause of sporotrichoid lymphocutaneous spread, it is important to raise awareness to physicians who may see sporotrichoid pattern to consider the possibility of malignancy in their differential diagnosis, especially when there is a history of malignancy or there is a concomitant visible mass present.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2000 - Poster
Classification: Resident (Not for Competition)
Presenter: Leslie Coons
Department: UNT System College of Pharmacy: Pharmacotherapy
Authors: Leslie Coons, PharmD; Jessica Gardea, PharmD, BCACP; Annesha White, PharmD, MS, PhD; Shara Elrod, PharmD, BCACP, BCGP

Opioid overdose: Patients' knowledge of and ability to manage the life-threatening crisis

Purpose: Increasing naloxone access for opioid users has become a nationwide initiative. Naloxone can be a lifesaving medication, yet it is essential that patients understand when and how to use it and can communicate this to others. Most information about people's knowledge of opioid overdose management comes from populations of illicit drug users. Additionally, there is little data demonstrating the efficacy of overdose education provided by pharmacists. The purpose of this study is to determine patients' baseline knowledge, immediate recall, and long-term retention of opioid overdose management after receiving education from pharmacy personnel in a pain and palliative care clinic.

Methods: Patients deemed high risk for opioid overdose will be prescribed naloxone and receive overdose management education from a pharmacist during a clinic visit in Tarrant County, TX. Before the education, demographic data will be collected and patients will complete a 10-question assessment on opioid overdose. Six of the 10 questions evaluate patients' knowledge on overdose risk factors and management. The remaining four questions also assess knowledge regarding overdose, but may provide insight into patients' perception of and confidence to manage opioid overdose. Additionally, patients will be evaluated on their knowledge of the prescribed naloxone device. Patients will be taught how to use the device, and a checklist will be utilized to evaluate the patient's understanding via teach-back. Following the encounter, patients will complete the 10-question assessment again to measure immediate knowledge retention of overdose management. At the patient's next follow-up visit (within 1-3 months), patients will complete the assessment and perform teach-back to evaluate long-term knowledge retention. ANOVA will be used to analyze scores on the knowledge assessment, and a paired t-test will be utilized to analyze device checklist scores. Descriptive statistics will be used for secondary analysis of specific questions and steps on the device checklists.

Results:

Conclusions:

Sponsor: N/A
IRB/IACUC/IBC#: 1330831-1

2001 - Poster
Classification: School of Public Health Student
Presenter: Saehwan Park
Department: School of Public Health: Health Behavior & Health Systems
Authors: Saehwan Park; Liam O'Neill, PhD

Can Private Rooms Save Costs by reducing HAIs?: a Monte-Carlo Simulation Study for Cost-Benefit Analyses of a Public Safety-net Hospital

Purpose: Private patient rooms (PPRs) have long been hypothesized to lower the risk of critical hospital-acquired infections (HAIs) including methicillin-sensitive staphylococcus aureus (MSSA), methicillin-resistant staphylococcus aureus (MRSA) and central-line associated bloodstream infections (CLABSIs). Moreover, there has been an increasing interest in "evidence-based design" and how structural elements influence health and financial outcomes. However, evidences have been weak from management and policy perspectives. Extant literature consists either expert opinions or case studies based on a single hospital. This simulation study investigated whether cost-savings from reductions in HAIs justify additional construction and operating costs of hypothetical All-PPR renovation projects.

Methods: We conducted probabilistic Monte-Carlo cost-benefit analyses of converting the existing space occupied by bay rooms to PPRs for a large (537-bed) public safety-net hospital, based on known quantities drawn from the Texas Inpatient Public-Use Data File (IP PUDF). Three HAIs (two staphylococcus aureus infections – MSSA and MRSA – and CLABSI acquired during hospitalizations) were considered in this study. Two patient-level statistical models were developed to predict the effect of PPRs on hospital-acquired MSSA/MRSA risk and the effect of MSSA/MRSA on hospital costs, by using logit regression and generalized linear regression models respectively. Medicare payments were used as a proxy measure for hospital hosts. Attributable costs were estimated by taking difference between matched groups. Potential confounders including patient mix, hospital characteristics, nurse staffing, occupancy rates, physical space, procedure classes, and clinical burden were adjusted in both predictive models. We also used our previous CLABSI study to identify and estimate relevant variables (acquisition risk and attributable cost) of CLABSIs.

Results: Despite uncertainty in cost estimates and infection risks, our simulation findings indicated that the cost savings from the reduction of HAIs meaningfully offset huge construction costs and operating expenses for the target hospital, ultimately contributing to positive net benefits ($4,122,019; 95% CI was [$772,996, $7,471,043]). The mean value of internal rate of return (IRR) over 5-year analysis period was 8.71% (95% CI= [3.83%, 13.58%]), outperforming the threshold of cost of capital for healthcare facility sector (5.8%). Even after considering randomness of various conditions, the likelihood of renovation project success (as defined by IRR greater than 5.8%) exceeded 87% with 5,000 repeated simulated trials.

Conclusions: Our study shows that although All-private room facilities are costly to build and operate, they can result in substantial cost-savings on top of improved safety (fewer adverse events and/or deaths).

2002 - Poster
Classification: School of Public Health Student
Presenter: Leilani Dodgen
Department: School of Public Health: Health Behavior & Health Systems
Authors: Leilani Dodgen; Ann M. Adams; Subhash Aryal; Jessica Maack Rangel

Study of trends in opioid prescription for chronic abdominal pain from 2009-2014 using National Ambulatory Medical Care Survey (NAMCS) data

Purpose: Chronic abdominal pain (CAP) is a common reason for health care visits affecting approximately 25% of adults. Often opioids are prescribed to treat CAP, though there is not much evidence to support this. Opioid use has been connected to increased morbidity and mortality of patients including drug misuse, abuse and exacerbation of abdominal pain. The purpose of this study is to examine national trends in prescriptions of opioids for treating CAP using National Ambulatory Medical Care Survey (NAMCS).

Methods: NAMCS data were retrieved from the National Center for Health Care Statistics (2009-2014). The original data were paired into two-year groupings. We conducted stratified analysis and combined analysis for each 2-year period. We categorized patient diagnoses via the clinical classification software (CCS). Patient data were included if they were 18 or older and the reason for visit was CAP (including: Stomach pain, cramps, spasms, generalized lower or upper abdominal pain, and liver, gallbladder, or biliary tract pain). Certain types of abdominal pain were excluded including: pain from injury, infectious/parasitic diseases, neoplasms, diseases of the genitourinary system and pregnancy/childbirth complications. Logistic regression was used to determine trends in the number of visits where opioids were prescribed, and factors related to opioid prescriptions.

Results: Visits for 2009-2010, 2011-2012, 2013-2014 were 10.3 million, 9.7 million and 10.2 million respectively. During the same time periods the estimated number of opioid prescriptions for treating CAP were 300 thousand, 400 thousand and 100 thousand respectively. There were no significant differences in the number of opioid prescriptions between time periods ($p > 0.05$).

Conclusions: Even though an increasing trend for opioid prescriptions was reported in the literature for treating abdominal pain for 1997-1999 (7.9% increase) and 2006-2008 (15.5% increase), this analysis revealed the opioid prescription rate during this study period was not statistically different from year to year. Further analyses will incorporate additional data from the National Hospital Ambulatory Medical Care Survey (collected with NAMCS) which only contains hospital outpatient visits. This will contribute to a more robust, evidence-based analysis about practices in opioid prescribing, and inform the work of clinicians and public health officials working to address the US opioid epidemic today.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-104

2003 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Nancy Sang
Department: TCOM: Internal Medicine & Geriatrics
Authors: Nancy Sang, OSM-II; Sarah E. Ross, DO,MS, CMD; Jennifer Severance, PhD; Valerie Agena, DO; Jane Oderberg, LMSW

Evaluation of Team STEPPS training in Skilled Nursing Facilities

Purpose: Skilled nursing facilities (SNF) face many challenges in providing safe and competent care to a frail population. Surveys of SNF staff reveal poorer levels of safety culture compared to their hospital counterparts. Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) is an evidence-based interprofessional training program designed to teach tool to promote teamwork, communication, and patient safety. Implementation of TeamSTEPPS has led to improvements in patient safety culture in hospital settings, but there is a lack of evidence of benefit of TeamSTEPPS in SNF.

Method: Our research team adapted the TeamSTEPPS curriculum for implementation at two area SNF. We conducted three TeamSTEPPS training sessions to direct care staff (n=139). The trainings were delivered between October 2017 and June 2018. Focus group sessions comprised of the direct care staff (n=119) were then conducted at each facility between August and September 2018. The questions asked focused on staff perception on using communication tools, the training program itself, and feedback on program improvements. The comments from each of the sessions were than categorized to overarching themes.

Results: Thematic analysis of responses resulted in six major themes, communication, accountability, leadership/authority, implementation of the training, need for training and burn out. A majority of the comments from both facilities focused on the implementation of the training, communication, and accountability. Staff comments about the training implementation were positive and that they enjoyed the delivery method of the training and were able to apply the training to practice. Staff acknowledged that the communication tool led to improvements in communication between the staff from different shifts. Staff members also noted that they became more aware of their own roles and accountability to patient safety.

Conclusion: TeamSTEPPS training was well received by the direct care staff, and there were reports of improved communication and safety awareness. We anticipate that as direct care staff at SNF use TeamSTEPPS tools a positive impact will be seen on patient safety culture. Considerations for implementation of TeamSTEPPS tools in SNF requires a tailored approach. Barriers to success include high turnover in both leadership and direct care staff.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-084

2004 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Joshua Lindsley
Department: SaferCare Texas Patient Safety Institute
Authors: Joshua Lindsley; Conner Reynolds; Trevor Williams; Jacob Underwood; Janet Jowitt, Dr.

How Dirty is Your Phone?—Linking Restroom Behavior to Cell Phone Contamination at a Health Science Center

Purpose: Preventable medical errors are the third leading cause of death in the United States annually, accounting for 251,000 lives annually. Healthcare-acquired infections (HAIs) account for nearly 40% of this population, costing the healthcare system $28.4-33.8 billion each year. Current efforts monitoring sources of HAI have set their focus on device-associated infections (i.e. central line, catheter, and ventilator-associated infections). Yet, in a recent Multistate Point-Prevalence Survey of Health Care-Associated Infections, device-associated HAI only accounted for 25.6% of instances detected. The rising prevalence of smartphone usage has also prompted researchers to target mobile phones as potential vectors for infectious transmission in healthcare. One potential area accounting for significant cellphone contamination is use in restrooms.

Methods: In the present study, we surveyed students for their restroom cell phone usage. Following the survey, we then assessed the degree of contamination using an ATP Luminometer.

Results: Using an ATP luminometer to measure surface contamination, students' phones demonstrated an average level of 1702.09 ± 165.90 RLU/100 cm^2. When correlating these contamination levels with survey behavior, some interesting things begin to emerge. There was a significant protective effect of hand washing, with a higher likelihood of washing leading to lower contamination levels ($rs(101) = -.172$, $p < 0.05$). There was also a significant protective effect of cell phone cleaning, with more frequent cleaning leading to lower contamination levels ($rs(101) = -.184$, $p < 0.05$). When comparing the cleaning methods, soap & water appeared to be most effective in reducing contamination (772.86 ± 297.96 RLU/100 cm2), while alcohol swabs were least effective (1672.29 ± 250.07 RLU/100 cm2).

Conclusion: Cell phones offer a world of information at the provider's fingertips, allowing for higher quality care than ever before. However, these can easily become contaminated and are rarely disinfected. Taken together, the results of this study establish some of the first evidence for cell phone use behavior leading to surface contamination. To prevent these new smart devices from becoming fomites for infectious spread, it is the responsibility of health systems to implement cleaning protocols. This may reduce the overall rate of HAIs and preventable medical errors for patients across the United States.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-142

2100 - Poster
Classification: GSBS Student
Presenter: Grant Currens
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Grant Currens; Rinkal Patel; Yi-Qiang Cheng

Microbial Natural Product Drug Discovery Through Systematic Sampling of Diverse Texas Soils

Purpose: Microorganisms have long been a valuable source of new pharmaceutically relevant small molecules. Because of their intrinsic need to compete for scarce resources in their microenvironment, they have often adapted to produce secondary metabolites capable of exerting cytotoxic effects against competing microorganisms. Microbial natural products and their derivatives account for nearly half of the currently approved anti-infective and anti-cancer drugs. Because of the State of Texas' rich soil diversity, systematically collecting and fermenting bacteria and fungi collected around the state should yield a library of interesting and diverse molecules which can then be screened for desirable activities and identified for use as lead compounds in pharmaceutical research.

Methods: To validate this project, the chemical crude extracts from 80 fungal species were separated through reverse-phase flash chromatography and screened for cytotoxicity against MIA PaCa-2 (ATCC® CRL-1420), SH-SY5Y (ATCC® CRL-2266), and COLO 829 (ATCC® CRL-1974) cancer cell lines as measured by Promega's CellTiter-Glo® Luminescent Cell Viability Assay (ATP-Luciferase assay). Subsequently, a short-list of fractions containing promising cytotoxic compounds was identified and those fractions were subjected to further purification through multi-step activity-guided reverse-phase high-performance liquid chromatography (HPLC). Accurate masses and isotope distributions for compounds were assessed through time-of-flight mass spectrometry (TOF MS) and compared to known compound databases for dereplication. The purified compounds then underwent high-resolution proton and carbon NMR studies to determine their structure and novelty.

Results: The first 80 fungal species collected from around the state were separated into 800 flash chromatography fractions of which 17 exhibited consistent cytotoxicity against MIA PaCa-2, a human pancreatic carcinoma cell line. Early study of a further narrowed test-group of 8 fungal species has thus far yielded a few interesting compounds. Notably of these species, one produces a compound with a mass of 401.257 which has been observed in multiple HPLC generated fractions exhibiting >99% cell clearance after 48 hours. Based upon the accurate mass and isotope distribution, this compound preliminarily does not appear to have been previously described. Sufficient quantities of purified compound have been produced to perform high-resolution proton and carbon NMR to determine compound structure.

Conclusions: We have seen from our preliminary study that we can systematically construct and screen a library of natural products derived from Texas microbes as way to identify lead compounds which exert cytotoxic effects on established cancer cell lines. Further, through collaboration, this library can be screened against a wider variety of targets to aid in identifying valuable lead compounds.

Sponsor: N/A
IRB/IACUC/IBC#: IBC/p/YC-2018-1

2101 - Poster
Classification: Postdoctoral Fellow
Presenter: Ina Mishra
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Ina Mishra; Stephen Curry; Michail Kastellorizios

An Alternative Method To Quantify Surface Properties of Anti-Cancer Drugs

Purpose: Physicochemical properties such as size and size distribution affect liposome formulations' physical stability and accumulation in the target tissue. The FDA's "Liposome Drug Products, Guidance for Industry", 2018 emphasized size and size-distribution as "critical quality attributes", however, it does not mention the criteria for an acceptable polydispersity index (PDI), currently measured using size-scattering technique. A monodisperse, homogenous size distribution population (PDI≤0.3) is desired. In this work, we measured surface tension of two different size distributions of liposome populations, with lipid composition similar to clinically approved anticancer formulation DOXIL, as a method to quantify liposome surface properties. This work establishes a building block in our long-term goal of obtaining insight into and facilitating the translation of nanoparticles from animal to human studies by offering additional preclinical characterization techniques based on surface properties of nanoparticles.

Method: Liposome formulations A and B, consisting of hydrogenated (Soy) phosphatidyl choline, cholesterol, and DSPE-PEG (7.64:5.17:1 molar ratio) were formulated in-house using thin film hydration method and probe sonication. Average particle size (PS) and PDI was obtained using dynamic light scattering (Mobius122, Wyatt Technology). The two formulations were fabricated with small differences in probe sonication process, yielding slightly different PDIs but the same average PS. The formulations were tested at two different lipid concentrations: 1mg/ml and 0.1mg/ml. Surface energy measurements were obtained on all four using pendant drop method, reported as mean with standard error (n=3) against the PDI.

Results: Average PS for A and B was similar (92.9±1.6 nm, 90.3±0.4 nm respectively), with PDIs 0.1±0.02 and 0.04±0.02 respectively. As expected, the surface tension was significantly decreased with concentration. PDI was found to significantly affect the total surface tension at higher concentration tested (1mg/ml) while it did not play a role at the lower concentration tested (0.1mg/ml). Interestingly, this trend was reversed when the surface tension was broken into its polar and dispersive components.

Conclusions: This work confirmed that small PDI changes, arising from slight variations in fabrication/manufacturing process, can translate into measurable changes in surface properties that can be obtained more rapidly and with higher accuracy than conventional DLS-based sizing techniques.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2102 - Poster
Classification: Postdoctoral Fellow
Presenter: Nigam Mishra
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Nigam M. Mishra; Mario Schubert; Oanh Vu; Yu Du; Jan Stichel; Corinna Schüß; C. David Weaver; Annette G. Beck-Sickinger; Jens Meiler; Kyle A. Emmitte

Asymmetric syntheses identify preferred stereochemistry in small molecule allosteric modulators of the neuropeptide Y4 receptor

Purpose: The neuropeptide Y4 receptor (Y4) is a GPCR belonging to a family of five receptors that bind ligands neuropeptide Y (NPY), peptide YY (PYY), and pancreatic polypeptide (PP). These ligands are hormones that play important roles in the regulation of feeding behavior and energy homeostasis. Small molecule ligands that selectively activate the Y4 receptor are potential therapeutics for obesity. Currently, there is a lack of non-peptide Y4-selective ligands available for studying Y4. Having recently identified multiple small molecule Y4 ligands via HTS, optimization of these hits is ongoing. The objective of the work described here is to develop asymmetric syntheses of two confirmed small molecule Y4 ligands, enabling determination of the preferred stereochemistry for Y4 activity and facilitating further optimization efforts.

Methods: Compounds were prepared via solution phase chemistry. Microwave reactions were run in an Anton Paar Monowave 200. Flash chromatography was carried out on either a CombiFlash® EZ Prep or CombiFlash® Rf+ system and utilized RediSep® Rf normal phase disposable columns. Preparative HPLC was carried out on a CombiFlash® EZ Prep system using a RediSep® Prep C18 10 x 250 mm, 100Å, 5 µm HPLC column from Teledyne ISCO. Compounds were characterized via NMR on a Bruker Fourier 300HD NMR spectrometer and via LCMS on an Agilent 6230 Accurate-Mass TOF LC/MS. Compound pharmacology was assessed in a two-addition protocol via Ca^{2+} flux assays in COS7 cells stably expressing Y4 and a chimeric G-protein.

Results: Four diastereomers of Y4 PAM tBPC were synthesized to > 87% d.e. utilizing a synthetic route employing an asymmetric alkylation, chelation controlled addition, and a Grubbs RCM reaction for the formation of key bonds. (1S,2S)-tBPC was found to be the preferred diastereomer for Y4 activity. Two enantiomers of Y4 NAM VU0637120 were synthesized to >99% e.e. by employing commercially available chiral starting materials. (S)-VU0637120 was highly preferred for Y4 activity compared to (R)-VU0637120. A library based on (S)-VU0637120 was subsequently synthesized.

Conclusions: Identification of the preferred stereoisomers for these Y4 ligands were successfully accomplished through asymmetric syntheses. These results enable the further optimization of these compounds in the context of the preferred stereochemistry, enhancing the probability of identifying optimized tools for studying the Y4 receptor.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2103 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Andrew Kramer, OMS-II
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Andrew Kramer; Hamed Hayatshahi; Jin Liu

Using Autodock Tools for Automated Docking of Ligands to D2/D3 Receptors

Parkinson's Disease (PD) is a neurodegenerative disorder of the substantia nigra, affecting roughly ten million individuals worldwide. Considering that the substantia nigra is the main player in dopamine production, progressive erosion of this structure has been shown to dramatically decrease the amount of dopamine in the brain. The direct pathway of movement responds to dopamine through the dopamine receptors, D2 and D3. Therefore, without dopamine, the brain struggles to produce movement, yielding many of the symptoms associated with PD: rigidity, tremors, shuffling gait. Current medications for PD increase dopamine concentrations or artificially activate the D2/D3 receptors; yet they are not without their side effects, most often causing loss of impulse control, confusion, and postural hypotension. Our goal is to better understand the selectivity mechanism of D2/D3 receptors in hopes of generating a more efficient medication in the future. By constructing a series of ligands with a similar molecular backbone but differing in various functional groups, we can utilize computer programming to find the activating energy of each ligand and compare the data in order to determine which functional group specifically activates either the D2 or D3 receptor. In this, roughly ninety distinctive ligands were drawn and converted to a three-dimensional product using Maestro. Utilizing Autodock Tools, these ligands were then computationally bound to both the D2 and D3 receptors, producing binding affinity for each ligand. In order to activate both the D2 and D3 receptors, a salt bridge must form between the protonated nitrogen of the nonaromatic ring of the ligand and aspartate residue 114 on the extracellular aspect of the receptor. Our findings revealed only thirty-six ligands successfully activating the D2 receptor in the correct orientation, and thirty-seven activating the D3 receptor. In total, the ligands drawn were more selective for the D3 receptor. From this data, we found a correlation between the presence of an ortho-methoxy group on the benzene ring of the ligand and its relationship to a serine residue on the receptor on D3R, producing a higher binding affinity. Therefore, by identifying the significance of this serine residue, we can better understand the selectivity of the D2/D3 receptors.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2104 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Benjamin Romanowski
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Benjamin Romanowski; Nicole Phillips, PhD, MS; John C Licciardone, DO, MS, MBA, FACPM

Genetic Influences on Opioid Use in Low Back Pain: OPRM1 rs1799971

Purpose: The OPRM1 rs1799971 single nucleotide polymorphism (SNP) has been studied for its influence on drug abuse and opioid use. Opioids have a questionable long-term risk-benefit profile in chronic low back pain, and a genetic predisposition to taking higher doses could place a patient at higher risk of complications related to opioid use. Studies have demonstrated higher dosages of self-administered opioids in an acute post-surgical setting in subjects with the rs1799971 AG polymorphism. We hypothesize that subjects with the rs1799971 AG polymorphism will use higher doses of opioids than subjects with other rs1799971 polymorphisms in the setting of chronic low back pain.

Methods: This study was conducted using data from the PRECISION Pain Research Registry at UNTHSC. A saliva sample from each subject was obtained to determine genotypes, including the OPRM1 rs1799971 SNP. Additionally, numerical ratings of low back pain intensity and opioid use in morphine milligram equivalents (MMEs) were measured. The MMEs were computed in accord with CDC guidelines, which further indicate that opioid doses greater than 50 MMEs per day double the risk of opioid complications as compared with doses under 20 MMEs per day. We analyzed pain intensity, daily MMEs, and the proportion of subjects taking doses in excess of 50 MMEs per day based on allele status at SNP rs1799971.

Results: Of 351 subjects with subacute or chronic low back pain, 279 were AA and 72 were AG. There was no significant difference in MMEs between rs1799971 AA subjects ($\bar{x}$=5.90, SD=17.03) and AG subjects ($\bar{x}$=9.53, SD=22.85). AG subjects had statistically significant lower pain intensity ($\bar{x}$=5.2777 SD=1.74) compared to AA subjects ($\bar{x}$=5.985, SD=1.9489 Mann-Whitney U=7897.5 p=0.005). rs1799971 AG subjects were more likely to be taking opioid doses greater than 50 MMEs per day than AA subjects (OR=3.40 95% CI:1.01-11.46 p=0.04). Five and 6 subjects with AG and AA, respectively, were taking doses greater than 50 MMEs per day (OR, 3.40; 95% CI, 1.01-11.46; Fishers exact p=0.11)

Conclusion: There was no significant difference in mean MMEs among rs1799971 AG and AA subjects. However, AG subjects were marginally more likely than AA subjects to be taking doses greater than 50 MMEs per day. This SNP could potentially place rs1799971 AG patients at higher risk of complications relating to higher opioid doses, indicating a less favorable risk-benefit profile for long-term opioid therapy.

Sponsor: N/A
IRB/IACUC/IBC#: IRB 2015-169 and 2017-102 IBC-2019-0106

2105 - Poster
Classification: UNT System College of Pharmacy Student
Presenter: Sophia Le
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Sophia Le; Xiaowei Dong

Development and Characterization of In Situ Self-Assembly Nanoparticles for Oral Tissue-Targeting Delivery

Purpose: Tissue-targeting delivery system is an advanced method that improves drug concentration in tissues of interest and minimizes systemic toxicity. Drugs are encapsulated in a carrier and will be released at the site of action. Up to now, very few studies have reported on oral formulations of tissue-targeting delivery systems. Oral dosage form is preferred for the ease in administration and increased patient compliance. The objective of this study is to develop an orally administered nanoformulation that can deliver drug to targeted tissues using the in situ self-assembly nanoparticle (ISNP).

Methods: Docetaxel (DTX), an anticancer agent, was used as a model drug for this study. DTX ISNP granules were prepared using surfactant, lipid, solid carrier and DTX. Long term stability of the granules was characterized in term of particle size, drug loading, entrapment efficiency and solid structure using particle size analyzer, HPLC and differential scanning calorimetry (DSC). Particle size stability in simulated physiological environment (2 hours in pH 1.2 followed by another 3 hours in pH 6.8) were studied. In-vitro release of DTX from NPs were also measured using HPLC. After oral administration of DTX ISNP granules, DTX concentration in plasma and tissues of rats were measured using LC-MS.

Results: Average size of DTX ISNPs were around 187 nm with narrow distribution and polydispersity index < 0.250. The measured drug loading and entrapment efficiency were around 9% and 90% respectively. No significant decrease in these parameters and no degradation were observed after storing granules at room temperature for 6 months. DTX in the granules was present as amorphous throughout the 6-month study period. Particle size did not change significantly after being incubated in simulated physiological condition for 5 hours. In the in-vitro release study, up to 20% of DTX was released from NPs after 20 minutes. Plasma concentration of DTX fluctuated throughout the study without significant difference between DTX ISNP granules and DTX powder. However, compared to DTX powder, DTX ISNP granules remarkably increased drug concentrations in liver, lung and kidney at 1 hour after oral administration.

Conclusions: The results demonstrated that ISNP nanotechnology has the potential applications in developing an oral formulation that selectively delivers the drugs to the targeted tissues.

Sponsor: N/A
IRB/IACUC/IBC#: IACUC-2017-0010

2106 - Poster
Classification: UNT System College of Pharmacy Student
Presenter: Jeffrey Taylor Jameson
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Jeffrey Jameson; Meredith Garrett; Ina Mishra; Michail Kastellorizios

Effect of Cholesterol Content on Surface Properties of Doxil-Mimicking Liposomes

Purpose: The use of nanoparticles (NPs) for drug delivery has gained a lot of attention from biomedical researchers in the last few decades. This is primarily because NPs are of an extremely small size that enables them to accumulate preferentially inside of the tumors instead of healthy tissue. The reason is unknown as to why research being done on NPs has shown promising results in animal models but does not translate successfully to the clinic. Here, we will study the effect of NPs cholesterol content on their surface tension. Cholesterol is sometimes added to NPs to increase their rigidity and stability, but we do not know if it interferes with other properties such as surface tension. We hypothesize that surface tension can be useful in enriching characterization of novel NPs and help determine which NPs to move on to clinical testing.

Methods: We used Doxil®, one of the few successful NPs for cancer therapy, as reference. Doxil® consists of a drug (doxorubicin) encapsulated in nano-sized vehicles (liposomes) made of HSPC, cholesterol (CHOL), and PEG. Two formulations of NPs, HSPC:CHOL:PEG (Doxil®) and HSPC:PEG, were prepared by thin film hydration followed by membrane extrusion. We tested their surface tension at six concentrations using the twin-capillary method. A capillary stand was 3D-printed that was able to hold the capillaries stable.

Results: The average change in surface tension for the six different concentrations between the two formulations did not have a noticeable change. The surface tension decreased proportionately at the same concentrations for each of the HSPC:CHOL:PEG and HSPC:PEG formulations. In addition, the same experiment was used to compare the difference in surface tension between HSPC:CHOL and phosphatidylcholine (PC), which is equivalent to HSPC. The difference between the values were also negligible.

Conclusion: Based on our results, we conclude that the inclusion of cholesterol in liposomes does not alter their surface energy properties as measured by the twin capillary rise method. This may be due to the fact that cholesterol is a small molecule while PEG is a giant molecule that covers the surface of the entire liposome. Even though cholesterol does not affect surface tension, it is still pertinent for the formulation to be effective. In future studies, an additional technique will be used (pendant drop shape analysis) that gives more insight into surface tension and breaks it into its polar and non-polar components.

2107 - Poster
Classification: UNT System College of Pharmacy Student
Presenter: Meredith Ashley Garrett
Department: UNT System College of Pharmacy: Pharmaceutical Sciences
Authors: Meredith Ashley Garrett; Jeffrey Taylor Jameson; Ina Mishra; Michail Kastellorizios

Investigating Effects of Pegylation of the Surface Tension of Liposomes used in the Treatment of Breast Cancer

Purpose: In recent years there have been many advancements in nanomedicine as potential delivery systems for the treatment of various types of cancer. Two formulations on the market, Doxil® and Myocet®, are made of doxorubicin-loaded liposomes. One them, Doxil® has the hydrophilic polymer polyethylene glycol (PEG) immobilized on its surface, while the other (Myocet®) doesn't. PEG has been shown to improve liposome circulation in the blood by disguising them from the immune system, creating a 'stealth' delivery system for drugs. However, it is unknown whether the PEG changes the way liposomes may interact within the tumor. Here, we fabricated liposomes that mimic Doxil® and Myocet® and measured their surface tension, as surface tension is a driving force behind the interfacial interactions between liposomes and tumor extracellular matrix.

Materials and Methods: Two formulations of liposomes (Doxil® and Myocet®) were fabricated using thin film hydration for liposome formation and membrane extrusion for liposome downsizing to nanometer levels. A thin film of each formulation was made and then hydrated with phosphate buffered saline. Extrusion was performed using a 50nm membrane bringing final liposome size of each formulation to approximately 100nm. The Doxil® formulation contained hydrogenated soybean phosphatidylcholine (HSPC), cholesterol and PEG, while the Myocet® contained only HSPC and cholesterol. The two formulations underwent a series of dilutions, and the surface tension of each concentration was calculated using the twin capillary rise method. A custom 3D printed stand coupled with a well plate was used to secure the capillaries while allowing small volumes of the formulations to be used.

Results: Data collected showed a significant decrease in surface tension when PEG is removed from the surface of the liposomes. This effect was consistent across all concentrations when compared to the original formulation.

Conclusions: Our results show that PEG causes a drastic change in how liposomes interact with surfaces. Further, we demonstrated that this effect is greatly affected by small changes in liposome concentration. The reduction in surface tension observed in Myocet® versus Doxil® may be the reason behind Doxil's sustained success in the clinic compared to Myocet®. Future studies will focus on quantifying interfacial tension between these liposome formulations and breast cancer biopsies in order to potentially explain their different clinical performance.

2200 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Bhavik Hirapara
Department: Other
Authors: Bhavik Hirapara, OMS-II; Angela Yen Moore, MD; Madalyn Nguyen, OMS-III

Evaluating Safety and Efficacy of Combination Therapy with Short-Contact Topical 5-Fluorouracil 5% and Calcipotriene for Actinic Keratoses

Background: Actinic Keratoses (AKs) are precancerous lesions to squamous cell carcinomas of the skin, affecting roughly 35% of adults over the age of 40. The lesions are directly linked to the cumulative exposure to UV radiation and arise from keratinocyte dysplasia. Standard treatment includes liquid nitrogen (LN2), topical 5-Fluorouracil creams (5-FU), or combination therapy. Vitamin D derivatives have demonstrated anti-proliferative properties in cancer treatment via stimulation of the vitamin D3 receptor and, therefore, may be efficacious in the treatment of AKs. However, these treatments are limited by side effects such as pruritus, erythema, dryness, and irritation.

Objective: The purpose of this study is to evaluate the safety and efficacy of short-contact combination therapy of topical 5-FU 5% cream and vit D foam after LN2.

Methods: This was a retrospective study on adults diagnosed with AKs in a private clinical dermatology office setting. Charts from 139 patients, 49% males and 51% females, with a mean age of 57.4, were examined. All patients were first treated with LN2 at baseline. Short-contact therapy of topical 5-FU and/or vit D foam consisted of a thin application nightly to the face for 5 nights and to other treatment areas for 7 nights, and then no application for 2 weeks. The cycles were repeated every 3 weeks. The patients were divided into six treatment groups: 1) 5-FU 5% after LN2, 2) vit D foam after LN2, 3) 5-FU 1% after LN2, 4) 5-FU 5% and vit D foam after LN2, 5) 5-FU 1% and vit D foam after LN2, and 6) LN2 alone. AKs of the of the face, scalp, chest, upper extremities, back, and lower extremities for each patient were documented at baseline and follow up visits at 20-50, and 51-100 days. An analysis of covariance (ANCOVA) model was used to compare post-treatment lesion counts between treatment groups at 95% confidence intervals.

Results/Conclusions: Greater irritation was observed with the 5-FU 5% cream compared to other treatment groups. Short-contact combination therapy with 5-FU cream and Vit D foam after LN2 demonstrates increased efficacy over LN2 alone. Studies with an increased sample size for a longer duration should be performed to evaluate efficacy and safety.

Sponsor: N/A
IRB/IACUC/IBC#: SAIRB-17-0077 ADVARRA

2201 - Poster
Classification: UNT System College of Pharmacy Student
Presenter: Sarah Edwards
Department: GSBS: Pharmacology & Neuroscience
Authors: Sarah Edwards; Vien Nguyen; Daniel de la Cruz; Laszlo Prokai; Katalin Prokai-Tatrai

Study on the Antidepressant-like Effect of an Estrogenic Compound

Purpose: Estrogens have numerous beneficial effects on brain health; they impact learning, memory, and mood. We utilized the latter effect of estrogens to study an estrogenic compound's antidepressant-like effect in experimental animals upon systemic (subcutaneous) drug administration.

Method: The Porsolt Swim Test (PST) is a well-known model to survey the antidepressant-like effect of potential CNS agents. In this model, a mouse is placed in a water-filled container for a set period of time. When the animal ceases swimming and only makes enough movement to keep its head above the water, also known as immobility, this corresponds to a "depressive mood." We used 30 ovariectomized CD-1 mice lacking endogenous estrogens to avoid inference with the exogenously added estrogenic compound. The mice were divided into 5 groups of 6, with one group being designated as the control. Test agent was administered at various doses to the other 4 groups in corn oil vehicle for 5 days daily, and experiment started 30 minutes after the last injection for each mouse. At the highest dose, ICI 182,780 (an estrogen antagonist) was also co-administered. The movement of the animals were taped for 6 minutes. Two blinded observers independently determined the immobility times for the last 4 minutes of the videotaped experiment. At the end of the experiment, the mice were sacrificed and tissues were harvested for future drug quantification. Uterus wet weights were also measured. Mice were only exposed to these experimental conditions on the day of the experiment.

Results: Compared to the corn oil vehicle control, a dose-dependent and statistically significant reductions in immobility time were observed in animals treated with the estrogenic compounds. ICI 182,780 completely reversed the antidepressant-like effect of the test agent. Wet uterus weights were also statistically significantly different from those measured for the control group, indicating the uterotropic effect of the estrogenic test compound.

Conclusion: We have showed that an estrogenic test compound produced a dose-dependent antidepressant-like effect in PST, and this effect was completely reversible by the co-administration of an estrogen antagonist, implicating that the genomic effect of the estrogenic compound played a pivotal role in the observed CNS effect. At the same time, we also showed that the uterus of animals receiving the estrogenic test compound became very large due to fluid imbibition, which is a typical detrimental peripheral side-effect of estrogens exogenously administered for the purpose of neurotherapy. In the future, drug content in the brain and blood of the experimental animals will be determined and correlated with the obtained neuropharmacological effect.

Physical Medicine/OMM (Abstracts in the 2300s)

2300 - Poster
Classification: Resident (Not for Competition)
Presenter: Austin Henke
Department: Other
Authors: Austin M Henke

Osteopathic Manipulative Treatments to Improve Functionality of Parkinson's Disease: Case Study

Background: Parkinson's is a progressive neurodegenerative disease, second most common neurodegenerative disease. Standard of care is generally pharmacologic treatment with Levodopa, as it manages the bradykinesias, tremors and rigidity. The muscles become rigid with increased tone; symptoms can become exaggerated by pain, spasms and facial restrictions. Several methods of adjunct therapy are researched and attempted to improve the quality of life in patients with Parkinson's disease. Applying OMT to the joints and key muscles of posture/walking, improve the severity rigidity, allowing for increase usage of muscles; resulting in improvement in QoL and ADLs.

Case Information: The patient is an 80-year-old male presenting to OMM Clinic seeking to improve function with Parkinson's disease. The patient initially presented with mild Parkinsonian symptoms-such as minimal shuffled gait, worsened balance, and restricted sits to stand. Pharmacological treatment was Carbidopa 25mg- levodopa 100mg QID. He ambulates, when pain and rigidity symptoms are worse with bilateral walking poles. The gait was described as minimal shuffle, minimal rigidity of elbows and worsened throughout presentation. OMT was performed by a board certified osteopathic physician, and was applied regularly to major joints. The patient reports after OMT, he has improved range of motion and gait. A witnessed participation that occurred between the patient and the researcher revealed that the patient walked in with rigidity and need for walking poles, but walked out with smooth gait no assistive devices.

Conclusion: While Parkinson's disease is a progressive neuromuscular disease, quality of life can continue to remain stable with adjunct therapies such as OMT and exercise. This case demonstrates that improved movement and postural stability can occur after addressing range of motion, leading to improved QoL. With rigidity, muscles can become restricted and exaggerated pain/spasms. While neurodegeneration is of central origin, the peripheral manifestations are pain and shortened muscle fibers from chronic tone with OMT to remain relaxed for greater lengths of time. OMT treatments target these muscle fibers by attempting to reset the muscle spindle reflex. With improved hamstrings, hip flexors, and decreased flexion bias of the torso, this patient was able to stand with better posture and improved fluidity.

Sponsor: N/A
IRB/IACUC/IBC#: 1364531-1

2301 - Poster
Classification: Resident (Not for Competition)
Presenter: Frederick O. Barnum IV, DO
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Frederick O. Barnum IV, DO; Mary Ellen Chang, OMS-III; Rita M. Patterson, PhD; Sajid Surve, DO

Effects of Practicing Osteopathic Manipulative Treatment (OMT) on Hand Function

Purpose: Practitioners who use osteopathic manipulative treatment (OMT) rely on their hands to diagnose and treat patients. While the general population's hand functionality declines with age, OMT practitioners seem to maintain hand strength and function as they age. Although majority of studies involving OMT examine its effects on patients, there is scarce research on how its practice affects practitioners. The purpose of this cross-sectional study was to assess OMT practitioners' hand functionality by measuring grip strength and comparing it to published gender- and age-matched normative data. We hypothesized that OMT practitioners' grip strength is maintained/improved versus non-OMT-practitioners of the same gender and age despite increasing age.

Methods: 264 OMT practitioners at the American Academy of Osteopathy (AAO) Convocation (90 subjects in 2017 & 164 in 2018) provided self-reported demographic data via Qualtrics, such as age, gender, height, weight, number of hours per week average OMT performed over career, and number of total years of OMT practice. Then, their intrinsic and extrinsic grip strength was measured with a pinch gauge and Jamar dynamometer, respectively. Finally, anthropometric data was collected, such as hand length using a tape measure and hand volume using a volumetric dunk tank.

Results: OMT practitioners' grip strength decline was calculated at -1.9 pounds over 5 years (lb/5y) for males and -1.0 lb/5y for females. Their decline rate was less than published normative data (males -4.2 lb/5y, females -2.4 lb/5y).

Other collected data is currently undergoing analysis and significance has yet to be determined. In the next phase of data collection, we plan to investigate participants' hand usage outside of OMT practice, what types of OMT they are utilizing, if practitioners have ever injured their hands while performing OMT, and if they have previously completed the study.

Conclusion: The grip strength results suggest that osteopathic physicians who practice OMT slow the rate of decline of their hand function as they age rather than experience the more rapid decline seen in the general population. Data analysis supports that OMT physicians maintain hand strength, possibly due to the nature of using their hands more than the general population. The results from this study serve as the first database of grip strength normative data not just for OMT practitioners, but physicians overall.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-043

2302 - Poster
Classification: Resident (Not for Competition)
Presenter: Malinda Hansen, DO
Department: Non-UNTHSC
Authors: Malinda Hansen; Miral Vaghasia; Kimberly Fulda; Kendi Hensel

Effect of Palpatory Neuromodulation of the Trigeminal Nerve for Tenderness in the Posterior Neck Musculature

Purpose: The trigeminal nerve coordinates several reflexes in the head, including a head-retraction reflex (HRR) when a stimulus comes close to the face. HRR utilizes the posterior neck musculature (PNM) to remove the face from potential danger. PNM has been identified as a possible source of discomfort in headaches, muscular tightness, and chronic neck pain. Neuromodulation is the mechanical, electrical or magnetic stimulation used to affect a change in the signaling circuitry of a nerve to affect how sensory inputs are processed via neurotransmitters. Our goal in using neuromodulation on the trigeminal nerve where it exits the face is to influence the circuitry of this reflex to decrease the tension and pain of the posterior neck musculature. Osteopathic manipulative treatment (OMT) has many modalities, one of which is using constant palpatory pressure, or inhibition, for relief of discomfort. Typically, inhibition has been used with muscular tender points and other somatic issues. We are using the OMT palpatory pressure on specific points of the face where the branches of the trigeminal nerve are known to reside. This study investigated change in tenderness of the PMN before and after using an OMT-based neuromodulation intervention as constant pressure on facial trigeminal points. We hypothesized a decrease in tenderness of the PNM after the intervention.

Methods: Fifty-two out of 100 subjects have been recruited thus far, 9 of which were excluded for no discomfort on initial assessment. The PNM was assessed for tenderness bilaterally using a 0-10 pain scale. If tenderness was present, the V1 and V2 branches of the trigeminal nerve endings on the face were assessed with an average pressure of 1.5±.21 lbs (left hand) and 1.6±.25 lbs (right hand), then given the 30-second neuromodulation OMT intervention. Using the IsoTouch system, average pressure used for intervention was 1.92 ±.16 lbs (left) and 1.92 ±.34 lbs (right).

Results: The average change in pain pre to post PNM right versus left side is R 1.50±1.54 and L 1.48±1.44.

Conclusions: The variability seen in the 52 subjects in our pre to post-intervention suggests neck pain is a multifaceted issue. The range of how the tenderness changed could indicate a role for the HRR circuitry as a target for neuromodulation. Length of neuromodulation, the amount of pressure used, and indication for intervention are all possibilities for future research.
Study funded by American Osteopathic Association #291PIT1811606

2303 - Poster
Classification: School of Health Professions Student
Presenter: Yingzhi Li
Department: Other
Authors: nick li; Vincent Smith; Howe Liu; David c Mason

Osteopathic Manipulation for Genital Pain - A Case Report

Background: For U.S. Osteopathic Manual Medicine (OMT) physicians, there is an over emphasis on medication, rather than the usage of manual diagnosis and therapy. We report a rare case of idiopathic penile pain that, after conventional means failed, was resolved by OMT treatment.

Case Information: A 54-year-old male presented with acute genital pain that was accompanied by dysuria. The patient reported his pain to be a 9 out of 10. His symptoms would come intermittently, lasting about 10 minutes before slowly receding away. The patient was initially treated with acupuncture and pain medicine, yet his symptoms persisted. The patient was then referred to a physician who had previously studied OMT, who utilized his knowledge of anatomy and the palpation technique to differentially diagnose the source and cause of the symptoms. With the use of Ligamentous Articular Strain Technique (LAS) and the High Velocity-Low Amplitude (HVLA) technique, the patient reported relief after 1st session of treatment on the 1st day, .and a full recovery after two extra treatments in next two consecutive days.

Conclusions: This was our first time treating this kind of medical problem with the OMT. It was treated following a comprehensive history-taking and physical exam. The differential diagnoses of this case suggest that an anatomical analysis, detailed physical exam, and specific palpation should be combined with exploratory therapy. This type of treatment approach should be used by practicing OMT physicians in order to improve patient care.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2304 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Justin Salman
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Justin Salman,, MS; John Licciardone,, DO, MS, MBA, FACPM; Nicole Phillips,, PhD, MS

Association of ABCB1 (rs1045642) single nucleotide polymorphism and drug metabolism reserve index (DMRI) with pain intensity among adults with chronic low back pain

Purpose: Low back pain is the leading cause of disability in the United States. It is often associated with long term opioid use, which may lead to opioid misuse and serious adverse events. Current clinical guidelines caution that opioids may provide only a small to moderate therapeutic effect, despite these potential risks. This study explores the use of pharmacogenetics in patients with chronic low back pain who are managed with opioids by investigating nucleotide variants in ABCB1,a gene implicated in drug bioavailability. Additionally, a three gene model using CYP2D6, CYP2C9, and CYP2C19, will be used to determine opioid drug metabolism on a quantitative scale. We aim to identify pharmacogenetics variants that may lead to safer and more effective treatment of chronic low back pain in patients being managed with opioids.

Methods: This study included 102 patients with low back pain within the Pain Registry for Epidemiological, Clinical, and Interventional Studies and Innovation (PRECISION). All patients in the study reported using opioids for their low back pain. DNA genotyping of biological samples from all patients was conducted on Illumnina iScan Global Screening Array. A common SNP locus (C3435T, rs1045642) in ABCB1was genotyped. Additionally, SNPs for CYP2D6, CYP2C9, and CYP2C19 were used to construct the drug metabolism reserve index (DMRI) for each patient, which was then stratified as Sub-functional (DMRI < 6), Functional (DMRI = 6), or Supra-functional (DMRI > 6). Outcome measures included a numerical rating scale for low back pain intensity, the Roland-Morris Disability Questionnaire, and the PROMIS-SPADE cluster for quality of life. The Mann-Whitney test was used for statistical analysis in SPSS.

Results: Patients with the T allele at rs1045642, which inhibits ABCB1 protein function and increases drug bioavailability, reported significantly lower pain intensity within the functional DMRI group (p = 0.01). However, there was no significant difference in pain intensity with the sub-functional DMRI group (p = 0.186).

Conclusion: The results suggest that gene variants in ABCB1 may potentially affect pain relief in opioid users, and may be useful in guiding opioid prescribing for pain management. Longitudinal pharmacogenetic studies in larger cohorts are necessary to establish the utility of such gene variants in ABCB1 in guiding safer and more effective pain management in patients with low back pain.

Sponsor: N/A
IRB/IACUC/IBC#: 2015-169 and 2017-102 IBC-2019-0106

2305 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Apollo Tran
Department: Other
Authors: Apollo Tran, MS; Nicole Phillips, PhD, MS; Subhash Aryal, PhD; John Licciardone, DO, MS, MBA, FACPM

Association between GDF5 single nucleotide polymorphism rs143383 and chronic lower back pain

Introduction: Low back pain presents a unique and ongoing challenge for patients and physicians. Of those who experience an episode of low back pain, 10% go on to develop persistent chronic low back pain (CLBP). However, the cause of this progression is not understood and it is unclear why the clinical manifestation of CLBP differs across individuals. There is a large body of evidence demonstrating the role of genetics as a risk factor CLBP. Growth factor differentiation factor 5 (GDF5) is a protein involved in the growth and development of bone and cartilage. A variant of GDF5, single-nucleotide polymorphism (SNP) rs143383 has been implicated with increased susceptibility and severity of musculoskeletal disorders such as osteoarthritis, rheumatoid arthritis, and ankylosing spondylitis. Considering that the cause of low back pain often involves musculoskeletal pathology, rs143383 may be implicated with symptomatology and the progression to persistent CLBP.

Objective: This study seeks to determine whether the rs143383 SNP is associated with pain severity in CLBP. We hypothesize that subjects with the CC genotype experience higher levels of pain compared to the TT and CT genotypes.

Methods: This project is an observational cohort study based on data retrieved from The Pain Registry for Epidemiological, Clinical, and Interventional Studies and Innovation (PRECISION). Subjects were divided into three groups, TT, CT, and CC. Average pain levels based on the Numerical Rating Scale (NRS) for low back pain were compared among the groups.

Results: Using a general linear model, we found that the rs143383 SNP was significantly associated with NRS scores (P = 0.001). We also found that the CC genotype had a statistical higher mean NRS score than the CT (P = 0.0370) and TT (P = 0.0004) genotypes. However, when the data was adjusted for race, ethnicity, gender and age, no significance was found between rs143383 and NRS scores.

Conclusion: Our findings indicate that there is no association between the GDF5 rs143383 polymorphism after adjusting for race and ethnicity. We were unable to complete a stratified analysis due to the distribution of participants in each strata. Larger studies should consider a stratified analysis to determine whether there is an association between rs143383 and CLBP within different ethnicities and racial groups.

Sponsor: N/A
IRB/IACUC/IBC#: 2015-169 and 2017-102 IBC-2019-0106

2306 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Scott Vicenzi
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Scott Vicenzi

Proximal Hamstring Tendinopathy Secondary to Malalignment Syndrome and the Effects of Running on Cross-Sloped Surfaces: A Case Report

Background: Patients with proximal hamstring tendinopathy (PHT) will typically report deep buttock or thigh pain that increases with running speed which may also flare with prolonged sitting. Malalignment refers to a minimal displacement from the normal alignment of any of the bones that results in abnormal biomechanical stresses. The effects of running on cross-sloped surfaces (i.e. cambered) involve asymmetrical forces that can predispose to malalignment. This case report serves to remind the clinician to check for pelvic malalignment early in the treatment of PHT and other common running injuries, provides recommendations for effective screening and treatment measures, and demonstrates that running on cross-sloped surfaces is involved in the development of pelvic malalignment.

History: A 19 year old male D1 collegiate long-distance runner initially presented with left buttock pain of 3 months duration. Over the course of the subsequent 7 years he experienced increasing pain in his right shin and tibial tuberosity, increasing soreness in his right calf, right Achilles tendinopathy, plantar fasciitis, and a left lateral ankle sprain.

Physical Exam Significant Findings:
-Right anterior rotated innominate
-Left innominate inflare
-Right leg shortened when moving from supine to sitting
-Reduced ROM and flexibility on left when performing seated IT band stretch

MRI of left hip:
-Partial-thickness tearing at the ischial attachment of the left semimembranosus tendon

Treatment and Outcomes
Ineffective:
-Physical therapy (hamstring strengthening, massage, EMS, LED, US, ice, heat) and Aleve
-Active Release Technique and Graston
-Left ischial tuberosity bursal injection with Marcaine and Methylprednisolone
-1/8 inch right heel lift
Effective:
-Running on opposite side of road to reverse angle of cross-slope
-Daily Muscle Energy treatment of left innominate inflare and right anterior innominate

Conclusions: Distance runners should avoid running on cross-sloped surfaces; regular reversal of direction is necessary. The seated IT band stretch may be a more suitable measure than Ober's test to use in the clinical setting, both as a diagnostic and therapeutic tool when assessing for IT band contraction and innominate inflare. The IT band contraction and inflare are directly associated with the

PHT and a result of adaptation to cross-slope; they may be a common etiology and should be investigated further. Daily treatment is necessary or the patient will fall back out of alignment.

Sponsor: N/A
IRB/IACUC/IBC#: please note: this report does not require IRB approval as it was a case report written about myself

2307 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Ryan Nguyen
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Ryan T. Nguyen; Yein Lee, DO; Thomas Crow, DO

Complex Regional Pain Syndrome Presenting Similar to A Myocardial Infarction: A Case Study

Background: Complex Regional Pain Syndrome (CRPS) is a disease of chronic pain often times arising after an initial triggering event (i.e., surgery, trauma, stroke etc.) that is refractory to normal pain management. CRPS is classified into type I and type II. Type I is absent of a nerve injury, while type II has a nerve injury. Both can present with symptoms of abnormalities in skin blood flow, edema, spontaneous pain, and hyperalgesia. The current mechanism of action of this syndrome is poorly understood, however it is believed that the trigger alters the autonomic nervous system, chronically stimulating the affected region. We report a patient who has a history of a myocardial infarction that left him with chronic chest and left arm pain refractory to pain management.

Case Presentation: A 50-year-old male with a history of coronary artery disease in native artery, hypertension, hyperlipidemia, obesity, diabetes, and one prior myocardial infarction presented with severe chest pain located in the middle to upper left chest region that radiated to the left arm. He states that the pain is a 10/10, sharp, and burning. The pain that radiates to his arm is debilitating. He reports similar pain in the past with marked swelling and decreased range of motion in his left upper extremity. He says he has been suffering this chronic pain associated with episodes of intense pain since his myocardial infarction. He has been to the emergency room numerous times in the past for similar symptoms, which were all negative for any acute coronary syndrome.

Conclusion: CRPS Type I often arises after an inciting event without any underlying nerve damage and usually affects a patient's extremities. Since a uniform treatment for CRPS does not currently exist, treatment is usually patient specific and varies from neuromodulation, medications, nerve blocks, physical therapy, and regional anesthesia. Treatments are aimed at reducing a patient's pain back to their baseline. Sympathetic nerve blocks provided the best relief of symptoms for our patient. The distribution of our patient's chronic pain closely resembles the pain pattern seen in a patient suffering from a myocardial infarction. This unique presentation can help remind physicians that we should have an open mind to all possible differentials, and that we should pay close attention to our patients' stories and physical exam to help us provide appropriate, cost-effective care for our patients.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

Proteomics (Abstracts in the 2400s)

2400 - Poster
Classification: Postdoctoral Fellow
Presenter: Khadiza Zaman
Department: GSBS: Pharmacology & Neuroscience
Authors: Khadiza Zaman; Fatima Rahlouni; Vien Nguyen; Katalin Prokai-Tatrai; Laszlo Prokai

A DISCOVERY-DRIVEN LABEL-FREE PROTEOMICS BASED SURVEY OF ESTRADIOL-REGULATED PROTEIN NETWORKS AND ASSOCIATED BIOLOGICAL FUNCTION IN THE RAT RETINA

Purpose: Previous studies have established the pleiotropic role of 17β-estradiol (the predominant human estrogen) as a potent neuroprotectant, but only recently it has gained attention for its therapeutic potential against ocular neurodegenerative diseases. Thus, this study was designed to perform a label free quantitative proteomics based survey to understand the impact of topical administration of E2 on the rat retina. This is one of the first reports elucidating E2-regulation of rat retinal proteins, networks and associated biological processes, thus providing us with more insights on topical hormone therapy.

Methods: Ovariectomized (OVX) Brown Norway rats were given 0.1% w/v E2 eye drops in saline/2-hydroxypropyl-β-cyclodextrin vehicle and controls received vehicle daily for three weeks. Retina from euthanized animals were immediately isolated. Retinal proteins were extracted and analyzed using data-dependent nanoflow LC-ESI-MS/MS on Orbitrap Elite^{TM} (Thermo) or Orbitrap Velos Pro. MS/MS data was searched against the UniProt rat protein database using Mascot (Matrix Science). Validations and label-free quantitation were performed using Scaffold (Proteome Software) by observing changes in protein abundances between treated and control using t test. Differentially expressed proteins were mapped to protein interaction networks and biological processes through Ingenuity Pathway Analysis® (Qiagen).

Results: In our proteomics-based quantitation, we identified 66 E2 regulated proteins in the OVX rat retina among which 49 up-regulated and 17 down-regulated (p1.5-fold change between groups). Some of the most highly scored identified networks are associated with endocrine system disorders, organismal injury and abnormalities, and developmental disorder. Presence of nuclear estrogen receptor (ER) in our dataset also reinforces the intricate nature of E2 signaling conveying neuroprotection. Our network-based analysis emphasized on the role of E2 in neuroprotection through regulation of various stress-induced signaling cascades such as ERK/MAPK pathways.

Conclusion: By using an OVX model with little or no endogenous E2, our study potentiates the neuroprotective role of E2 upon topical administration of the hormone. With this vast array of information on estrogen biology we seek to create foundations in basic science research regarding hormone therapy focusing on the "estrogenic retina."

Rehabilitative Sciences (Abstracts in the 2500s)

2500 - Poster
Classification: Community Partner (Not for Competition)
Presenter: Neshat Baset
Department: Other
Authors: Neshat Baset; Mahdi Haghshenas-Jaryani, Ph.D.; Rita M. Patterson, Ph.D.; Brittany Schnell; Dona Antony; Katie Carrigan, Ph.D.; Maria Cruz-Lugo; Muthu B Wijesundara, Ph.D.

Soft Robotic Exoskeleton for Cerebral Palsy Rehabilitation

Purpose: This work presents development of a soft robotic exoskeleton to provide active and passive therapeutic-assistive hand motion for children between the ages of 5-12 suffering from Cerebral Palsy (CP) while recording and adapting to the current state of the hand. Cerebral Palsy is a birth related brain injury; studies have shown that 60-83% of children with CP have some form of upper extremity limitations that lead to reduced hand functions and quality of life. Soft robotic devices show promise as a therapy extender needed for motor learning while reducing the safety issues involved in conventional robotic systems. The developed soft exoskeleton is integrated with sensors that measure finger trajectory (inertial measurement units) and force (in-line pressure) associated with finger extension and flexion. Finger trajectory and associated forces will provide a quantifiable means for tracking therapy progression.

Methods: The robotic exoskeleton includes five hybrid soft-and-rigid robotic digits attached on top of a wearable attachment. The soft robotic digits was designed based on the measurements from 16 children's hands (7 girls and 9 boys in the range of 5-12 years old) to fit the children's range of hand sizes while it satisfies the kinematic compatibility with finger joint range-of-motion and center-of-rotation. The robotic digit is comprised of three inflatable bellow-shaped structure sections and four semi-rigid sections in an alternating order which correspond to the anatomy of a human finger. Fabricated with 3D printed injection molds and over molding techniques, the soft robotic digits were made using silicone rubber material. The robot is actuated using pressurized air, where it was successfully tested so that it can provide full range of motion with inflation pressure of 200 kPa.

Results: Soft robotic exoskeletons in a small, medium and large size has been developed by assembling the robotic digits into the wearable attachment. Initial feasibility testing have been carried out on one healthy child (a 6 years old boy with medium hand size) to evaluate the operation, ease-of-use, and level of comfort provided by the robot. Results from the preliminary test and the feedback from the subject through the questionnaire indicated the ease-of-use, safety, and effective operation of the robot.

Conclusions: We plan to extend this pilot study to CP patients to evaluate the effectiveness of the soft robotic exoskeleton on this population.

Sponsor: NSF
IRB/IACUC/IBC#: 2016-087

2501 - Poster
Classification: Community Partner (Not for Competition)
Presenter: Brittany Schnell
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Brittany Schnell; Neshat Baset; Mahdi Haghshenas-Jaryani PhD; Muthu BJ Wijesundara PhD; Rita M Patterson PhD

Hand Force Measurement Using A Human-Powered Linear Movement

Background: Cerebral Palsy (CP) is a neurological disorder that affects many motor functions, such as muscle tone. 60-80% of children born with CP neurological movement disorders have functional limitations in the upper extremity, depriving them of the opportunity of experiential learning through repeated reaching, grasping and manipulating objects. To help give the necessary mobility of hand function to those with CP, a therapist must be able to see if the current therapy methods are improving the range of motion. Currently, there are plenty of devices that test the amount of isometric hand strength but, not how much resistance to hand opening there is due to spasticity.

Objective: Determine the amount of force it takes to open a subject's hand, who has Cerebral Palsy. Starting from a closed fist position (0 degrees) to a fully extended position using a human powered mechanism. To test this force measurement device on all grade levels of CP hand function.

Hypothesis: The load applied across a cylindrical handle, as it is being pulled away from the subject, will give an accurate readout of how much force it takes to open the hand of a subject with Cerebral Palsy.

Method: The amount of force will be measured using a cylindrical handle with a load cell attached at either end. As the study conductor pulls the device away from the subject, via a handle on the opposite end and attached wheels, the hand is forced open causing a load to output.

Results: A manual powered car will be pulled by a handle attached to the front of the car. On the opposite end of the car, a handle with an internal load cell at each end will read the amount of force it takes to open the hand. The subject will rest their arm on a 3D designed wrist stabilizer to prevent noise in the output.

Conclusions: The current design will be able to provide an objective measure of hand stiffness that can be used to track rehabilitation progress. Future studies on the device's ability to measures stiffness in other hand impairments are planned.

2502 - Poster
Classification: School of Health Professions Student
Presenter: Taylin Watson
Department: School of Health Professions: Physical Therapy
Authors: Taylin E Watson, SPT; Mary-Catherine Wilson-Garcia, SPT; Michael Salvatore, PhD; Nicoleta Bugnariu, PT, PhD

Does High Intensity Aerobic Exercise Improve Postural Control for Older Adults?

Purpose: While falls are a major source of disability in the aging population, walking has been linked to reduced risk of falls for older adults. Treadmill walking has even been shown to positively impact muscle-strengthening, motor control, and balance. The purpose of this investigation was to determine if a high intensity aerobic exercise program can improve postural control in older adults.

Methods: Participants completed 36, 1-hour exercise sessions, 3 times a week over 3-4 months, consisting of 40 min fast pace walk/jog, with a 10 min warm-up and cool down. A high intensity at minimum 80% max heart rate was aimed for as long as possible in each session, and intensity was progressively increased during training. Postural control was assessed at baseline (V1), mid-point during exercise training (V2) and at the end of exercise training (V3) using a dynamic balance task. A V-GAIT dual-belt treadmill was used to create surface perturbations and a 12-camera Motion Analysis system collected body kinematics. Backward surface translation perturbations inducing a forward loss of balance were presented randomly at two levels (2 m/s^2 and 5 m/s^2). Primary outcome measures were: maximum Center of Pressure – Center of Mass (COP-COM) distance during the first compensatory step and reaction time for initiating the first compensatory step. Paired sampled t tests with significance set at p

Results: Preliminary results show that maximum COP-COM distance during the first compensatory step increased significantly from an average of 9.87 ± 1.70 cm to 19.92 ± 2.40 cm as the level of perturbation increased. The reaction time for initiating the first compensatory step in response to the slowest perturbation decreased significantly between V1 (608 ± 63 ms) and V3 (543 ± 17 ms), with a similar trend but no significant change in response to the fastest perturbation.

Conclusions: Larger COP-COM distances during the first compensatory step are indicative of a robust postural control. A high intensity aerobic consisting of walking/jogging exercise on a treadmill improved the reaction time for initiating the first compensatory step in response to balance perturbations by an average of 50 ms, which is clinically meaningful for preventing a fall.

IRB/IACUC/IBC#: 2016-140

2503 - Poster
Classification: School of Health Professions Student
Presenter: Rachael Mobley
Department: School of Health Professions: Physical Therapy
Authors: Rachael Mobley; Carmel Rohani; Emily Bow; Haylie Miller, Ph.D.

The Effect of Exercise Programs on Children with Autism Spectrum Disorder (ASD): A Review of Current Literature

Purpose: Autism Spectrum Disorder (ASD) is characterized by challenges with social skills and delays in motor skills (Bremer, Balogh, & Lloyd, 2014; Caçola et al., 2019). Children with ASD tend to have a greater need for therapy compared with other children with special healthcare needs, but accessing services can be expensive, time-consuming, and difficult (Benevides, 2015). It is important for families to have motor intervention options without barriers of financial resources, transportation, or access. A home exercise program, for example, could be completed with the family at convenient times in a familiar environment. This approach may increase the likelihood of intervention adherence, allowing children with ASD to improve their motor skills without experiencing many of the common barriers to care. Our objective is to identify trends and gaps in literature regarding exercise programs for children with ASD, and to determine the most beneficial exercises to improve motor skills in ASD.

Methods: We completed a literature search using a combination of terms with Boolean operators including: (autistic disorder OR autistic OR autism OR Asperger's OR ASD OR pervasive developmental disorder) AND (motor intervention OR movement intervention OR movement therapy OR motor therapy OR exercise OR physical therapy OR PT OR HEP OR home exercise program). We limited our search to articles published in English within the last ten years. Three independent reviewers screened the articles to determine relevance.

Results: The search yielded 609 results, of which 20 empirical articles and 3 systematic reviews were relevant to the effects of exercise on ASD. Preliminary results show an emphasis on cognitive and behavioral effects of exercise, rather than motor benefits. Additionally, the majority of exercise programs were school-based; few included parent involvement in the exercise program.

Conclusion: The existing body of work suggests that exercise has significant benefits regarding behavior, cognitive function, and motor skills. However, there is a lack of research validating home exercise programs and parent involvement in exercise for children with ASD. We plan to identify a set of targeted, age-appropriate exercises and create a home exercise program for children with ASD designed to improve motor skills. This approach may be of greater value to the community than clinic or school-based motor interventions, given the commonly-reported barriers to care experienced by families.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2504 - Poster
Classification: School of Health Professions Student
Presenter: Sonali Aggarwal
Department: School of Health Professions: Physical Therapy
Authors: Sonali Aggarwal; Mostafa Fahmy; Howe Liu; Myles Quiben; Metin Yavuz; Yasser Salem

AQUATIC EXERCISE FOR CHILDREN WITH CEREBRAL PALSY: A SYSTEMATIC REVIEW

Purpose: Cerebral palsy (CP) is the most common cause of childhood physical disability. The purpose of this systematic review was to examine evidence regarding the potential benefits of aquatic exercise for children with CP. Safety, outcomes, and applications are addressed.

Methods: Electronic databases used were PubMed/MEDLINE, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), the Physiotherapy Evidence Database (PEDro), and Scopus. Additionally, we performed a hand search of the reference lists of relevant studies. Studies were included if they met the criteria of diagnosis (any form of CP), population (aged 0-21), and intervention (aquatic exercise). Quality of the included studies was rated using the Centre of Evidence-Based Medicine: Levels of Evidence and the PEDro scale.

Results: Of the 17 studies, three were randomized controlled trials, three were cohort studies, seven were quasi-experimental design, one was a prospective time series group design, two were case reports, and one was a case study. The sample sizes for the included studies ranged from 1 to 46 subjects. In total, 319 children with CP were analyzed. The duration of treatment ranged from 6 weeks to 6 months, with frequency of sessions varying between 1 to 3 times a week, and length of sessions averaging between 30 to 60 minutes. A range of aquatic exercises and techniques were used to address multiple impairment areas, including upper and lower extremity strengthening and stretching, balance, aerobic capacity, water adjustment skills, and gait. Various outcome measures were used to assess effectiveness of aquatic exercises including gross motor function, ROM, balance, gait, energy expenditure, social acceptance, and self-esteem measures.

Conclusion: The evidence suggests that aquatic exercise programs may be effective in the short term for improving gross motor function, gait parameters, social function, and self-esteem in children with CP ages 0-21. The evidence also suggests that aquatic exercise is a safe and fun treatment option for this population, with no reports of adverse effects. The overall body of evidence is inconclusive due to a lack of high-quality evidence, small sample sizes. There is significant variability between studies in intervention parameters (frequency, duration, intensity, etc.), disease severity of subjects, and outcome measures used to document changes.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2505 - Poster
Classification: School of Public Health Student
Presenter: Aakshita Monga
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Ali Ersen; Aakshita Monga; Mike Richardson; Brandy Schwarz; Alan G Garrett; Dong Nyguyen; Myles Quiben; Yasser Salem; Lawrence A Lavery; Metin Yavuz

Biomechanical Assessment of TCC-EZ® Kits for Diabetic Foot Ulcers

Purpose: Diabetic foot ulceration has been tied to elevated plantar pressures and the presence of neuropathy. Traditional Total-Contact Casting (tTCC) is considered the gold standard for treating diabetic foot ulcers (DFUs). However, this intervention is not applicable to some patients with active ulcers. The tTCC application also requires expertise which may not be available in all healthcare facilities, a limiting factor in its widespread implementation. Many physicians prefer the alternative route in treating DFUs which entails the use of off-the-shelf off-loading devices, such as diabetic boots. While diabetic boots are subject to patient compliance issues, they also have advantages such as being practical to implement. There are also new products such as TCC-EZ® kits on the market that offer a user-friendly casting process for healthcare providers. To the best of our knowledge, comparison of the offloading characteristics of TCC-EZ and tTCC has not been done. The purpose of this study was to determine whether plantar pressures, gait speeds, and cast weights are different between the two modalities (TCC-EZ vs. tTCC).

Methods: In this ongoing pilot study, 14 individuals (nine male, five female; median age of 47.8 (40.5 to 66.1)) participated, ten were healthy and four have diabetic neuropathy. Participants were casted and instructed to complete three 30-meter walking trials at a comfortable pace with two modalities on the day of testing in a randomized order. Time to traverse the path was captured using automated photogate sensors (Dashr Systems, Lincoln, NE), and plantar pressures were measured using Pedar (Novel, Munich, Germany) pedobarographic insoles. Paired t-tests were used to compare peak pressures, gait speed, and cast weights across the two modalities.

All study procedures were approved by the North Texas Regional Institutional Review Board (IRB) prior to recruitment and testing, and informed consent was obtained from subjects prior to testing.

Results: Gait speed was significantly higher (0.96±0.20m/s vs. 0.85±0.26m/s; p=0.014) whereas cast weight (1.79 ± 0.17 kg vs. 2.09 ± 0.25 kg; p=0.001) was significantly lower in the TCC-EZ group. No difference was detected (p=0.935) in peak pressures (296±84kPa vs. 295±84kPa) between the two modalities.

Conclusion: The prefabricated kit of the TCC-EZ and its ease of application has the potential to reach a wider patient population while offering noticeable pressure reduction to patients with DFUs. Based on our results, faster walking speeds indicate that the product may improve patients' ability to walk who prefer a more active lifestyle. Further work is needed to evaluate the activity, durability, rate of DFU healing and adverse events associated with these two modalities.

Sponsor: N/A
IRB/IACUC/IBC#: #2018-040

2506 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Jacob Robinson
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Jacob Robinson; Rita Patterson

Soft Robotic Glove for Post-Stroke/Cerebral Palsy Hand Rehabilitation

Objective: The upper extremity plays a vital role in manipulation, communication and overall quality of life. Upper limb hemiplegia is one the most common presentations of stroke and cerebral palsy. Stroke is projected to increase dramatically as the over 65 population increases. Cerebral palsy (CP) is a non-progressive brain injury that occurs during the pre, peri, and post-natal periods of life, with an incidence ranging from 2-4 per 1000 live births. The purpose of this study is to evaluate the rehabilitative capacity of a pneumatically actuated soft and rigid hybrid actuator hand exoskeleton system called the REHAB Glove. Testing has been performed for post-stroke hand complications and a smaller pediatric version is also currently being tested to determine functional outcomes in cerebral palsy cases.

Research Question: Does the Soft Robotic Glove for post-stroke hand rehabilitation meet the basic standards for rehabilitation, can it be used on a pediatric scale for Cerebral Palsy patients and is it practical for patient use in an in-home setting?

Methods: Prior to glove use subject demographics were collected and subjects were prepped with instructions and safety. Post-stroke Subjects were timed and assessed for ease of donning the glove and then participated in continuous passive motion (CPM) of the hand using the glove. Post glove assessments consisting of hand evaluation and survey for ease of use were then collected. CP subjects are being tested in a similar fashion.

Results: From observation of 2 post-stroke patients, it has been noted that their hands can be very difficult to manipulate. This has complicated the process donning the glove to begin therapy. Detaching the finger portions of the glove from the pneumonic actuator device has been shown to simplify this process. The time elapsed to complete this process prior to modification was much greater, approximately a 608 sec. Also, redness has been noted in both stroke patients and 1 control subject for the CP study.

Conclusion: More modifications are necessary to simplify the process of gloving the hand and further testing and evaluation is necessary prior to establishing definitive results. Alterations in areas of increased pressure on the skin should also be considered to reduce redness.

Sponsor: Honor's Research Program
IRB/IACUC/IBC#: 2015-154, 2016-087

2507 - Poster
Classification: TCOM DO Student (4th Year)
Presenter: Cindy Tiu
Department: Non-UNTHSC
Authors: Cindy C Tiu; Christa Ochoa; Katherine Froehlich-Grobe

Qualitative Analysis of the Reasons People with Spinal Cord Injury Opt to Enroll in an Exercise Program and their Barriers to Participation

Objective: Understand why people with spinal cord injury (SCI) enrolled in an online exercise trial, what barriers to exercise they cited, and their plans to address these barriers.

Design: Qualitative study of participant responses during a 16-week online exercise trial where they completed weekly online modules that included completing skill building activities.

Participants/methods: Eligible individuals experienced a SCI > 6 months, required wheelchair use outside the home, and reported/week. Advertisements were disseminated through SCI-specific organizations across the U.S. Qualitative data from participant responses were analyzed by identifying themes that emerged from responses to online activities. Two researchers independently read and coded all responses. All disagreements were discussed and final coding decisions were unanimously achieved with the principal investigator.

Results: Participants (n=111) average age was 49.6 years old and they lived average of 14.3 years post-injury. Health reasons emerged as the leading reasons participants enrolled in the exercise trial. Nearly two-thirds (64.9%) of participants stated they joined the program to improve their health while over half (56.8%) reported a desire to improve their function. Time was noted as the leading exercise barrier (53.8%) and a quarter (27.7%) reported accessibility issues. Participant-generated solutions to address time constraints included scheduling exercise (68.2%) or using friends or technology to support (15.9%) exercise efforts. Accessibility issue solutions included locating accessible facilities (30%) and obtaining equipment (25%) for home use.

Conclusion: Health issues emerged as the primary reason people with SCI enrolled in the study. Health issues included those similar to the general population regarding improving cardiovascular health and longevity and SCI-specific issues, such as improving function related to activities of daily living. Exercise barriers followed a similar pattern, with the predominant concern being lack of time and the second most commonly cited barrier being accessibility problems. Accessibility issues included lack of accessible facilities, equipment, and need for self-advocacy. Intervention approaches to promote exercise for people with SCI should address issues faced by those in the general population as well as SCI-specific issues.

Structural Anatomy (Abstracts in the 2600s)

2600 - Poster
Classification: Alumni (Not for Competition)
Presenter: Summer Ladd
Department: GSBS: Physiology & Anatomy
Authors: Summer H Ladd; Alexandra H McBride; Jason M Organ; Rachel A Menegaz

Absolute and Relative Morphometric Differences in the Craniofacial Skeleton of OIM-/- Mice and Wild-Type Littermates

Purpose: Osteogenesis Imperfecta (OI, or "Brittle Bone Disease") is a disorder caused by genetic point mutations in COL1A1/COL1A2 which affect the synthesis of type I collagen (Col1). Humans with the severe type III OI exhibit increased susceptibility to skeletal fractures and shortened stature, as well as cranial dysmorphologies and dental malocclusions. Mouse models of Col1 defects report postcranial phenotypes similar to those seen in humans, with a limited number of studies reporting alterations to cranial and dental integrity. This project tests the hypothesis that the reduced craniofacial dimensions reported in both humans and mice with Col1 defects are linked to an overall reduction in body size.

Methods: The homozygous OI murine (OIM$^{-/-}$) is a mouse strain with a nonlethal recessively inherited mutation of the COL1A2 gene. Wild-type (WT) and OIM$^{-/-}$ littermates were weaned at 21d and raised until adult (16 weeks). 3D morphometric landmarks were collected from serial in-vivo μCT scans at 4, 10, and 16 weeks using etdips software. Past 2.17 software was used to Procrustes-transform (rotate and translate) the landmark data, and to calculate interlandmark distances (ILDs) and centroid sizes. ILDs were scaled against skull/mandible centroid size and skull/mandible length to account for the effect of size. Mann-Whitney U tests ($\alpha=0.05$) were used to compare centroid sizes and both absolute and relative (scaled) ILDs between the genotypes.

Results: When comparing absolute morphometric distances, adult OIM$^{-/-}$ mice have shorter skulls, basicrania, palates, mandibles, and toothrows. However, OIM$^{-/-}$ mice are smaller overall than their WT littermates as measured by both body mass and craniomandibular centroid sizes. When the effects of size are accounted for, the trend for interlandmark distances in WT mice to be greater than those in OIM$^{-/-}$ mice is significantly reduced or even reversed. For example, when scaled to centroid size, no significant difference exists between WT and OIM$^{-/-}$ mice in skull, basicranial, or mandibular length. OIM$^{-/-}$ mice have a relatively short midface, short nasal bones, tall mandibular corpora and long mandibular toothrows.

Conclusions: These findings underscore the importance of size and scaling in morphometric analyses. The deleterious effect of Col1 mutations on global skeletal dimensions, in combination with localized morphometric changes, may underlie the facial phenotype seen in human patients with OI type III. Attempts to identify these localized changes should first account for the restricted growth and small body sizes present in individuals with OI.

IRB/IACUC/IBC#: Indiana University School of Medicine #11133

2601 - Poster
Classification: Alumni (Not for Competition)
Presenter: Ranger Kile
Department: GSBS: Physiology & Anatomy
Authors: Ranger Kile; Richard Saavedra; Rachel A Menegaz

Virtual Dissection of Complex Masticatory Muscles with DiceCT

Purpose: Weaning is a critical stage in the life history of altricial mammals, with far-reaching impacts on growth trajectories and survival. Post-weaning diet(s) are known to affect craniofacial skeletal morphology as well as masticatory muscle volumes, physiological cross-sectional areas (PCSA), and fiber type ratios. These muscles and their subparts can be functionally grouped into vertical elevators, protractors, and retractors. However, the extent to which these functional groups differ in their responses to dietary changes is currently underappreciated, particularly where they are difficult to isolate through traditional dissection methods. Here we use diffusible iodine-based contrast-enhanced computed tomography (diceCT) to perform digital dissections of small, complex masticatory muscles to assess the effects of longitudinal variation in diet on the growth of functional groups of these muscles.

Methods: Sprague-Dawley rats were raised from weaning (21 days) to adulthood (16 weeks), and randomly sorted into hard and/or soft dietary treatment groups. Post-sacrifice, cranial tissues were fixed in 4% PFM for 36 hours and stored in 70% EA at 4°C. Specimens were stained in 11.25% Lugol's solution (I_2KI) for 48 hours before microCT scanning. In 3D Slicer, muscles were manually segmented every 10 slices, the "Fill Between Slices" function was applied, and volumes were quantified. Volumetric measurements were compared using Kruskall-Wallis tests and pairwise Mann-Whitney U-tests (α = 0.05).

Results: Contrary to our expectations, preliminary results suggest a trend for animals raised on softer diets to have larger temporalis and superficial masseter muscles than those raised on hard diets. However, no statistically significant differences were observed among or between treatments likely due to small sample size (n

Conclusions: DiceCT is a promising method for soft tissue analysis that complements CT analyses of bone. Volumetric data can be obtained for small and/or complex musculature where limitations exist for traditional dissection methods.

IRB/IACUC/IBC#: University of Missouri #6827

2602 - Poster
Classification: Dual Degree Student
Presenter: Suhhyun Kim
Department: GSBS: Physiology & Anatomy
Authors: Suhhyun Kim; Lauren N. Butaric; Armando A Rosales; Scott D Maddux

Variation in maxillary sinus anatomy: Implications of ostium positioning on health disparities in sinusitis

Purpose: Over 30 million people were diagnosed with sinusitis in 2017, yet potential anatomical etiologies behind sinus infections remain poorly understood. Previous research has suggested regional differences in maxillary sinus (MS) size and shape as possible contributors to sinusitis susceptibility. Paranasal sinuses drainage is mediated by mucociliary transport and gravity, but the human orthograde posture and the superior positioning of the MS ostia result in a heavy reliance on the mucociliary system. The purpose of this study was to examine the anatomical relationships between MS and the MS ostium among different ancestral groups to assess potential impacts on drainage and infection risks.

Methods: By utilizing CT scans (n=49) of crania from Europe, East Asia, and Sub-Saharan Africa, we collected 93 3D coordinate landmarks from which 34 linear measurements of MS and surrounding facial features were calculated. ANOVA and Tukey-Kramer tests were employed to test for statistically significant differences between groups.

Results: ANOVA and Tukey-Kramer test results indicate that Asians have significantly taller MS compared to Europeans and Africans (F=9.4, p=0.0003) and a greater distance from the floor of MS to the ostium (F=8.4, p=0.0007). Further, the ratio of these two variables indicates that the ostium is more superiorly positioned among Asians (at 66% of MS height) than Europeans (61%) or Africans (60%).

Conclusions: From this data, we tested and support the hypothesis that MS size, shape, and ostium position differ between regional groups. Although limited by small sample size, these results suggest that MS and ostium structure may differentially influence mucus and pathogen clearance from the sinus among individuals of Asian ancestry relative to those of European or African ancestry. Additional research into the prevalence of MS sinusitis in these populations is warranted to evaluate potential contributions to health disparities.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2603 - Poster
Classification: GSBS Student
Presenter: Alexandra McBride
Department: GSBS: Physiology & Anatomy
Authors: Alexandra H McBride; Summer H Ladd; Jason M Organ; Rachel A Menegaz

Craniofacial Bone Mineral Density in Mice with Osteogenesis Imperfecta (OI)

Purpose: Osteogenesis imperfecta (OI) is a rare genetic disorder characterized by the abnormal synthesis and assembly of type I collagen (Col1), a major organic component of bone. Clinical manifestations of the severe OI type III include small body size, limb deformities, and low bone mineral density (BMD) within the post-cranial skeleton. OI type III often co-occurs with craniofacial defects, such as dentinogenesis imperfecta (DI). The goals of this study are: (1) to examine whether Col1 defects, as seen in OI type III, affect BMD within the craniofacial skeleton; (2) to examine whether craniofacial BMD covaries with diet-related biomechanical loading.

Methods: The homozygous recessive murine mouse (OIM$^{-/-}$) is a model for OI Type III. Similar to human OI patients, OIM$^{-/-}$ mice exhibit low post-cranial BMD, smaller body size, and DI. OIM$^{-/-}$ mice and WT littermates were weaned at 21 days and raised on either hard (high loading) or soft (low loading) diets. This resulted in four genotype x diet treatment groups: OIM-hard (n=6), OIM-soft (n=3), WT-hard (n=9), and WT-soft (n=3). Micro-CT scans were collected at 16 weeks (skeletal maturity). BMD was measured using Bruker CTAnalyzer software for eight regions of interest (ROIs) within the mandible (TMJ, corpus at the second molar, and symphysis), facial skeleton (nasal bone, maxilla at the second molar, premaxilla at the incisor), and cranial vault (frontal and parietal bones). Pairwise Mann-Whitney U tests were used to statistically compare BMD between treatments (α = 0.05).

Results: At all ROIs except for the frontal bone, WT-hard mice had significantly (p < 0.05) higher BMD values compared to OIM-hard and/or OIM-soft mice. At the frontal bone, WT-hard mice tended to have higher BMD than OIM-soft mice but this was not statistically significant (p = 0.052) with the current sample sizes. Similarly, at the mandibular and cranial vault ROIs, WT-soft mice tended to have higher BMD than OIM-hard and/or OIM-soft mice (p < 0.10).

Conclusions: These results suggest that craniofacial BMD is generally lower in individuals with Col1 defects, consistent with the postcranial presentation. WT mice raised on a hard diet were observed to have the highest BMD measurements across the craniofacial skeleton, however no significant differences were observed between OIM$^{-/-}$ mice raised on hard versus soft diets. While diet-associated loading may influence craniofacial BMD, in this study Col1 status appears to be the primary determinant of BMD.

2604 - Poster
Classification: Resident (Not for Competition)
Presenter: Jarren Section, MD
Department: Non-UNTHSC
Authors: Jarren Section; Lauren LaMont

Shoulder Balance Outcomes After Spinal Fusion

Purpose: The purpose of our study is to assess short and long term effects of posterior spinal fusion on shoulder balance and determine the correlation between osseous and soft tissue radiographic parameters utilizing a larger sample size than previously studied. This information could potentially guide patient counseling of expectations regarding postoperative outcome and assist surgeons in optimizing shoulder balance correction during arthrodesis.

Methods: This study will be a retrospective, chart review of patients treated for adolescent idiopathic scoliosis with spinal fusion at a single center. We will be collecting radiographic measurements to assess pre- and postoperative spinal, thoracic, and shoulder alignments. Research team members will individually collect data each patient's imaging with at minimum 2 years of postoperative radiographic assessment. Data will be stored in REDCap.

Results:

Conclusions:

Sponsor: N/A
IRB/IACUC/IBC#: 2018-033 CCHCS

2605 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Laura M. Garcia
Department: Other
Authors: Laura M. Garcia; Daniel A. Hubbard; Sarah M. Nguyen; Fatma M. Ozguc; Spencer Steinberg; Lesley R. Flores; Cara L. Fisher

Massive Intracranial Hemorrhage with Subsequent Subfalcine and Transtentorial Herniation: A Case Study

Background: Brain herniation is a progression of pathology due to increased intracranial pressure creating a mass effect. The mass effect created by a large intracranial hemorrhage on one side of the brain often leads to a subfalcine herniation. Subfalcine herniation is a common type of herniation, characterized by displacement of the brain beneath the inferior border of the falx cerebri dural infolding. As the mass effect increases, it can cause further herniations in the brain. In this case study, the posterior brain cavity is affected by a transtentorial herniation which causes compression of the brainstem and the cerebellum. This mass effect can lead to a variety of symptoms including headache, nausea, vomiting, and altered mental status. This case study is a classic presentation of a massive intracranial hemorrhage with resultant cerebral and cerebellar shifts due to mass effect.

Case Information: This case report presents a subfalcine herniation secondary to intracranial hemorrhage found during routine dissection in a 63-year-old male cadaver. Cause of death for the subject was listed as: Intracranial hemorrhage with subfalcine herniation, coagulopathy, acute liver failure, ischemia, congestive heart failure, and chronic obstructive pulmonary disease. Photographs of the brain and cranial cavity were obtained as well as cerebellar shift measurements along the transverse axis.

Conclusion: This case highlights the pathologies that can develop in severe cases of intracranial hemorrhage, and it emphasizes the comorbidities that may have affected the prognosis as well as the progression of the disease. Consideration of presenting symptoms can be crucial in identifying possible affected areas of the brain at the time of patient presentation. Due to the lack of patient history, we do not have a clear idea of the chronology of the disease. However, there are factors observed during dissection that allow us to concoct a plausible progression of the disease.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2606 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Daniel Hubbard
Department: Other
Authors: Laura M. Garcia; Daniel A. Hubbard; Nova Mebane; Sarah Nguyen; Fatma Ozguc; Rachel A. Menegaz

Novel Presentation of Hepatic and Foregut Vasculature: A Case Study

Background: In the most typical presentation, the foregut (abdominal esophagus, stomach, and first and second parts of the duodenum), pancreas, spleen, and liver are supplied by branches of the celiac trunk. The celiac trunk arises from the superior abdominal aorta and branches into the splenic artery, left gastric artery, and the common hepatic artery. The common hepatic artery further branches into the gastroduodenal artery and the proper hepatic artery, which gives rise to the left and right hepatic arteries near the hilum of the liver. The superior mesenteric artery arises from the abdominal aorta just inferiorly to the celiac trunk and supplies the midgut (third part of the duodenum through the splenic flexure of the colon). While this is the typical "textbook" arrangement, variations in branching patterns are not uncommon. In this case study, we describe a novel case of the hepatic foregut vasculature not matched in the current literature.

Case Information: The novel variant in the arterial supply of the liver was encountered during the routine cadaveric dissection of a 63-year-old Caucasian male. The common hepatic artery is absent as per its accepted definition. The gastroduodenal artery is a branch of the celiac trunk, while the proper hepatic artery emerges from the superior mesenteric artery. At the hepatic hilum, the proper hepatic artery gives rise to left and right hepatic arteries. Additionally, an accessory left hepatic artery is present branching from the left gastric artery.

Conclusions: Variations in hepatic arterial supply are common, and it is important for surgeons to be aware of these variations when performing surgical procedures such as liver transplants, cholecystectomies, and other abdominal procedures. Patients are at risk of hemorrhage, ischemia, or other surgical complications if these variations are not discovered and precautionary steps taken to avoid damaging or accidentally ligating the vessels. Appropriate imaging techniques, such as contrast-enhanced computed tomography (CE-CT), should be used to document patient-specific vasculature branching patterns from the celiac trunk and superior mesenteric when developing surgical approaches involving the foregut and liver.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2607 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Caleb Parry
Department: GSBS: Physiology & Anatomy
Authors: Caleb Parry; Shahana Momin; Aaron Perez; Marina Motina; Rebecca Mickle; Peter Nyguyen; Tiraj Parikh; Cara L. Fisher

Unilateral Variant Psoas Major with Split Femoral Nerve

Background: The psoas major muscle originates from the transverse processes of lumbar vertebrae 1-5 and inserts into the lesser trochanter of the femur. The femoral nerve arises from ventral rami of lumbar spinal nerves 2-4 and passes through the psoas major in an inferolateral direction until it emerges on the lateral border of the muscle. Variations of the psoas major muscle are rare and can have clinical significance. Here we describe a novel variation of the psoas major muscle.

Case Information: During a routine anatomical dissection of a 75-year-old female cadaver, a unilateral variant of the psoas major muscle was found amongst 30 donated bodies. The variant was observed on the left side as an accessory muscle to the psoas major. The variant lies posterior to and runs in parallel with the normal psoas muscle fibers. An anomaly of the femoral nerve was also noted. The femoral nerve arises from fibers that course both anterior and posterior to the variant muscle. These fibers recombine on the lateral border of the psoas major to make the femoral nerve. An additional peripheral neurovascular bundle to the accessory muscle was not observed during the course of dissection.

Conclusions: The psoas major variant described has a number of clinically important features. An accessory psoas can result in issues with a lateral interbody fusion procedure. Its implication in femoral nerve injury is variable, and thus neurosurgeons must take particular caution when performing this procedure on patients with this variant. It has been suggested that variant psoas major muscles underlie neuropathies such as nerve entrapment and are often described as disrupting the course of the femoral nerve. Here the femoral nerve was divided by the variant psoas muscle. Such a division could cause compression of the femoral nerve leading to neuropathies and could explain these clinical pathologies. This condition can postulate hip pain. African-American men tend to have a thicker psoas than average, hence extra precautions should be taken for those with this variation in terms of risk of femoral nerve compression.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2608 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Sarah Philip
Department: TCOM: Internal Medicine & Geriatrics
Authors: Cara Fisher, Ph.D.; Sarah Philip, MS; Madeeha Javed; Parker Lachowsky; Mustafa Karagoli; Sarah Hutton; Minh Di Le; Esther Jung, MS; Jeremy Kao

Pericardial Cyst: A Case Report

Background: Pericardial cysts are usually benign, congenital or idiopathic anomalies with an occurence of 1:100,000 and are commonly noted in the right (70%) or left (22%) cardiophrenic angle and are rarely found in other locations of the pericardium, such as the anterior or posterior superior mediastinum (8%). The aortopulmonary window is the small space between the aortic arch and the pulmonary artery that holds the ligamentum arteriosum, recurrent laryngeal nerve, and lymph nodes. It is a common location for lymphadenopathies, but is a less common location for tumors, cysts, or aneurysms, further signifying the rarity of our findings.

Case Information: During a routine dissection of a 91-year-old female cadaver, a pericardial cyst was noted in the aortopulmonary window, an unusual location for such cysts.

Conclusion: This case report serves to expand knowledge on the anatomical aspects of rare pericardial cyst locations. Pericardial cysts are often asymptomatic and incidental findings, but some patients may present with complications consisting of dyspnea, cough, and hemoptysis secondary to the compression of structures surrounding the cyst. Knowledge of rare pericardial cyst locations is necessary for clinicians and surgeons during diagnostic and therapeutic procedures, and as a result, current clinical guidelines should take rare variants into consideration.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2609 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Mackenzie John Ewart
Department: TCOM: Medical Education
Authors: Shanzay Mohammad; Mackenzie John Ewart; Daniel Erickson; Brett Platis; Justinne Certeza; Jake Powell; Fatima Khan; Basia Karnkowska; Cara Fisher, PhD

TCOM Anatomical Research: Left Extraacetablar Trochanteric Bursa Abscess

Background: The connections between diseases and their respective symptoms are unique, and often require the study of a multitude of factors. For a large abscess to persist, both the underlying disease and therapy options must permit the chronic progression. For this reason, studies that focus on condition-disease causalities offer important information as to the disease potential of a given region of the human anatomy. In this anatomical research, we studied a rare extra-acetablar trochanteric abscess (to determine condition-disease causality) discovered during the dissection of the left sub-ileum pelvic area of a an elderly female donor.

Case Information: This case report was based off of the anatomical findings of an anonymous female donor. The donor's body presented with an isolated Left Extra-acetabular Trochanteric Bursa Abscess. We hypothesized that: "the extra-acetabular trochanteric bursa abscess may elucidate condition-disease causality of this rare anatomical finding, given the donor's past medical history and histological findings." Dissection of the abscess and subsequent histological processing provided insight into a condition that was clearly chronic, unmanaged, and pathological nature. Correlating symptoms were swelling, immobilization at the joint, and severe pain.

Conclusions: The anatomical anomaly of an isolated left extra-acetabular trochanteric bursa abscess was confirmed through dissection and histological processing. Numerous studies have confirmed a significant correlation between middle-aged or elderly females and trochanteric bursae. This may be due to the wider pelvis, or to hormonal effects in females. These findings are in accordance with our hypothesis that the prevalence of a rare anatomic bursitis may be explained by a deeper disease causality. A medical history and thorough examination are enough to diagnose trochanteric abscesses, yet it is a diagnosis that is commonly missed - especially in elderly patients. Thus, the data presented in this report provides evidence for the presence of a plausible disease-condition causality to this rare anatomical anomaly, but does not imperially quantify such a finding to the general population. More experiments are required to determine the cause, identity, and prevalence of the extra-acetabular trochanteric bursa abscess in humans.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2610 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Minh-Triet (Michael) Nguyen
Department: TCOM: Medical Education
Authors: Minh-Triet (Michael) Nguyen; Misha Mobeen; Ezek Mathew; Rustin E Reeves, PhD

An analysis of an aberrant circumflex artery originating from the right aortic sinus and its clinical implications.

During routine cadaver dissection, a coronary vessel abnormality was discovered in a 71-year old female cadaver. The circumflex artery (CxA), normally a branch from the left coronary artery (LCA), took its origin from the root of the right coronary artery (RCA) instead. It appears to exit the right aortic sinus sharing the same coronary ostium as the RCA. The vessel veered left, taking a retroaortic course between the aorta and left ventricle towards the left side of the heart. Although the female donor's death was due to chronic hypoxemia and respiratory failure secondary to chronic obstructive pulmonary disease, there was no medical history evidence of pathological conditions due to the variant coronary vessel. The aberrant CxA is rare due to its origin from the RCA. In addition, the normal perfusion area for the CxA appears markedly reduced in this case, possibly due to constriction as it loops posterior to the aorta. Preliminary measurement of the CxA indicated some possible sites of constriction, and overall the diameter of the vessel was small. Furthermore, the RCA and LCA perfusion areas appeared to compensate for the reduction. Surgical case reports implicate the significance of a CxA arising from the right coronary sinus. One such clinical significance for this variant would be an increased difficulty with aortic valve replacement due to the origination site of the CxA.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2611 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Jedidiah Mahan
Department: GSBS: Physiology & Anatomy
Authors: Jedidiah Mahan; Pavithra Wickramage; Daeija Lewis; Matthew Owens; Cara L Fisher

Two Cases of the Psoas Quartus Muscle Variant

Background: The psoas major muscle originates from the thoracic and lumbar vertebrae, joins with the iliacus along the iliac crest, and attaches to the femur at the lesser trochanter. The iliopsoas muscle, formed from the joining of the psoas and iliacus muscles, acts as a powerful hip flexor. An additional psoas muscle, psoas minor, is commonly found in up to half of the population. Although rare, several other variations in this muscle have been reported that could influence the surrounding structures.

Case Information: During routine dissections of 31 cadavers, two cadavers showed a variant of the psoas muscle that attaches superior to the iliac crest. A bilateral variant on a 71-year-old female cadaver and a unilateral variant on an 80-year-old female cadaver were discovered. Similar variants have previously described as the psoas quartus muscles. After reviewing the literature, this case appears to represent the third reported psoas quartus muscle, the first reported psoas quartus muscle without the presence of a psoas tertius variant, and the second reported bilateral psoas quartus muscle.

Conclusion: Clinicians should consider the possibility of a muscle variant during surgical procedures, radiological interpretations, or evaluations of pain, especially in relation to the displacement of the femoral nerve.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2612 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Trevor Williams
Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine
Authors: Trevor Williams; John Gibson, Dr.

Ladd's Band Obstruction in 61 Year Old Physician

Ladd's Band obstruction and congenital malrotation of the intestines is a rather uncommon anomaly with an incidence of 1 in 500 births and with symptomatic cases only appearing in 1 out of every 6000 births. Malrotation occurs when any part of the normal developmental cycle arrests and prevents the total 270 degrees of counterclockwise rotation. This will orient the caecum, appendix, and colon to the left side of the abdomen and the small bowel to the right. The ligament of treitzis also absent. When malrotation occurs, physiological absorption of primitive mesentery may not hapen. This forms peritoneal bands that may obstruct the small bowel. These bands are known as Ladd's bands and were described in 1932 by William Ladd in multiple cases of small bowel obstruction in children.

Treatment of acute bowel obstruction secondary to peritoneal bands typically involves surgery to lyse the obstructing band. This procedure is known as the Ladd's procedure and is usually accompanied with returning the intraabdominal organs to their anatomical position and an appendectomy to avoid future sequela1. This procedure is an open procedure, but can be done laparoscopically

Most (40%) affected patients present within the first week of life with the large majority (75–85%) then presenting within the first year. Incidence rates in adults become increasingly small and one estimate shows an occurrence of 0.16% within the adult population. I present a case of a 61 year old man with undiagnosed malrotation who presented with acute small bowel obstruction. This would be one of the oldest patients presenting with a small bowel obstruction from Ladd's band adhesions.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2613 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Trevor Williams
Department: Other
Authors: Trevor Williams; Daniel Cooley; Russell Wagner, MD

Patellar Fracture Non-Union with Acquired Patella Baja: A Case Report

Fractures of the patella are usually caused by direct forces on the bone such as from a fall on a flexed knee or a dashboard injury and constitute 1% of all fractures 1,9. This injury occurs most commonly in males (2:1 ratio) and may disrupt the extensor mechanism affecting ambulation. On physical exam a patient presenting with a patellar fracture will have significant hemarthrosis with anterior knee pain, inability to perform a straight leg test, and a palpable patellar defect. X-rays of this pathology are best evaluated on lateral x-ray. Operative fixation is commonly performed in order to preserve the patella and maintain full range of motion of the knee. Non-union of patellar fractures following surgical fixation is a rare complication; a recent meta-analysis reported an incidence of 1.3% 1,9. The literature on the treatment of patellar fracture non-unions is limited to small case series.

Patella baja is a condition in which the patella lies lower than normal in relation to the tibial tubercle. Diagnosis involves radiographs of the knee and measurement of the patella tendon length in relation to the patella bone length, known as the Insall-Salvati ratio 2,9. This condition is commonly seen following surgery or after trauma. These cause the patellar tendon to lose length, either from scarring or shrinkage of fibers. Symptoms may include anterior knee pain stiffness in addition to weakness the extensor mechanism and restriction of full knee flexion 2,9. Depending on the functional demands of the patient and severity of the symptoms, patients can either be managed non-operatively or with surgery to modify patella positioning or with patellectomy in severe cases.

To the best of our knowledge there is no previous literature describing the treatment of a patellar nonunion with significant patella baja. We present the case of a patella fracture nonunion that failed previous surgical fixation and acquired patella baja, which we treated with repeat open reduction internal fixation and tibial tubercle osteotomy.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2614 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Cameron Beck
Department: GSBS: Physiology & Anatomy
Authors: Cameron Beck; Austin Dickerson; Kevin Kadado; Zach Cohen, DPM; Jenna Holcomb; Cara Fisher, PhD

Novel Investigation of the Deep Band of the Lateral Plantar Aponeurosis and Its Relationship with the Lateral Plantar Nerve

Purpose: The plantar foot is separated into medial, central and lateral compartments by the plantar aponeurosis (PA). The PA functions to support the arch of the foot and transmit forces during the gait cycle. A recent dissection of a cadaveric foot uncovered a fascial band arising from the medial aspect of the lateral PA and diving deep into the foot. A branch of the lateral plantar nerve passed deep to this fascial band. A review of current literature turned up limited and outdated sources, while some of the most commonly used anatomy textbooks and atlases failed to describe or depict this band. As such, our study objectives were twofold. First, determine the frequency among cadavers that possess this fascial band. Second, determine the location where the lateral plantar nerve passed deep to it.

Methods: 50 pairs of cadaveric feet were dissected by removing the skin and superficial fascia on the plantar foot. If the medial portion of the lateral PA was present, the fascial band was dissected further to determine if it dove deep to the central PA and the tendons of the flexor digitorum brevis and longus muscles to insert on the plantar plates of the 3rd and 4th metatarsophalangeal joints. Images were taken when the lateral plantar nerve passed deep to the band. ImageJ was used to take two measurements assessing the relationship of the tuberosity at the base of the 5th metatarsal to where the nerve crossed deep to the fascial band. Measurements were also taken from the great toe to the heel to assess foot length.

Results: The fascial band was found unilaterally in 10 pairs and bilaterally in 14 pairs. Therefore, 38% of feet possessed the deep band of the lateral PA. On average, the point at which the lateral plantar nerve passed deep to the fascial band was 2.0037 cm medial and 1.6637 cm anterior to the tuberosity at the base of the 5th metatarsal. When separated by sex, both distances were not significantly different ($p < 0.05$).

Conclusion: Based on results, the deep band of the lateral PA should be included in textbooks and atlases because of the frequency at which it was discovered and its relationship to the lateral plantar nerve. The clinical implications of this study should be applied to the care of podiatry patients.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2615 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Austin Dickerson
Department: Other
Authors: Austin Dickerson; Cara Fisher, Ph.D.

Bilateral variation of the suboccipital region musculature

Background: This case report documents bilateral anatomic muscular variation observed in a detailed dissection of the suboccipital region of an 81-year-old male cadaver. The suboccipital muscle group consists of four paired muscles located inferior to the occipital bone. The muscles in this group include the rectus capitis posterior major muscle, rectus capitis posterior minor muscle, obliquus capitis superior muscle, and obliquus capitis inferior muscle. They are innervated by the suboccipital nerve and lie deep to the trapezius muscle and the semispinalis capitis muscle. In this case report, the rectus capitis posterior major muscles were doubled bilaterally. Accessory muscles were also noted bilaterally, immediately superficial to the suboccipital muscles. The two sets of anatomical variants described have little to no previous documentation. Doubling, or division, of the rectus capitis posterior major muscle has been reported, but mentions of a bilateral doubling of the muscle are infrequent. Accessory muscles have been discovered in this area before, but none with the same attachments or morphology as the ones noted here.

Case Information: Two accessory muscles lying deep to the semispinalis capitis muscle on each side were observed, as well as a bilateral doubling of the rectus capitis posterior major muscle. The accessory muscles ran from fascial attachments to the nuchal ligament at the level of the second and third cervical vertebrae to insert on the occipital bone below the superior nuchal line. In addition, the left greater occipital nerve was split in two by the medial band of the left accessory muscle. The nerve traveled in two separate parts around the muscle belly, and converged immediately cranial to the accessory muscle to continue its course to innervate the skin of the posterior scalp.

Conclusions: The suboccipital region contains neurologic and vascular structures that have been implicated in the etiology of cervicogenic pain, chronic headaches, and occipital neuralgia. Variations in the musculature, like those observed in this case report, have the potential to create structural interactions causing pain or other symptoms. Anatomic variation should be considered in the diagnosis and treatment of pain and other conditions of the suboccipital region.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2616 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Lexy Kindt
Department: Other
Authors: Lexy Kindt; Matthew Mitts; Marty Knott

Acute Torsion of an Extralobar Sequestration: Case Report

Background: Pulmonary sequestration is a congenital formation that involves the growth of non-functional lung tissue that is not perfused by the lung arterial blood supply. There are two types of pulmonary sequestrations, intralobar and extralobar. Intralobar sequestrations are more common and usually present in adults as recurrent pneumonia. Extralobar sequestrations are less common, asymptomatic, and usually are found incidentally on prenatal ultrasound. Presentations of symptomatic extralobar sequestrations are very rare and are most commonly diagnosed postoperatively.

Case Information: We describe a case of a 6-year-old boy who presented with a three-day history of acute abdominal pain, tachypnea, and a right pleural effusion. A tube thoracostomy was performed to drain his effusion in attempts to improve his symptoms. Computed tomography revealed a right posterior mediastinal mass that was concerning for malignancy. The decision was made to proceed with surgical excision versus biopsy. The patient was found to have a necrotic extralobar sequestration due to torsion. Thoracoscopic resection was performed and the patient was discharged without complication.

Conclusions: There are only 10 previously reported pediatric cases of an extralobar sequestration with torsion and only 1 reported on the right side. Extralobar sequestrations appear on imaging as posterior mediastinal masses which elicit a broad range of differential diagnoses in children and are often neoplastic. A review of the pediatric literature demonstrates a common radiographic, pathologic, operative and clinical vignette to maintain a high suspicion of extralobar sequestration for the differential of a paraspinal mass.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2617 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Jonathan Pineda
Department: GSBS: Physiology & Anatomy
Authors: Jonathan Pineda; Scott D. Maddux

Anatomical Adaptation to Climate: Patterns of Covariation Between Brain and Nasal Morphology

Purpose: Previous research has shown that the geographic distributions of both brain and nasal shape are highly correlated with climatic variables. Specifically, individuals indigenous to cold-dry environments typically exhibit relatively wider brains (for retention of heat), and taller/longer/narrower nasal passages (for enhanced warming and humidification of respired air) compared to individuals from hot-humid climates. While these ecogeographic patterns of brain and nasal shape are both well established, the spatial interaction of these two structures in relation to climate has not been as rigorously investigated.

Methods: We employed CT scan data collected from a total of 30 human crania from the Arctic Circle (9 female, 6 male) and West Africa (8 female, 7 male). 3D digital models were subsequently rendered for each cranium using the 3D Slicer software program and a total of 35 craniofacial landmarks were then placed on each 3D model, permitting assessment of both linear measurements (i.e., Euclidean distances) and 3D spatial relationships via univariate and multivariate statistical analyses.

Results: Largely consistent with previous research, permutational t-test results indicate that individuals from the Arctic Circle possess shorter (p=0.029) and wider (p=0.002) braincases compared to West Africans. Similarly, Arctic natives were also found to possess both taller (p=0.0001) and narrower (p=0.001) nasal passages. While on average the Arctic sample also possessed a longer nasal passage (69.8 mm) compared to the Africans (67.1 mm), this difference was not statistically significant (p=0.097). Moreover, a simultaneous-fit two-block partial least squares (2B-PLS) analysis of 3D coordinate landmarks, reveals a significant pattern of covariation (RV=0.37, p=0.012) between nasal and brain morphology, with the first PLS dimension (46.3% of the total covariation) reflecting a significant association between relative brain width and nasal height, width, and length (r=0.74, p=0.032).

Conclusions: Cumulatively, these results are consistent with previous studies, and support the hypothesis that climate has simultaneously influenced both brain and nasal anatomy. Moreover, our 2B-PLS results suggest that the relative spatial positioning of the nose may actually contribute to overall brain thermoregulation by differentially influencing airflow under the basicranium in different climatic regimes.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2618 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Patrick Prazak
Department: GSBS: Physiology & Anatomy
Authors: Patrick Prazak,; Alexa Kelly; Scott Maddux, Ph.D.

Evaluating Energetic Demands on the Human Nose Within a Regional Sample

Purpose: It is widely recognized that the primary function of the nose is to warm, humidify, and filter air in preparation for entry into the lungs. Accordingly, geographic variability in nasal anatomy has long been attributed to climatic adaptation. However, as the human nose is also the primary respiratory conduit during normal breathing, it must facilitate a sufficient intake of oxygen to meet metabolic demands. Thus, given that body size also exhibits considerable geographic-mediated variation, it has long been argued that metabolism may represent a confounding influence on human nasal morphology. In particular, given its critical role in air-conditioning, it has been hypothesized nasal passage breadth should most strongly correlate with climate. Conversely, it has been suggested that nasal height and length dimensions may represent compensatory mechanisms for ensuring that a sufficient volume of oxygen can be inspired to meet body size/metabolic demands.

Methods: To test these hypotheses, we obtained CT scan data for 35 modern human crania from the Bronze-Age archaeological site of Tepe Hissar, Iran. CT dicom images for each cranium were initially processed using the 3D Slicer software program, rendering a 3D digital model which was subsequently oriented in the Frankfurt Horizontal position to permit anthropometry. A total of 61 craniofacial landmarks were then placed on each 3D model, from which 15 linear measurements of nasal morphology were ultimately calculated using the Euclidean distance formula. These 15 nasal measurements were then employed in conjunction with body size/stature estimations (i.e., metabolic proxies) derived from associated post-cranial measurements, to assess the relationship between body size and nasal anatomy.

Results:Following theoretical expectations, our results indicate that, within this one geographic sample (i.e., holding climate constant), no measure of nasal passage breadth was significantly correlated with body size (all p-values>0.06). Conversely, all height and length measurements of the nasal aperture and internal cavity were found to be significantly correlated with body size (all r-values=0.48-0.62, all p-values

Conclusions: Collectively, these results support the assertion that airway height and length dimensions reflect metabolic demands for sufficient intake of oxygen, while nasal breadth dimensions are more likely driven by climatic factors.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

Women's Health (Abstracts in the 2700s)

2700 - Poster
Classification: Postdoctoral Fellow
Presenter: Meenakshi Srinivasan
Department: UNT System College of Pharmacy: Pharmacotherapy
Authors: Meenakshi Srinivasan; Annesha White

Outcomes and economic burden of hormonal contraceptive failure in developing countries: A case for improving effectiveness?

Purpose: Unintended pregnancies (UP) result from contraception non-use or inconsistent and incorrect use leading to negative maternal and child health outcomes. The burden of healthcare spending on the consequences of UP and associated opportunity costs are substantial in resource-scarce developing regions. Among users of hormonal contraceptives (HC) which include IUDs, implants, injectables and pills, contraception failure can occur from non-compliance or drug-drug interactions (DDI) with co-medications. The objective of this study is to evaluate the prevalence of use, outcomes and cost burdens of HC failure in developing regions.

Methods: Country, region-wise contraceptive prevalence, distribution of contraceptive use by marital status and pregnancy intention, outcomes of UP and costs were taken from the "Adding It Up, 2017" dataset published from Guttmacher Institute. The developing countries were divided into sub-regions by UNDP classifications and included Africa, Asia, Latin America and the Caribbean. Number of UP were calculated by multiplying contraceptive method specific failure rates and number of users of each of the ten methods. Outcomes of UP were estimated by multiplying proportions of each outcome with total number of UP. Only costs of UP resulting in abortion are reported. Descriptive analysis and visualization was done using R (v. 3.5.1).

Results: The lowest hormonal contraceptive coverage was seen in Middle Africa (3.8%) while the highest is seen in Eastern Asia (35%). In developing countries, 44% of all pregnancies were unintended. Of the 885 million women who wish to avoid a pregnancy, 24% of women have an unmet need of contraception relying on traditional methods or no method. These women contribute to around 70 million (84%) of unintended pregnancies. However, users of HCs contribute to around 6.6 million (8%) of the unintended pregnancies. Of these, 2 million result in unplanned births, 1.8 million result in safe abortions and 1.9 million result in unsafe abortions. UP results in 98% of total abortions costs ($1.7 billion) with HC failure estimated to account for 8% ($144 million).

Conclusions: Hormonal contraceptives are known to be highly cost-effective, consequently increasing their access in developing countries is imperative. Apart from an emphasis on using long acting contraceptives whose efficacy does not rely on patient adherence, healthcare providers must be sensitized about potential pregnancy risk due to DDI's in the subset of women taking HCs and interacting co-medications.

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2701 - Poster
Classification: School of Health Professions Student
Presenter: Emily Cavazos
Department: School of Health Professions: Physician Assistant Studies
Authors: Emily C Cavazos, PA-S; Jessica L Hartos, PhD; Annalee F Alston, PA-S; Jessica K Jones, PA-S; Cori A Sparks, PA-S

Is Weight Status Related to Sleep Duration in Middle Aged Women?

Purpose: Both obesity and short sleep duration are epidemics in the United States but the relationship between these has yet to be studied exclusively in females age 45-64. The purpose of this study was to examine the relationship between weight status and sleep duration in middle aged women.

Methods: This study was a cross-sectional analysis that used data from the 2016 Behavioral Risk Factor Surveillance System (BRFSS) for middle-aged females (45-64 years old) from Alabama (N=1,235), Arkansas (N=947), Louisiana (N=1,045), and Mississippi (N=942). Ordered logistic regression was conducted separately by state to assess the relationship between weight status and sleep duration while controlling for health conditions, tobacco use, alcohol use, education level, employment status, income level, ethnicity, and age.

Results: A quarter of the participants reported having short or long sleep duration (24-27%), and almost half reported having an obese weight status (44-48%) and two or more health conditions (40-45%). There was no significant relationship between weight status and sleep duration in middle aged females', however, sleep duration was related to health conditions in three of four states.

Conclusion: There was no relation between weight status and sleep duration among middle aged females across states. However, short sleep was related to two or more health conditions in three of four states. Results of the study may be generalized to middle aged women in a primary care setting. Because of the relationship we found, this target population should be screened for short sleep duration and number of health conditions, if they present with symptoms of either. Education about healthy BMI and sleep duration should be provided to all middle aged women due to their significant comorbidities. Referral to sleep therapy for those who report short sleep duration could prove beneficial.

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2702 - Poster
Classification: School of Health Professions Student
Presenter: Lindsay Friesenhahn
Department: School of Health Professions: Physician Assistant Studies
Authors: Lindsay M. Friesenhahn, B.S.; Jessica L. Hartos, PhD; Jessie C. Ramsey, B.S.; Alee C. Sdao, B.S.; Mackenzie A. Warner, B.S.

Is Mental Health Status Related To Alcohol Use In Pregnant Women Ages 21-35?

Purpose: Alcohol consumption during pregnancy is a major health concern that is entirely preventable. The purpose of this study is to determine whether mental health status during pregnancy is related to alcohol use in pregnant women ages 21-35 years in the general population.

Methods: This cross-sectional analysis used 2016 data from the Behavioral Risk Factor Surveillance System (BRFSS) for 418 pregnant females ages 21 to 35 in Florida, Michigan, Minnesota, and New York. Logistic regression with combined state data was used to assess the relationship between mental health and alcohol use during pregnancy while controlling for tobacco use, educational level, income level, employment status, marital status, ethnicity/race, and age.

Results: Across states, few participants reported any alcohol use (10-12%), about one-third reported having mental health issues in the last thirty days (27-40%), and few reported they were current smokers (0-15%). Adjusted results indicated that alcohol use during pregnancy was highly related to mental health status and tobacco use.

Conclusions: This study found that mental health status was significantly related to alcohol use during pregnancy for women ages 21-35 years. Clinicians in obstetrics and gynecology should expect to find approximately 1 out of 10 women to report any alcohol use during pregnancy and about one-third to have mental health issues in the last 30 days. Since these two factors are problematic and highly related, providers should screen and counsel all pregnant women about alcohol use and mental health at each appointment. Smoking was also found to be highly related to antenatal drinking. At each visit, clinicians should continue to screen and counsel any pregnant patients on smoking cessation. If additional treatment for mental health or substance use is required clinicians should provide additional resources and referrals to psychiatry or substance abuse programs.

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2703 - Poster
Classification: School of Health Professions Student
Presenter: Sean R Jamieson, PA-S
Department: School of Health Professions: Physician Assistant Studies
Authors: Sean Jamieson; Shannon M Swickard; Abby L Cahill; Sharonica S Powell; Kenya Samuels; Jessica L Hartos

Does Mental Health Differ by Ethnicity and Income in Middle-Aged Females?

Purpose: There is conflicting research surrounding how mental health in middle-aged women differs by ethnicity and income. Therefore, the purpose of this study was to examine whether mental health differs by ethnicity and income in middle-aged women in the general population.

Methods: This cross-sectional analysis used 2016 BRFSS data for middle-aged women from Alabama (N=1455), Mississippi (N=1082), North Carolina (N=1215), South Carolina (N=2277), and Tennessee (N=1263). Ordered logistic regression analysis by state was used to assess the relationship between mental health and ethnicity and income, while controlling for age, marital status, educational level, employment status, physical health status, tobacco use, and alcohol use.

Results: About half of the middle-aged women reported low to moderate mental health (39-48%), half to most reported being white (52-81%), and about half reported an income of less than 50,000 per year (52-67%). The results of this study indicated that mental health did not differ significantly by income, but did differ significantly by ethnicity after controlling for health-related and demographic factors. In addition, mental health was consistently and significantly related to age, tobacco use, and physical health.

Conclusion: Overall, ethnicity was found to be related to mental health in general population samples of middle-aged women ages 40-64; however, income was not found to be related to mental health. Limitations of this study include underrepresentation of particular ethnicities and a lack of more in-depth measures that may affect mental health. Providers can expect a moderate (38-45%) proportion of patients with low to moderate mental health. It is recommended that practitioners in a primary care setting screen all middle-aged women for mental health; taking special care to screen white patients, smokers, those with low to moderate physical health, and those under the age of 55. It is recommended that providers treat, educate, and refer these patients as necessary.

Sponsor: N/A
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2704 - Poster
Classification: School of Public Health Student
Presenter: Annalynn Galvin
Department: School of Public Health: Health Behavior & Health Systems
Authors: Annalynn M Galvin; Ashvita Garg; Sarah Matthes; Erika L Thompson

Cervical cancer screening: Does educational attainment moderate Protection Motivation Theory correlates?

Purpose: Cervical cancer screening is recommended for women 21-65 years old. Disparities in cervical cancer screening exist by education attainment, yet no study to date has differentiated cervical cancer screening psychosocial predictors between women of varying education levels. This study assessed Protection Motivation Theory psychosocial factors (e.g., threat and coping appraisal) for cervical cancer screening adherence by educational attainment among U.S. women.

Methods: Women, aged 30-65 years, without a hysterectomy, were surveyed online (n=812). The outcome was adherence (yes/no) to 2012 cervical cancer screening guidelines: 3-year pap testing or 5-year HPV co-testing. Threat and coping appraisal predictor variables were derived from the Protection Motivation Theory. Educational attainment was operationalized as high school or less (33%), some college (37%), and college graduate (30%). Using SAS 9.4, adjusted odds ratios estimated cervical cancer screening nonadherence, stratified by education.

Results: Most women (71%) were adherent to screening recommendations: 68% of high school or less, 71% of some college, and 76% of college graduates. Salient predictors of screening nonadherence varied by educational attainment: lacking knowledge of community screening resources (aOR=3.05; 95%CI 1.44-6.45) for women with high school or less; perceiving screenings as painful (aOR=2.16; 95%CI 1.08-4.32) for women with some college; and uncertainty about cervical cancer curability (aOR=2.97; 95%CI 1.24-7.12) for women with college degrees.

Conclusions: Designing interventions without factoring educational attainment may result in limited improvements to cervical cancer screening adherence. Accounting for education level can improve health-literate and population-specific initiatives seeking to address cervical cancer screening disparities.

Sponsor: N/A
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2705 - Poster
Classification: School of Public Health Student
Presenter: Sarah Matthes
Department: School of Public Health: Biostatistics & Epidemiology
Authors: Sarah Matthes; Morgan O'Neal; Erika Thompson, PhD

The Cost of DIY: Correlates of Women's Willingness to Pay for At-Home HPV Self-Sampling

Objective: Cervical cancer is largely preventable through screening, including Pap testing and human papillomavirus (HPV) testing. Yet, most women who get cervical cancer are under-screened. At-home self-sampling for HPV, the causal virus for virtually all cervical cancers, offers a potential opportunity to reach more women. Users may need to pay when this service becomes available. Therefore, research is needed to inform strategies to promote uptake of HPV self-sampling among under-screened women. This study identified correlates of women's willingness to pay for HPV self-sampling, particularly among women not compliant with cervical cancer screening guidelines.

Methods: Women 30-65 years old who have never had a hysterectomy completed an online survey in June 2018 (n=812). The survey assessed correlates of willingness to pay for HPV self-sampling (Yes/No), including sociodemographic characteristics, perceived benefits (6-items), perceived risks (4-items), and trusting a healthcare provider. Descriptive statistics were assessed, and logistic regression modeled correlates of willingness to pay for self-sampling using SAS 9.4. The same method was followed for a subpopulation of women not compliant with cervical cancer screening guidelines (n=232).

Results: Nearly one-third (36.0%) of participants were willing to pay for self-sampling. Women reported being willing to pay an average of $35.12 for testing. Significant correlates of willingness to pay for HPV self-sampling were age, salary, four of six perceived benefits (e.g. ease of use, comfort, autonomy, and not embarrassing), two of four perceived risks (e.g. pain and uncertainty test performed correctly), and trusting information from a healthcare provider. The perceived benefit, ease of use, was the strongest predictor for willingness to pay for HPV self-sampling (OR=3.91, 95%CI 1.80-8.59). Among women noncompliant with cervical cancer screening guidelines, trusting a healthcare provider was the only statistically significant correlate, with those who did not trust their provider at all being less likely to be willing to pay for self-sampling than those who trusted their provider a lot (OR=0.09, 95%CI 0.02-0.42).

Conclusion: Perceived risks and benefits were correlates of willingness to pay for HPV self-sampling among women. Understanding the perspectives of potential end-users can inform future efforts to utilize innovative approaches for cervical cancer screening, especially among under-screened women.

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IRB/IACUC/IBC#: #2018-089

2706 - Poster
Classification: TCOM DO Student (1st Year)
Presenter: Sarah Hutton
Department: TCOM: Medical Education
Authors: Sarah E. Hutton; Sarah J. Philip, MS; Heather D. DeVille, MS; Rebecca Mickle; Aparna Sankar, MS; Kathy Dolan, PhD

Tarrant County Breast, Cervical, and Ovarian Cancer Resources

Purpose: Breast, cervical and ovarian cancer are significant sources of morbidity and mortality in women in the United States, Texas and Tarrant County. One of the best ways to combat these cancers is taking appropriate preventative measures as needed as well as understanding one's individual risk . Often survivors of breast, cervical, and/or ovarian cancer require significant community resources to help them navigate and recover from their cancers. This poster describes risk factors and demographics and identifies local support in Tarrant County for these groups.

Methods: The primary method of gathering the information and data shown here was research on governmental and non-governmental sources regarding statistics and demographics. Tarrant County community resources for these groups were identified using tarrant211.org and the Tarrant Cares website.

Results: Our research showed that that breast, ovarian, and cervical cancers are most commonly diagnosed in women aged 62 and older, 50-60 years old, and 35-44 years old respectively. Risk factors for each of these three cancers are identified, as well as resources for preventative screening and support for those who have had one of these diseases. Resources identified include the local chapter of the Susan B. Komen foundation, local chapters of the National Cervical and Ovarian Cancer Coalitions, the Tarrant County Indigent Health Care Program, and JPS Connection at John Peter Smith Hospital.

Conclusions: In Tarrant County, there are many different resources available for those who have breast, ovarian and cervical cancer, including local and national organizations that provide financial, medical and transportation services. Lack of both awareness and access to appropriate screening tools and information about these diseases are some of the biggest obstacles women in Tarrant county face.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2707 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Divya Naik
Department: Other
Authors: Divya Naik; Christine Hoang

Giant ICA Aneurysm in Pregnancy: A Case Report

Background: Giant internal carotid artery (ICA) aneurysm in pregnancy is rare, especially without a history of trauma. There are many risk factors for the development of intracranial aneurysms, including hypertension, smoking, carotid artery stenosis, and hypercholesterolemia. 85% of saccular aneurysms arise from the arteries of the circle of Willis, with the ICA accounting for 30%. Aneurysms are hard to diagnose while asymptomatic and become challenging to manage during pregnancy, especially when a patient is late in the third trimester.

Case Information: A 22-year-old G2P0010 female in the third trimester presented to the ED complaining of headache secondary to left orbital socket infection onset. The patient was initially diagnosed at 31 weeks with an eye infection but saw no improvement with antibiotics. Upon return to the ED at 36 weeks, physical exam revealed left eye exophthalmos, dysconjugate gaze, and blurred vision. She had no history of trauma, past cardiac events, or complications with the current pregnancy. Her risk factors included developing HTN during the third trimester as well as obesity with a BMI of 40.34. In addition, the patient reported occasional smoking. Imaging was ordered, and patient was admitted to the hospital after MRI without contrast revealed a giant left paraophthalmic ICA aneurysm measuring 2.6 cm. Neurosurgery recommended delivery before pursuing treatment, and after MFM consult, antenatal steroids were administered. At 36 weeks, 3 days intrauterine pregnancy, a primary low transverse Cesarean section was performed with no complications. 9 days after delivery, neurosurgery performed a successful pipeline embolization of the aneurysm. 8 months following the surgery patient had an MRA w/wo contrast completed that showed no evidence for residual aneurysm.

Conclusions: It is rare for giant ICA aneurysm to occur during pregnancy without a history of trauma. Upon review of the literature, this case was found to be unique in that there were less than a handful of cases with ICA aneurysm presenting during the third trimester, with most cases presenting post-partum. Although the patient was pre-term, maternal risks with delaying delivery did not outweigh potential benefit to the infant, with management notable in pursuing antenatal steroids before delivery. A main takeaway from this case was the importance of maintaining a multidisciplinary approach in developing the best treatment plan.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2708 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Nisha Issac
Department: GSBS: Physiology & Anatomy
Authors: Nisha Issac; Brandy Roane

Dysmenorrhea and Sleep Disturbances as Predictors of Depressed Mood in Adolescents

Purpose: Pubertal changes mark a distinction in the trajectory of the sexes such that post-pubescent females are twice as likely to experience disturbed sleep and depression compared to males. Painful menses (dysmenorrhea) may be a contributing factor to this divergence as females who experience dysmenorrhea report both elevated depression and sleep disturbances. We predicted that teens with dysmenorrhea would exhibit increased depressed mood compared to their peers when accounting for disturbed sleep.

Methods: Participants were 33 healthy post-pubescent teens from the Fort Worth area. Mean age was 15.2 years (SD=1) with 73% female (mean gynecological age=3.4) and 24% Latino. Data were collected during an experimental study examining sleep and health. Parents and teens gave informed consent/assent before reporting on disturbed sleep (SDIS), depressed mood (PHQ9), phase preference, and daytime sleepiness (PDSS). For 1 week, females reported daily on menstrual status and all teens wore actigraphy to capture sleep from which sleep duration (TST), timing (bed-/wake-time), and efficiency (SE) were calculated. At week's end, teens completed a second PHQ9 and PDSS. Groups were determined by biological sex, menses status (active or not), and pain medication use resulting in 4 groups: females with menses and pain (dysmenorrhea), females with menses and no pain, females without menses or pain, and males without pain. Univariate ANOVAs determined significant contributors to mood for the final repeated measures ANOVA model that examined group differences in depressed mood. All analyses were evaluated at $p < 0.05$.

Results: A repeated measures ANOVA examined differences in mood with covariates SDIS, PDSS, and wake-time. Results showed trend overall group differences in mood, $F(3,25)=2.68$, $p= 0.069$. Planned pairwise comparisons showed females with dysmenorrhea had significantly higher depressed mood than females without menses (12.3 vs 5.5, $p=0.037$) and males (12.3 vs 3.2, $p=0.016$). Disturbed sleep also contributed significantly to depressed mood, $F(1,25)=9.13$, $p=0.003$.

Conclusions: Dysmenorrhea contributed to sustained depressed mood in teens. Importantly, depressed mood remained elevated as menses ended for these females, but not for those without dysmenorrhea. Long-term studies should examine the role dysmenorrhea has in chronic depressed mood in teens, and if sleep interventions can improve dysmenorrhea and prevent chronic depressed mood in adolescent females.

Sponsor: N/A
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2709 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Ava Moorhead
Department: TCOM: Pediatrics
Authors: Ava Moorhead

Virilization and Pelvic Pain in a Premenopausal Ovarian Steroid Cell Neoplasm

Background: Ovarian neoplasms generally considered as derived from surface epithelium, stromal tissue, or germ cells within the ovary. Steroid cell tumors are classified as stromal tumors, and these neoplasms comprise less than 0.1% of all ovarian neoplasms. Steroid cell tumors could be classified as Leydig cell, stromal-luteal or not otherwise specified. NOS neoplasms are the most common type of steroid cell neoplasm. This report describes an ovarian steroid cell tumor attaching to a eutopic left ovary and its clinical course in a 33-year old woman with an extensive medical history.

Case Information: We present a woman who initially complains of pelvic pain and virilization, with a history of PCOS. Secondary to uncontrolled blood glucose and concern for surgical risk, her symptoms progressed over a 2-year course. After being lost to follow-up for a time, this patient underwent a right sided salpingectomy and left salpingo-oophorectomy. Pathology reported this to be a steroid cell tumor, not otherwise specified of which there are fewer than 25 cases out in current literature. To date, this patient recovered well and has not has a resurgence of this neoplasm.

Conclusions: Her uncontrolled diabetes and HIV status remained barriers to devise and adhere to treatment plans. Presumptive PCOS overlying or potentiating neoplastic symptoms may have led to delayed diagnosis. In addition, the persistence of some hirsutism may support PCOS as a culprit for her facial hair, as her postoperative serum Testosterone levels were normal. This is the first patient presentation of this specific tumor who was HIV positive and especially given the lack of diagnostic or treatment algorithm it will be valuable to follow this patient after the mass removal, even though her symptoms did completely resolve.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

2710 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Morgan O'Neal
Department: TCOM: Medical Education
Authors: Morgan O'Neal; Sarah Matthes; Erika Thompson

Assessing Women's Perceptions of Their HPV and Cervical Cancer Knowledge

Purpose: This project aimed to assess women's HPV and cervical cancer knowledge and women's perceptions of their knowledge. With recent changes to cervical cancer screening guidelines in the US, it is an opportune time to assess women's knowledge of cervical cancer and its primary cause, human papillomavirus (HPV). Women's knowledge of HPV and cervical cancer may be beneficial for reducing anxiety and uncertainty with cervical cancer screening. Moreover, there is a need to examine if women's perceptions of their knowledge align with knowledge levels, which may present opportunity for health education.

Methods: An online survey (n=812) of women 30-65 years old without hysterectomy was conducted in June 2018. Survey items assessed knowledge of HPV (16-items), cervical cancer (12-items) and perceived ease of understanding cervical cancer screening information (Likert scale). Knowledge scores were created from correct responses to true/false questions. Descriptive frequencies for items and Kruskal-Wallis tests were used in SAS 9.4.

Results: Most women (70%) perceived understanding cervical cancer screening information as easy or very easy. The mean HPV knowledge score was 8.10 (out of 16). The mean cervical cancer knowledge score was 6.88 (out of 12). Women's perceptions of their understanding were significantly associated with HPV and cervical cancer screening knowledge (p

Conclusion: Results indicate that women have an accurate perception of their cervical cancer screening knowledge. Additionally, the association between HPV and cervical cancer was noted by participants. Increasing knowledge of the high likelihood of HPV infection may increase screening willingness. Education that the clinical course of cervical cancer is slow and preventable may reduce testing anxiety. More public information on no and low cost screening resources may also help increase screening. These gaps represent patient and provider education opportunities that may assist in increasing adherence to cervical cancer screening recommendations.

2711 - Poster
Classification: TCOM DO Student (2nd Year)
Presenter: Tammy Nguyen
Department: TCOM: Pediatrics
Authors: Tammy Nguyen; Martha J Felini

Knowledge, Attitudes, and Perceptions of Sex Workers in Substance Abuse Recovery on Women's Health

Purpose: Street sex worker populations are underrepresented in women's health research. Of the few studies, women moving in and out of the criminal justice system demonstrate higher prevalence of co-occurring substance use disorders, poor reproductive outcomes, and cervical cancers compared to other women. Barriers to healthy screening behaviors include access, experience of discrimination and/or stigmatization, and competing priorities. This study sought to examine whether knowledge, perceptions and attitudes would affect the uptake of well woman exams in this underserved population.

Methods: A cross-sectional study was conducted among women diverted through the Prostitute Diversion Initiative and into substance abuse recovery in lieu of jail. Trauma-sensitive cancer prevention education was conducted prior to a well woman exam (2012-2017). Self-administered baseline assessments of 36 items measured on the Likert-scale was used to assess baseline knowledge (n=14), attitudes (n=4), and perceptions (n=18) about well woman exams. Statistical analysis was performed using SAS statistical software to assess difference overall, and by age, education and history of trauma.

Results: Only 32% of 219 women believed they were at increased risk of cervical cancer. The majority (92%) knew well woman exams were important even if asymptomatic, but fewer (58%) knew when their daughters should initiate exams. Knowing someone with cervical cancer was significantly associated with uptake (p

Conclusions: Although knowledge about cervical cancer screenings was relatively high, and attitudes mostly encouraging, there remains misconceptions about risk and perceived barriers like provider's gender and anxiety waiting for results that needs to be addressed to scale up cervical screening uptake rates in this underserved population.

Sponsor: N/A
IRB/IACUC/IBC#: 2014-012

2712 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Ryan Nguyen
Department: GSBS: Physiology & Anatomy
Authors: Ryan T. Nguyen; Spencer C. Cushen; Nicole R. Phillips; Styliani Goulopoulou

Mitochondrial oxidative stress and extrusion of mitochondrial DNA from endothelial cells: implications for maternal endothelial dysfunction in preeclampsia

Purpose: Preeclampsia is one of the leading causes of maternal mortality during pregnancy and a risk factor of cardiovascular disease for the mother later in life. Hypertension and endothelial dysfunction are common characteristics of the maternal syndrome in preeclampsia, and oxidative stress is considered a pathogenic mediator of these maternal features. Mitochondria are the primary cellular producers of reactive oxygen species (ROS) and overproduction of mitochondrial ROS (mtROS) is detrimental to cellular processes, often leading to cell death. Mitochondrial DNA (mtDNA) has pro-inflammatory properties when released from dying cells into the extracellular space and its concentrations are increased in women with preeclampsia. The objective of this study was to determine the effects of mtROS in mtDNA release into the extracellular space. We hypothesize that inhibition of mitochondrial transport chain results in extrusion of mtDNA from vascular endothelial cells. Also, inhibition of Complex III causes a greater release of mtDNA compared to inhibition of Complex I.

Methods: Human umbilical vein endothelial cells (HUVEC) were grown to 80-90% confluency before being treated with a mitochondrial complex I inhibitor (Rotenone: 5, 10, 25 mM – 4h) and mitochondrial complex III inhibitor (Antimycin A: 10, 50, 100 mM – 4h). After treatment, the cell media supernatant was collected and stored in -80 °C until further mtDNA quantification. mtDNA was isolated using the Mag-Bind Blood & Tissue DNA HDQ 96 Kit and quantified using the TaqMan chemistry-based method of absolute qPCR.

Results: HUVEC cells treated with rotenone, regardless of dose, had no effect on concentrations of extracellular mtDNA (Figure A; One-way ANOVA followed by Sidak's post-hoc test). Concentrations of mtDNA increased in HUVECs treated with 100 mM of Antimycin A (Figure B; One-way ANOVA followed by Sidak's post-hoc test). Lower concentrations of Antimycin A had no effect on concentrations of extracellular mtDNA (Figure B).

Conclusions: Inhibition of mitochondrial respiratory chain complex III, but not inhibition of complex I, results in extrusion of mtDNA. The increase in mtDNA released from dysfunctional cells may contribute to the increased circulating mtDNA concentrations seen in pregnancies with maternal endothelial dysfunction, such as pregnancies with preeclampsia.

Sponsor: N/A
IRB/IACUC/IBC#: IBC-2016-0024

2713 - Poster
Classification: TCOM DO Student (3rd Year)
Presenter: Julie Bunyard
Department: TCOM: Medical Education
Authors: Julie Bunyard; Jacqueline Garda

An unlikely culprit of abdominal pain in a 23-year-old female: a case study

Background: Ovarian cancer is the most common cause of gynecologic cancer death in the United States. Ovarian cancer is most commonly seen in women over the age of 60, and the incidence of women aged 20 to 29 at diagnosis is 1.8 to 2.2 per 100,000 cases. Ovarian cancer can present either acutely or subacutely, and patients can remain asymptomatic for extended periods of time. Acute presentations involve shortness of breath due to malignant pleural effusion or severe nausea and vomiting due to a bowel obstruction, whereas subacute presentations involve bloating, urinary symptoms, early satiety, and pelvic or abdominal pain.

Case Information: A 23-year-old female with no past medical history presented to the Emergency Department with sharp abdominal pain for 3 days duration, associated with subjective fever, chills, and nausea. On examination, she was hypertensive and tachycardic with abdominal distension and tenderness in the left lower quadrant. Her white blood cell count was elevated, and an abdominal and pelvic CT scan showed an extremely large complex solid and cystic mass measuring 31 by 27 by 20 cm concerning for ovarian malignancy. The patient was transferred to Obstetrics and Gynecology, where she reported further history of 15 pound weight gain, early satiety and new-onset irregular heavy bleeding for the last 3 months. A heavy, immobile mass was palpated during bimanual exam. An exploratory laparotomy was conducted, at which time the right ovary was found to fill the entire abdominal cavity up to the diaphragm. Right salpingoophorectomy and pelvic washings were performed and sent for preliminary frozen pathological examination, which resulted as possible mucinous adenocarcinoma. The mass excised was more than 10 kilograms. Gynecologic Oncology was consulted, and completed omentectomy, appendectomy and staging procedure. The patient recovered well post-operatively, and was discharged home 3 days later. The final pathology report was resulted as invasive adenocarcinoma of the right ovary arising in borderline mucinous cystic neoplasm, with no evidence of tumor in omentum, appendix, or lymph nodes.

Conclusions: This case calls attention to the insidious progression of ovarian cancer, which is all the more dangerous when occurring in a patient demographic with such low incidence of disease. As the most common cause of gynecologic cancer death, ovarian cancer is an important differential to consider when patients present with even one vague subacute symptom.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

Oral Presentations

Aging/Alzheimer's Disease (Abstracts in the 100s)

100 - Oral
Classification: GSBS Student
Presenter: Mavis A.A. Tenkorang
Department: GSBS: Physiology & Anatomy
Authors: Mavis A.A. Tenkorang; Phong Duong; Elizabeth Nicole Wilson; Rebecca Lynn Cunningham

Mechanisms Underlying Membrane Androgen Receptor-Induced Neurodegeneration

Purpose: A common characteristic of several neurodegenerative disorders is oxidative stress (OS). Many neurodegenerative disorders are more prevalent in men and postmenopausal women. Our lab has shown testosterone via a non-genomic mechanism exacerbates OS damage in neurons. Indeed, our lab was the first to discover the presence of the androgen receptor (AR) splice variant, AR45, in the brain. We found testosterone can initiate signaling cascades via this membrane associated AR (mAR), leading to increased OS. However, the mechanism for OS generation is unknown. NADPH Oxidase 1 and 2 (NOX 1/2) are major OS generators, and potential targets for androgen-induced OS and cell death. Based on our studies showing protein-protein interactions between NOX1/2, AR45 and Gαq, we hypothesize testosterone increases OS by activating mAR complexed with NOX 1/2, initiating IP$_3$ signaling.

Method: Using an immortalized neuronal cell line (N27 cells), we exposed cells to hydrogen peroxide (H$_2$O$_2$) prior to testosterone (100 nM) or DHT-BSA (500nM). Inhibitors were used to examine AR, IP$_3$ and NOX1/2 signaling. Cell viability and OS were quantified. In addition to in vitro experiments, we examined the effects of NOX 1/2 on DHT exacerbation of chronic intermittent hypoxia, CIH (AHI=10) induced OS by treating adult male Long Evans rats with the NOX1/2 inhibitor, apocynin (4mg/kg).

Results: Classical AR antagonists did not block testosterone's negative effects, indicating classical AR does not mediate these effects. Since AR antagonists do not block mAR, we used an AR protein degrader, ASC-J9 (5uM). ASC-J9 blocked testosterone's negative effects. Next, we examined signaling cascades associated with proteins complexed with mAR-AR45. To block NOX actions, we used apocynin (10 uM). Apocynin did not alter H$_2$O$_2$-induced cell loss, indicating H$_2$O$_2$ increases OS via a non-NOX mechanism. However, apocynin completely blocked testosterone induced cell loss and OS, suggesting the involvement of NOX1/2. Consistent with our in vitro data, apocynin also decreased OS generation in DHT-treated rats exposed to CIH, during sleep phase for 7 days. Inhibition of IP$_3$ receptor blocked testosterone's negative effects, indicating that testosterone may activate IP$_3$ signaling via the mAR-NOX complex.

Conclusion: NOX and IP$_3$ play a crucial role in mAR-induced neurodegeneration. Future studies will examine the mAR-NOX complex as a therapeutic target for neurodegenerative diseases.

105 - Oral
Classification: GSBS Student
Presenter: Gita Pathak
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Gita Pathak; Zhengyang Zhou; Nicole R Phillips

Analysis of 436,390 genetic variants in 9,765 elderly individuals implicates TOMM40, MARK4, CLPTM1 and VDAC1/FSTL4 in the inverse relationship between Alzheimer's and cancer

Purpose: A rapidly aging demographic, aged 65 and older, is expected to double by 2060 reaching 98 million and creating demands for better healthcare. While the number of co-occurring diseases increase in the aging population, Alzheimer's and cancer have been reported to be inversely related – a lower than expected probability of the secondary disease after the primary disease diagnosis. This fueled our interest in exploring genetic variation that is responsible for the inverse relationship between AD and cancer.

Rationale & Hypothesis: Age is a risk factor for both AD and cancer, and our goal was to compare late-onset AD with two most prevalent age-related cancers – breast and prostate cancer. We hypothesize that harmonizing the age to study the cross-phenotypic effects of genetic variants between AD and cancer against a common control group will identify genetic variants that contribute to their inverse relationship.

Methods: Genomic SNP data from ADNI (Alzheimer's Disease Neuroimaging Initiative), ADGC (Alzheimer's Disease Genetics Consortium) and BPC3 (Breast and Prostate Cancer Care Consortium) which contained 757, 6065, and 11893 individuals respectively included genotypes for up to 700,000 SNP markers. Standard quality control measures were implemented. Individuals with age of disease onset between 60- 80 years were included, and Bayesian multinomial regression was used to compare cases (AD and cancer) against controls in a two-stage replication study.

Results: A total of 4 SNPs that replicated in the two study stages. In males, two risk loci were significant with opposite odds ratios – rs2075650 mapped to TOMM40 , and an intergenic SNP- rs4298154 on chr 4. Since TOMM40 is near APOE region, we conditioned on APOE SNPs – rs429358 and rs769449, to identify secondary hits. 8 SNPs in the MARK4 region were significant with the inverse hit. In females, rs2075650 was also significant, and conditional analysis resulted in variants in CLPTM1. A non-coding SNP in the VDAC1/ FSTL4 region was also replicated in females.

Conclusion: Our novel approach has identified four genic regions that have cross-phenotypic effects when comparing AD and cancer: TOMM40/APOE, MARK4, CLPTM1, and VDAC/FSTL4. These genes have been previously implicated independently in AD and cancer and are known to be involved in mitochondrial pathways; however, this is the first study to directly demonstrate that genetic variability in these genes underlies the inverse comorbidity of AD and cancer.

IRB/IACUC/IBC#: 2016-090

106 - Oral
Classification: GSBS Student
Presenter: Delaney Davis
Department: GSBS: Pharmacology & Neuroscience
Authors: Delaney L Davis; Nathalie Sumien, PhD

Behavioral profiling of aged glutathione-deficient mice exposed to an oxidative stressor

Purpose: Aging is associated with a decrease in brain function and vitality, along with an increased risk to stressors. Oxidative stress is a mechanism associated with aging, in which antioxidant defenses are overcome by the production of reactive oxygen species, leading to molecular damage and decreased cellular efficiency. Glutathione is a major antioxidant and indicator of cellular redox status, however its role in resilience remains unclear. To determine its involvement, we used the oxidative stressor paraquat (N,N'-dimethyl-4,4'-bipyridinium dichloride; PQ), a widely used herbicide that is highly toxic to animals and humans, in a mouse model of glutathione deficiency.

The purpose of this study was to determine if paraquat-induced oxidative stress would exacerbate age-associated functional impairments in glutathione deficient mice.

Methods: Groups of old (18 months) male and female $gclm^{+/+}$ and $gclm^{-/-}$ mice were assigned to a control group (saline) or a paraquat group (10 mg/kg; once via i.p.). One week following the injection, animals underwent behavioral testing of motor, affective and cognitive function (bridge walking, wire suspension, coordinated running, locomotor activity, elevated zero maze, fear conditioning, and active avoidance).

Results: $Gclm^{-/-}$ exhibited less anxious behavior than the $gclm^{+/+}$, and PQ had no effect on that measure. $Gclm^{-/-}$ were more active than the $gclm^{+/+}$, and PQ reduced that activity especially in females. PQ treatment seemed to improve cognitive flexibility, and improved associative learning in males only. PQ improved balance and strength of the $gclm^{-/-}$ in females, but worsened the strength in $gclm^{+/+}$ males.

Conclusion: Overall, this study indicates that PQ did not exacerbate any phenotype associated with glutathione deficiency, and in some instances, it made the mice better. These outcomes do not support an involvement of glutathione in resiliency, however its life-long deficiency may have led to upregulation of other protective mechanisms making the mice stronger in adverse situations.

Sponsor: N/A
IRB/IACUC/IBC#: 2018-0022

Cardiovascular (Abstracts in the 400s)

417 - Oral
Classification: Postdoctoral Fellow
Presenter: Alexander (A.J.) Rosenberg
Department: GSBS: Physiology & Anatomy
Authors: Alexander (A.J.) Rosenberg; Victoria L. Kay; Garen K. Anderson; Justin D. Sprick; Caroline A. Rickards

A Comparison of Protocols for Simulating Hemorrhage in Humans: Step vs. Ramp Lower Body Negative Pressure

Lower body negative pressure (LBNP) elicits central hypovolemia, and has been used to characterize the cardiovascular and cerebrovascular responses to simulated hemorrhage in humans. LBNP protocols traditionally employ a progressive stepwise reduction in pressure that is maintained for specific time periods. More recently, however, continuous ramp LBNP protocols have been utilized to simulate the continuous nature of most bleeding injuries.

Purpose: The aim of this study was to compare tolerance and hemodynamic responses between a step LBNP protocol and a continuous ramp LBNP protocol until the onset of presyncope.

Methods: Healthy human subjects (N=20; 8F, 12M) participated in two LBNP protocols to presyncope: 1) Step Protocol, where chamber pressure decreased every 5-min to -15, -30, -45, -60, -70, -80, -90 and -100 mmHg, and, 2) Ramp Protocol, where chamber pressure decreased 3 mmHg/min. Heart rate (HR), mean arterial pressure (MAP), stroke volume (SV), middle and posterior cerebral artery velocity (MCAv and PCAv), muscle and cerebral oxygen saturation (SmO_2 and ScO_2), and end-tidal CO_2 ($etCO_2$) were measured continuously. Time to presyncope, the cumulative stress index (CSI; summation of chamber pressure*time at each pressure), and hemodynamic responses were compared between the two protocols.

Results: Time to presyncope (Step: 1611.8 ± 80.5 s vs. Ramp: 1675.4 ± 68.3 s; P=0.17), and the ensuing magnitude of central hypovolemia (%Δ SV, Step: -54.3 ± 2.5 % vs. Ramp: -51.9 ± 2.7 %; P=0.31) were similar between protocols, despite a higher CSI for the step protocol (Step: 946.5 ± 98.4 mmHg*min vs. Ramp: 836.7 ± 81.6 mmHg*min; P=0.06). While there were no differences at presyncope between protocols for the maximum change in HR, MCAv, or SmO_2 (P≥0.21), the reduction in MAP was slightly less (Step: -17.1 ± 1.8 % vs. Ramp: -20.0 ± 1.4 %; P=0.02) and the reductions in PCAv, ScO_2,and $etCO_2$ (P≤0.08) were slightly greater for the step protocol compared to the ramp protocol.

Conclusion: These results suggest that step and continuous ramp LBNP protocols elicit relatively similar tolerance times, reductions in central blood volume, and subsequent reflex hemodynamic responses, despite a greater cumulative stress in young healthy adults.

IRB/IACUC/IBC#: 2012-163

300

Cell & Molecular Biology (Abstracts in the 500s)

503 - Oral
Classification: Postdoctoral Fellow
Presenter: Sarika Chaudhari
Department: GSBS: Physiology & Anatomy
Authors: Sarika Chaudhari; Parisa Yazdizadehshotorbani; Yanxia Wang; Rong Ma

Store-Operated Calcium Entry in Mesangial Cells And Glomerular Inflammatory Responses: Role of Interleukin-6

Purpose: Emerging evidence indicates that immunological and inflammatory mechanisms play a significant role in the development of diabetic nephropathy (DN). The early features of DN include accumulation of extracellular matrix (ECM) in the glomerular mesangium. Inflammatory cell infiltration mediated by locally produced cytokines/chemokines contributes to the histological impairment in DN. Glomerular mesangial cell (MC) is a major cell type in glomerulus to produce cytokines/chemokines in response to diabetes and a major contributor to mesangial expansion in DN. Interleukin-6 (IL-6) has dual roles acting as an inflammatory or anti-inflammatory cytokine in a cell context manner. We have previously demonstrated that the Orai-1 mediated store-operated calcium entry (SOCE) suppressed ECM protein production by MCs. The aim of this study was to determine if and how SOCE in MCs regulated IL-6 by MCs and macrophage infiltration into glomerulus.

Methods: In cultured human MCs, levels of IL-6 were examined using ELISA in the presence of normal glucose (5 mM D-glucose) with/without an activator (thapsigargin at 1 µM) of SOCE. Immunoblot analysis was used to study the expression of various proteins in the whole cell lysates of MCs. In the human MCs, IL-6 was overexpressed using IL-6 plasmid while Orai 1 was knockdown using siRNA against human Orai1 using transfection reagents. In wild type C57BL6 mice, Orai-1 channel protein in MCs was knocked down using the targeted nanoparticle-siRNA delivery system at the age of 16 weeks. Immunohistochemistry was performed on the paraffin embedded kidney sections to examine macrophages infiltration in glomeruli using F4/80 as a marker.

Results: In cultured human MCs, activation of SOCE by thapsigargin significantly increased IL-6 expression level which was attenuated by inhibitor of SOCE, GSK7975A and knockdown of Orai 1. IL-6 overexpression reduced the expression of ECM proteins in MCs. In vivo knockdown of Orai1 in MCs induced infiltration of F4/80 stained macrophages into the glomeruli in the mice treated with nanoparticle/Orai1 siRNA for 5 days compared to the control mice.

Conclusion: SOCE positively regulates IL-6 expression in MCs which in turn suppresses the ECM proteins. Orai-1 mediated SOCE inhibits the glomerular macrophage infiltration in mice. Thus SOCE in MCs has protective responses against glomerular inflammation and fibrosis.

Sponsor: N/A
IRB/IACUC/IBC#: 2017-0044; IBC-2018-0076

Community Medicine (Abstracts in the 600s)

609 - Oral
Classification: GSBS Student
Presenter: Naomi Swanta
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Naomi K Swanta; Subhash Aryal; Kathleen Borgmann; Anuja Ghorpade

Plasma Biomarkers as Indicators for Neurocognitive Impairment in HIV+ Individuals

Purpose: Chronic inflammation in HIV patients correlates with the severity of HIV-associated neurocognitive disorders (HAND), suggesting that inflammatory mediators could be indicators for the progression of HIV-associated neurocognitive impairment. The current clinical evaluations for HAND are designed for diagnosis after the onset of the disorder, limiting avenues for intervention. Therefore, there is a need for prognostic biomarkers to determine the likelihood for HAND development. This study aims to identify inflammatory factors from blood plasma and peripheral blood mononuclear cell (PBMC) that correlate with neurocognitive performance to serve as prognostic markers of HIV-associated neurocognitive impairment. We hypothesize that these associations are dependent upon race and sex.

Methods: A total of 121 HIV$^+$ male and female African, Caucasian and Hispanic Americans were enrolled for two separate study visits. At each visit, participants underwent a drug screen, a blood draw and a computerized neurocognitive assessment in memory, psychomotor speed, reaction time, complex attention, cognitive flexibility, processing speed and executive function using the CNS Vital Signs software. Participant blood was processed to isolate plasma and in vivo PBMCs, PBMCs were further incubated in media for 24 hours. A panel of inflammatory factors were measured in the participant samples by ELISA and real-time PCR. A multivariate multiple linear regression model was utilized to identify inflammatory factors that significantly associate with neurocognitive scores.

Results: Higher plasma levels of monocyte chemoattractant protein 2 or tissue inhibitor of metalloproteinases 1 significantly associated with lower neurocognitive scores in all domains tested except reaction time. In addition, higher plasma levels of chemokine c-c ligand 17, interleukin (IL) 10, and IL-23 significantly associated with lower neurocognitive scores in processing speed and executive functioning.

Conclusion: Identified plasma markers of neurocognitive performance can be utilized as indicators of neurocognitive impairment in HIV patients. This suggests that the markers can predict neurocognitive decline at the second study visit. This study may provide an avenue for early therapeutic intervention.

Sponsor: NIH
IRB/IACUC/IBC#: 2010-063

Eye/Vision (Abstracts in the 900s)

911 - Oral
Classification: GSBS Student
Presenter: Pinkal D. Patel
Department: North Texas Eye Research Institute
Authors: Pinkal Patel; Ramesh Babu Kasetti, Ph.D.; Prabhavathi Maddineni, Ph.D.; J. Cameron Millar, Ph.D.; Gulab Zode, Ph.D.

Activation of TRPV4 channels reduces IOP and improves outflow facility by regulating eNOS dependent nitric oxide release from the trabecular meshwork

Purpose: Nitric oxide (NO) is known to reduce intraocular pressure (IOP) by relaxation of the trabecular meshwork (TM) and distal vessels of the conventional outflow pathway. However, the intrinsic mechanisms by which outflow pathway tissues regulate NO production is yet to be elucidated. In vascular endothelium, activation of mechanosensory transient receptor potential vanilloid 4 (TRPV4) channels results in endothelial nitic oxide synthase (eNOS) mediated NO release, which in turn promotes vasodilation. Here, we determined whether activation of TRPV4 regulates IOP and conventional outflow via NO release in the TM.

Methods: In wildtype (WT) and glucocorticoid-induced ocular hypertensive (OHT) C57BL/6J mice, the effect of TRPV4 agonist GSK1016790A on IOP and outflow facility was determined using rebound tonometry and constant-flow infusion method respectively. Effect of TRPV4 agonist on eNOS activation and NO production was determined using Western blot and fluorometric DAF-FM assay in primary human TM cells and ex vivo cultured human TM donor tissues. We report for the first time a method for electrochemical measurement of NO in human anterior segment donor tissues using NO microsensors.

Results: Topical administration of TRPV4 agonist GSK1016790A significantly reduced IOP (P<0.001)in WT and OHT mice compared to contralateral control eyes. In OHT mice, treatment with GSK1016790A resulted in increased outflow facility (P=0.02)compared to contralateral vehicle treated eyes. We further demonstrate that TRPV4 activation by GSK1016790A resulted in increased eNOS phosphorylation in GTM3 cells, primary human TM cells, and cultured human TM donor tissues. Activation of TRPV4 in primary TM cells and ex vivocultured human TM donor tissues resulted in increased DAF-FM fluorescence, which signifies increase in TRPV4-mediated NO production. Treatment of human anterior segments with TRPV4 agonist resulted in increased production of NO as detected electrochemically using NO microsensors. Nonselective inhibition of NOS by L-NAME abrogated the IOP lowering effect of TRPV4 agonist in mice and reduced TRPV4-mediated NO production in outflow pathway cells and donor tissues.

Conclusion: TRPV4 activation improves IOP and outflow facility, perhaps by regulation of eNOS dependent NO release.

Sponsor: N/A
IRB/IACUC/IBC#: IACUC-2018-0032

912 - Oral
Classification: Postdoctoral Fellow
Presenter: Prabhavathi Maddineni
Department: GSBS: Pharmacology & Neuroscience
Authors: Prabhavathi Maddineni; Ramesh Kasetti; Pinkal Patel; Gulab Zode

Glucocorticoid-induced glaucomatous neurodegeneration is associated with demyelination of optic nerve axons and infiltration of immune cells

Purpose: Ocular hypertension (OHT) is a serious side effect of glucocorticoid (GC) therapy and if untreated, it can leads to secondary open-angle glaucoma. However, the precise mechanism of GC-induced glaucomatous neurodegeneration is not understood largely due to lack of proper mouse model that exhibits glaucomatous neurodegeneration similar to human glaucoma. Using a novel mouse model of GC-induced OHT, we determined whether prolonged GC-induced OHT leads to glaucomatous neurodegeneration and further explored the pathological mechanisms of axonal degeneration and role of neuroinflammation in glaucoma.

Methods: C57BL/6J mice were injected with either Dexamethasone Acetate (Dex) or Vehicle (Veh) via periocular-route, once a week for 10-weeks. IOP was measured every week and glaucomatous neurodegeneration was examined at 5 and 10-weeks of treatment using pattern ERG (pERG), whole mount retina staining with RBPMS antibody and PPD staining and transmission electron microscopy (TEM) for optic nerve (ON) degeneration. Reactive astrocytes, axonal cytoskeleton changes and immune cells at ON head (ONH) were assessed by immunostaining. Cholera toxin B (CTB) was used to trace axon anterograde transport deficits.

Results: Periocular injections of Dex caused significant and prolonged IOP elevation (Δ ≥3.5-5 mmHg) and outflow facility reduction (by ~40%) compared to Veh-injected mice. Dex-induced OHT was associated with increased ECM deposition and cytoskeleton changes in the TM. Interestingly, Dex-induced sustained OHT led to glaucomatous neurodegeneration after 10 weeks of treatment including significant functional and structural loss of RGCs as evident from reduced pERG amplitudes (10μV v/s 25μV) and ~36% loss of RGCs in whole mount retina RBPMS staining. Neuronal labelling with CT-B demonstrated anterograde transport deficits in Dex-treated eyes, with increased reactive astrocytes at ONH. We also observed ~40% loss of optic nerve axons in PPD staining. TEM analysis of ON further demonstrated chronic demyelination of optic nerve axons with mitochondrial accumulation and immune cells infiltration, which was further confirmed by immunostaining.

Conclusions: These data highlights that GC-induced OHT causes inflammatory demyelination of the optic nerve axons, which results in glaucomatous neurodegeneration.

Sponsor: N/A
IRB/IACUC/IBC#: IACUC-2018-0032

913 - Oral
Classification: Postdoctoral Fellow
Presenter: Biraj Mahato
Department: GSBS: Pharmacology & Neuroscience
Authors: Biraj Mahato; Koray Dagon Kaya; Yan Fan; Nathalie Sumien; Ritu Shetty; Zhang wei; Delaney Davis; Thomas Thomas Mock; Subrata Batabyal; Aiguo Ni; Samarendra Mohanty; Zongchao , Han; Rafal Farjo; Michael Forster; Anand Swaroop; Sai Chavala

Restoration of vision by chemically reprogrammed photoreceptors

Purpose: Many retinopathies such as Retinitis Pigmentosa, Stargardt disease, Cone-rod dystrophy, Achromatopsia, Chroideremia and Labor congenital Amaurosis (LCA) comprise a wide range of genetically and phenotypically heterogeneous conditions that share common progressive loss of photoreceptor function accompanied by irreversible vision loss. Majority of the patients affected by these diseases present with uncorrectable decreased visual acuity during their childhood years, which most often progress to legal blindness. Strategy to restore vision with photoreceptor like replacement cell has the advantage of being applied to these patients, regardless of their genetic dysfunction or stage of disease. Currently no FDA approved treatments are available to treat these disorders. We have discovered a chemical engineering method that can convert fibroblasts to chemically induced photoreceptors (CiPCs) with their ability to restore vision in retinal degeneration mouse model.

Methods: A combination of small molecule (5C) was used to convert fibroblasts to CiPCs. Gene expression of CiPCs was analyzed by RNA sequencing, RT-PCR and immunofluorescence. Light responsiveness of CiPCs was tested by single cell patch clamp recording upon stimulation with light. In vivo CiPC function was examined by pupil analysis, light aversion test, visual acuity and contrast sensitivity measurement after injecting them into retinal degeneration mouse model.

Results: We have identified a set of five small molecules (5C) that induces mouse embryonic fibroblasts (MEFs) and human adult dermal fibroblasts (HADF) into CiPCs both rods and cones, without the use of pluripotent cells or viral transcription factors in less than two weeks time. Detailed analyses have been performed in mouse cells, but in brief, these cells express transcript and proteins consistent with youthful photoreceptors (postnatal day 5). In vitro functional analysis indicated that CiPCs are light responsive. Moreover, when mouse ciPCs are injected into the subretinal space of retinal degeneration mutant mice (rd1), in some mice (approximately 50%) we observed cell survival for several months (more than 120 days), restored light-dark preference/discrimination, improved scotopic-Optomotry testing, fleeting but partial ERG recovery, and restoration of pupillary reflexes.

Conclusions: Based upon these observations we demonstrate restoration of visual functions by CiPCs that carry extraordinary translational potential for millions of visually impaired patients worldwide.

Sponsor: National Institute of Health (NIH), Foundation Fighting Blindingness
IRB/IACUC/IBC#: 2018-0015 (Sai Chavala)

1406 - Oral
Classification: GSBS Student
Presenter: Joseph D. Malaer
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Joseph D Malaer; Porunelloor A Mathew

Surface PCNA enables pancreatic and colon cancer stem cells to inhibit NK cell effector function

Purpose: Cancer stem cells (CSC) are a subset of tumor cells that have a stem-cell-like phenotype and are thought to facilitate metastasis by evading peripheral NK cell effector function. NK cell function is regulated by the balance of activating and inhibitory receptors binding to ligands on the surface of target cells. Cancer cells may escape NK cell killing by expressing or secreting ligands for NK cell inhibitory receptors. NKp44, a member of the natural cytotoxicity receptor family, can function as either an activating or an inhibitory receptor depending on ligand interaction. Proliferating cell nuclear antigen (PCNA) associates with MHC class I and forms an inhibitory ligand for NKp44, resulting in the inhibition of NK cytotoxicity. We hypothesize cell surface PCNA can be used as a marker for CSC and as a potential immunotherapeutic target for pancreatic and colon cancer.

Methods: Pancreatic (Panc-1) and colon (HCT 116) cancer cell lines were labeled with antibodies against PCNA, CD44, and CD133 and flow cytometry was performed to determine surface expression. CSC were identified as being CD44$^+$CD133$^+$. Cells were labeled and sorted via FACS; CSC transcription factors NANOG, SOX2, and Oct-4 were analyzed by qRT-PCR from sorted populations. NK receptor-ligand interactions were blocked by incubating cells with anti-PCNA, anti-NKp44, or control antibodies; interferon gamma and chromium release assays were performed.

Results: In both Panc-1 and HCT 116 cells, a PCNA$^+$CD44$^+$CD133$^+$ population was detected and enriched in naturally detached cells. Furthermore, cell sorting and qRT-PCR determined cells with cell surface PCNA have increased expression of CSC transcription factors compared to cells lacking surface PCNA. Blocking the PCNA-NKp44 interaction enhanced the specific lysis of target cells by NK cells and altered the release of interferon gamma.

Conclusions: Cell surface PCNA is associated with co-expression of CD44 and CD133 as well as increased CSC transcription factor expression. Additionally, cell surface PCNA alters interferon gamma secretion and facilitates escape from NK cell killing. Our data suggest that blocking NKp44-PCNA interactions may provide a novel immunotherapeutic target for pancreatic and colon cancer stem cells and prevent metastasis.

Sponsor: N/A
IRB/IACUC/IBC#: N/A

1407 - Oral
Classification: GSBS Student
Presenter: Busola Okunnu
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Busola Okunnu; Rance Berg, PhD

Neutrophils are more effective than monocytes at containment and clearance of Listeria monocytogenes

Neutrophils and monocytes are phagocytic cells that have previously been shown to be important for host protection during infection with the intracellular bacteria, Listeria monocytogenes. Previous studies have shown that simultaneous depletion of neutrophils and monocytes with the Gr-1 antibody leads to susceptibility to Listeria infection. However, the literature is divided on the necessity of neutrophils for host protection during infection. The purpose of these studies is to delineate differences in function between neutrophils and monocytes during intracellular bacterial infection. The mean fluorescence intensity (MFI), obtained with a flow cytometer, of the antibody against Listeria was measured as a determinant of the total bacteria phagocytosed by the cells. It was observed that neutrophils obtained from the bone marrow, liver and spleen of C57Bl/6 mice were more effective at phagocytosis of Listeria in comparison to monocytes as they had a higher total bacteria MFI than the monocytes. To determine differences in the ability of the cells to keep bacteria contained in the phagosome, the cells were infected with a strain of Listeria that only expresses GFP when the bacteria escapes out of the phagosome into the cytosol. Comparison of the MFI of total bacteria present vs escaped bacteria showed that monocytes from the bone marrow, liver and spleen of mice phagocytosed less bacteria and allowed for more bacteria to escape in comparison to neutrophils. Therefore, monocytes are less effective at bacterial containment in comparison to neutrophils. To ascertain differences in killing ability, bone marrow neutrophils and monocytes were sorted for a killing assay. Neutrophils were also observed to be more effective than monocytes at bacterial killing. In conclusion, although both cell types are important for protection during Listeria infection, neutrophils appear to be essential for protection as they are more effective at phagocytosis, phagosomal containment and bacteria killing. Future studies, including measurement of ROS/RNS and cytokine production, will aid in further defining specific functional differences between neutrophils and monocytes during intracellular bacterial infection.

1503 - Oral
Classification: GSBS Student
Presenter: Alexandria B. Marciante
Department: GSBS: Physiology & Anatomy
Authors: Alexandria B Marciante; Lei A Wang; Joel T Little; J Thomas Cunningham

Caspase Lesions of PVN-Projecting MnPO Neurons Blocks the Sustained Component of CIH-Induced Hypertension in Adult Male Rats

Purpose: Obstructive Sleep Apnea (OSA) is characterized by cessations in respiration that leads to development of hypertension and persists into the waking period even during normal respiratory patterns. Previous studies show that experimental models of chronic intermittent hypoxia (CIH) produces sustained hypertension similar to that with OSA. It has been proposed that peripheral and CNS renin-angiotensin systems contribute to hypertension associated with CIH. Our working hypothesis is that increased circulating angiotensin II feeds into the forebrain, increasing excitatory signaling through the hypothalamus and hindbrain, creating a vicious cycle. The median preoptic nucleus (MnPO) is an integrative forebrain region that contributes to blood pressure regulation. The MnPO has projections to the paraventricular nucleus (PVN) of the hypothalamus, which contains pre-autonomic centers that project to regions in the hindbrain and regulate sympathetic outflow. We hypothesize that lesioning pathway specific projections from the MnPO to the PVN could attenuate CIH hypertension.

Methods: Adult male Sprague-Dawley rats (250-300g) were anesthetized with isoflurane and stereotaxically injected bilaterally in the PVN with a retrograde AAV containing Cre (AAV9.CMV.HI.eGFP-Cre.WPRE.SV40) and with the caspase-3 (AAV5-flex-taCasp3-TEVp) or control virus (AAV5-hSyn-DIO-mCherry) in the MnPO. After 1-week recovery, rats were instrumented with aortic radio telemetry and allowed an additional week recovery. Rats were then moved to new homecages and underwent baseline recording before undergoing our 7-day CIH protocol.

Results: The control group exposed to CIH developed chronic hypertension, however, caspase lesions blunted the sustained hypertension. Brain tissue processed for FosB immunohistochemistry showed decreased expression with caspase-induced inhibition in the MnPO and downstream autonomic regulating nuclei. CIH significantly increased plasma advanced oxidative protein products (AOPP) levels in controls. This increase in AOPP levels was blocked in caspase-lesioned rats comparable to normoxic control concentrations. In situ hybridization experiments indicate a reduction in angiotensin type 1a receptors (AT1aR) expression in the caspase-lesioned group exposed to CIH compared to CIH controls.

Conclusion: The results indicate that MnPO neurons that project to the PVN play a significant role in blood pressure regulation and in the development of persistent CIH hypertension.

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Neuroscience (Abstracts in 1800s)

1809 - Oral
Classification: GSBS Student
Presenter: Kirthikaa Balapattabi
Department: GSBS: Physiology & Anatomy
Authors: Kirthikaa Balapattabi; George E Farmer; Joel T Little; Martha E Bachelor; J Thomas Cunningham

Intracellular Chloride Regulation of Supraoptic Vasopressin Neurons during Salt Loading

Purpose: Salt loading (SL) increases intracellular chloride concentration [Cl]i, impairing GABA$_A$ inhibition of arginine vasopressin (AVP) neurons in the supraoptic nucleus (SON) of hypothalamus. But the regulatory mechanisms leading to increased [Cl]i is not completely understood. Based on previous studies, we hypothesize that SL activates tyrosine receptor kinase B (TrkB) and downregulates K+/Cl- co-transporter 2 (KCC2) membrane expression. Downregulation of KCC2 decreases the efflux of chloride, Cl ion causing increase in [Cl]i in SON AVP neurons. In this study, we combined virally mediated ClopHensorN, a relatively new ratiometric Cl imaging technique with capillary based Simple Wes to record changes in [Cl]i and specifically detect KCC2 protein expression in individual SON AVP neurons.

Methods: Adult male Sprague Dawley rats were bilaterally injected in the SON with rAAV2-0VP1-ClopHensorN. The ClopHensorN (Addgene Plasmid #50758) was packaged in an AAV2 vector with an AVP promotor (Addgene Plasmid #40868). After 2 weeks, the rats were given either water or 2% NaCl to drink for 7 days. At the end of the protocol, the rats were anesthetized with inactin and their SONs were dissociated. The cells were plated on coverslips and placed in a perfusion bath on an inverted microscope for ratiometric live cell imaging. ClopHensorN positive neurons were tested for decrease or increase in [Cl]i to focal application of GABA$_A$ agonist muscimol (100uM). After imaging, individual neurons were collected by aspirating into a patch pipette to verify KCC2 and ß-Actin protein expression. Protein Simple Wes (12-230kDa matrix) was used to identify and quantitate very low concentration of protein from single neuron. Data were analyzed by Chi-squared test and one-way ANOVA with Bonferroni comparisons.

Results: Muscimol application to SL SONs either significantly increased Cl efflux (p<0.05;13/20) or did not change Cl flux (7/20). TrkB antagonist (AnA,50uM) significantly blocked the Cl effluxes. SONs from euhydrated rats showed muscimol induced Cl influx (p<0.05;11/16). KCC2 antagonist (VU 0240551,10uM) significantly blocked the Cl influxes in euhydrated rats. SON AVP neurons that responded to pharmacological inhibitors during Cl imaging were viable and expressed KCC2 co-transporter and ß-Actin. Neurons that did not respond during Cl imaging did not had KCC2 and ß-Actin protein expression.

Conclusion: Salt loading increases [Cl]i in SON AVP neurons through TrKB-KCC2 mechanism.

1810 - Oral
Classification: GSBS Student
Presenter: Venkata Viswanadh Edara
Department: GSBS: Microbiology, Immunology & Genetics
Authors: Venkata Viswanadh C Edara; Kathleen Borgmann; Anuja Ghorpade

Astrocyte HIV-1 Proviral Reservoirs in HAND

Purpose: Even though astrocytes are restrictively infected with HIV-1, they are capable of producing neurotoxic viral proteins and proinflammatory mediators. This can significantly aggravate the pathogenesis of HIV-associated neurocognitive disorders (HAND). Thus, there is a great need to identify latently infected astrocytes and develop strategies to target this elusive population. We hypothesize that harboring HIV-1 proviral reservoirs alters astrocyte function in conjunction with unique gene expression patterns that could serve as biomarkers and facilitate targeted therapy.

Methods: Red/Green-HIV-1 (R/G-HIV-1) was used to visualize viral promoter (LTR) activity in primary human astrocytes. Astrocytes with active (R+/G+) and silent (R+/G-) LTRs were enriched using FACS.

Results: Nested Alu-gag PCR confirmed the presence of integrated R/G-HIV-1 provirus in transduced astrocytes. Astrocytes with silent promoter activity were devoid of late viral proteins such as p24, indicating a functionally silent HIV-1 LTR. However, interluekin-1β (IL-1β) and Vorinostat, a histone deacetylase inhibitor (HDACi), reactivated silent HIV-1 LTR in R/G-HIV-1+ astrocytes. Glutamate clearance ability and cell proliferation were significantly impaired in astrocytes with either silent (R+/G-) or active (R+/G+) HIV LTRs when compared to integrase deficient R/G-HIV-1 (D116A) transduced cells.

Conclusions: Our data suggest that harboring HIV-1 provirus, either active or silent, interfered with astrocyte function and growth. Hence, we propose that identifying biomarkers for astrocytes harboring HIV provirus, and therapeutic gene editing to eliminate proviral gene expression will improve physiological function compared to HIV-1 infected cells.

1811 - Oral
Classification: GSBS Student
Presenter: Prah Jude K
Department: GSBS: Pharmacology & Neuroscience
Authors: Jude Prah; Ali Winters; Kiran Chaudari; Jessica Hersh; Ran Liu; Shaohua Yang

Development of a serum free astrocyte culture method that mimic resting in vivo astrocyte phenotype

Purpose: Primary astrocyte cultures have been extensively used for characterization of astrocytes functions in physiological and pathological conditions. The current primary astrocytes are mostly maintained in fetal bovine serum (FBS) containing medium. Although FBS contains growth elements that fulfills many metabolic needs of cultured astrocytes, it alters the genotypic and morphological profiles of primary astrocytes as well as induces astrocyte activation. The aim of this study was to establish a serum-free astrocyte culture medium that maintains primary astrocytes in a quiescent state with phenotypes that mimic in vivo astrocytes.

Methods: Primary astrocytes were isolated from the cerebral cortex of postnatal day 1 C57BL/6 mice and cultured in serum-free astrocyte basal medium containing FGF2 and EGF (ABM-FGF2-EGF). The phenotype of primary astrocytes cultured in ABM-FGF2-EGF were compared with astrocytes cultured in FBS supplemented DMEM medium (MD-10% FBS). Growth assays, immunostaining, Western blot, quantitative polymerase chain reaction, and metabolic assays were used to access the growth rates, metabolic phenotype, mRNA expression profiles and quiescent or reactive states of astrocytes.

Results and Conclusions: We demonstrated that the novel serum free ABM-FGF2-EGF medium supports astrocytes growth and enhanced glycolytic metabolism with higher glycogen content, lower GFAP and vimentin expression, and increased glutamate transporter mRNA levels as compared to astrocytes cultured in the MD-10% FBS medium. Our study suggests that our serum free culture method produces astrocytes with a biosynthetic phenotype and morphology similar to in vivo resting astrocytes. Additionally ABM- FGF2-EGF cultured primary astrocytes could be activated by various pathological conditions. The developed serum-free and EGF/FGF2-containing astrocyte basal medium will provide a critical tool for defining the precise function of astrocytes under physiological and pathological conditions.

2202 - Oral
Classification: GSBS Student
Presenter: Carmen Claudio
Department: GSBS: Pharmacology & Neuroscience
Authors: Carmen Claudio; Ren-Qi Huang; Glenn H. Dillon; Jin Liu; Hamed Hayatshahi; Kyle Emmitte

Mapping the binding site mediating carisoprodol's direct activation of GABAA receptors

Carisoprodol (CSP) is a centrally-acting prescription muscle relaxant that can directly activate and allosterically modulate the $GABA_A$ receptor. $GABA_A$ receptors are the target of many different clinically prescribed compounds. Our previous studies have shown that CSP differentially potentiates $GABA_A$ receptor subtypes via allosteric modulation and direct activation. It has been reported that a single amino acid residue, L415, located at the top of the fourth transmembrane domain (TM4) in the a1-subunit of the $GABA_A$ receptor is critical to CSP's direct gating effect. However, whether the residue is involved in CSP binding remains unsolved. The purpose of the present study is to explore the binding site mediating CSP's direct action with in-silico docking, site-directed mutagenesis and whole-cell electrophysiology. Initial simulated docking of CSP at the $GABA_A$ receptor suggested that the CSP binding pocket may be formed by residues from the TM4, pre-TM1 and cys-loop regions of the a-subunit. In whole-cell electrophysiology studies, specific modifications of CSP's molecular structure produced greater direct action on $GABA_A$ receptors. The role of the residues predicted as a CSP binding site in docking analysis are being verified with mutagenesis and patch clamp studies. It is expected that the results will not only enhance our understanding of CSP pharmacology but also the structure-function relationship at the $GABA_A$ receptor.

IRB/IACUC/IBC#: IBC/rDNA/HR-2018-1

Women's Health (Abstracts in the 2700s)

2714 - Oral
Classification: Dual Degree Student
Presenter: Spencer C Cushen
Department: GSBS: Physiology & Anatomy
Authors: Spencer C Cushen; Oluwatobiloba Osikoya; Alexandra Blessing; Nicole R Phillips; Styliani Goulopoulou

Placental Exposure to Hypoxia and Oxidative Stress Causes Mitochondrial DNA Release into the Extracellular Space

Purpose: In preeclampsia, a severe hypertensive disorder of pregnancy, placentae experience reduced perfusion, increased cell death, and oxidative stress. Also, there is an increase in circulating cell-free mitochondrial DNA (mtDNA) in the maternal blood. The main objective of this study was to determine the role of hypoxia and oxidative stress in mtDNA release from placental cells, and to examine the effects of soluble factors from hypoxia-exposed placentae on vascular reactivity. To address this objective, the following hypotheses will be tested: a) Exposure to hypoxia and oxidative stress will result in mtDNA release via cell-death dependent mechanisms in human trophoblast cells. b) Soluble factors from hypoxia-exposed placentae will result in reduced vasodilation in rat maternal arteries.

Methods: To examine the effects of preeclampsia-related placental stressors on mtDNA release, we treated human trophoblast cells (BeWo cell line) with: 1) hypoxia (1% O_2) vs. normoxia (21% O_2) for 15 h, or 2) a mitochondrial complex I inhibitor (Rotenone, 10 μM) vs. vehicle for 4 h. mtDNA in cell culture supernatant was measured using absolute qPCR and cell death was quantified using flow cytometry. To test the effects of hypoxic placenta-derived factors on maternal vascular function, we used mesenteric arteries and placenta-conditioned media (PLmedia) from pregnant rats. Placentae were incubated in physiological salt solution (37°C) for 3 h in either 1% or 21% O_2, while arteries were mounted on a wire myograph and underwent a baseline [(-) PL_{media}] concentration-response curve (CRC) to acetylcholine (ACh, $10^{-9} - 3 \times 10^{-5}$ M) followed by 30-min incubation with PL_{media}, after which the CRC was repeated.

Results: Exposure of trophoblast cells to rotenone resulted in cell death (Vehicle: 28.17 ± 2.67% vs. Rotenone: 48.43 ± 1.22%, n = 3, P = 0.002) and mtDNA release (Vehicle: 1.69 ± 0.12 ng/uL vs. Rotenone: 2.39 ± 0.10 ng/uL, n = 5, P = 0.002). Hypoxia did not induce trophoblast cell death (Normoxia: 24.7 ± 0.50% vs. Hypoxia: 24.25 ± 0.45%, n = 2, P = 0.6), but increased release of mtDNA (Normoxia: 14.22 ± 1.20 pg/uL vs. Hypoxia: 20.64 ± 0.39 pg/uL, n = 3, P = 0.007). PL_{media} from normoxic and hypoxic placentae reduced sensitivity to ACh ($-logEC_{50}$, Normoxia: $(-)PL_{media}$: 7.48 ± 0.03 vs. $(+)PL_{media}$: 6.96 ± 0.10, n = 4, P = 0.02; Hypoxia: $(-)PL_{media}$: 7.35 ± 0.35 vs. $(+)PL_{media}$: 6.70 ± 0.29, n = 3, P = 0.08).

Conclusion: A placental cell model of mitochondrial stress results in cell death and release of mtDNA, while a hypoxic model of stress results in release of mtDNA without cell death. Placental factors decrease resistance artery sensitivity to vasodilators in both normoxic and hypoxic conditions, indicating that the placenta contributes to maternal vascular tone in healthy pregnancies and in pregnancies complicated with reduced perfusion. Ongoing studies investigate the vasoactive potential of placenta-derived cell-free mtDNA.

2715 - Oral
Classification: GSBS Student
Presenter: Oluwatobiloba Osikoya
Department: GSBS: Physiology & Anatomy
Authors: Oluwatobiloba Osikoya; Hijab Ahmed; Sareh Panahi; Stephane L. Bourque; Styliani Goulopoulou

Uterine perivascular adipose tissue: A novel regulator of uterine artery hemodynamics during normal pregnancy

Introduction: During pregnancy, uterine artery (UtA) blood flow increases compared to non-pregnant state, in part due to reductions in uterine artery tone. The main objective of this study was to determine the role of adipose tissue surrounding UtA (perivascular adipose tissue, PVAT) in pregnancy-induced changes in UtA blood flow and vasodilatory capacity. We hypothesized that uterine PVAT augments UtA blood flow and potentiates UtA dilatory responses in pregnant rats. Also, we hypothesized that pregnancy induces distinct changes in uterine PVAT morphology and gene expression as compared to other adipose depots.

Methods: Blood flow and vascular reactivity were measured in UtA in pregnant and non-pregnant rats using transonic perivascular probes and wire myography techniques, respectively. Reactivity to acetylcholine (ACh: induces endothelium-dependent relaxation, 10^{-9} - 3×10^{-5} M) and sodium nitroprusside (SNP: induces endothelium-independent relaxation, 10^{-11} - 3×10^{-5} M) was measured in isolated UtA in the presence and absence of PVAT-conditioned media ($PVAT_{media}$, 30-min incubation). Adipocyte size was determined in hematoxylin and eosin-stained sections of uterine PVAT and ovarian adipose tissue. Gene expression was determined in uterine and periaortic PVAT using qRT-PCR.

Results: Maximum and minimum uterine artery blood flow (UBF) were increased in UtA with intact PVAT compared to PVAT-denuded UtA from pregnant rats (UBF_{max} (mL/min); denuded: 1.47 ± 0.3 vs. intact: 2.23 ± 0.2, p = 0.01; UBF_{min} (mL/min); denuded: 0.71 ± 0.1 vs. intact: 1.16 ± 0.1, p = 0.0002). Uterine PVAT had no effect on UBF in non-pregnant rats (p > 0.9). UtA from pregnant and non-pregnant rats incubated with $PVAT_{media}$ had reduced sensitivity to ACh compared to UtA controls (Pregnant, pEC_{50}; -$PVAT_{media}$: 7.14 ± 0.1 vs. +$PVAT_{media}$: 6.38 ± 0.2, p = 0.0006; Non-pregnant, pEC_{50}; -$PVAT_{media}$: 7.01 ± 0.1 vs. +$PVAT_{media}$: 6.50 ± 0.1, p = 0.005). $PVAT_{media}$ had no effect on UtA sensitivity to SNP in either pregnant (p = 0.48) or non-pregnant rats (p = 0.2). Adipocyte area was greater in ovarian adipose tissue from pregnant compared to non-pregnant rats [Area (μm^2/unit cell); Non-pregnant: 563.6 ± 76.6 vs. Pregnant: 857.6 ± 31.0, p = 0.02] but there were no group differences in uterine PVAT morphology (p = 0.6). Expression of uncoupling protein-1 (UCP-1) was downregulated (p = 0.02) in aortic PVAT but was unchanged in uterine PVAT (p = 0.4). Expression of peroxisome proliferator-activated receptor gamma (PPAR-γ), adiponectin receptor (AdipoR1), and leptin were downregulated in uterine PVAT (p < 0.02) but not in aortic PVAT (p > 0.6).

Conclusions: Uterine PVAT plays a regulatory role in uterine artery hemodynamics and reactivity during normal pregnancy and has a distinct and differential gene profile as compared to other perivascular depots. Ongoing studies investigate the effects of pregnancy on cross-talk between PVAT and maternal uterine arteries.