



Research Appreciation Day

26 March
2021

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HEALTH SCIENCE CENTER at FORT WORTH

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Research Appreciation Day

AWARDS

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RAD 2021 Winners

Graduate School of Biomedical Sciences

Graduate School of Biomedical Sciences, Department of Physiology & Anatomy-Structural Anatomy & Rehabilitation Sciences

Second Place \$200 Title: Assessing Ecogeographic Variation in the Nasal Passages Utilizing 3D Semilandmarks

(# 710) Presenter: Lyndee Ward

Graduate School of Biomedical Sciences, Department of Physiology & Anatomy-Structural Anatomy & Rehabilitation Sciences

First Place \$400 Title: Craniofacial Bone Mineral Density During Growth in Mice with Osteogenesis Imperfecta (OI)

(# 465) Presenter: Courtney A. Miller

Graduate School of Biomedical Sciences-North Texas Eye Research Institute Graduate Student

Second Place \$200 Title: Evaluation of Neuroprotective Effect of hybrid compound SA-2 Nanosuspension in Optic Nerve Crush Mouse Model.

(# 572) Presenter: Charles Amankwa

Graduate School of Biomedical Sciences-North Texas Eye Research Institute Graduate Student

First Place \$400 Title: The Effects of TGF β 2 on Uveoscleral Outflow in the Mouse Eye

(# 662) Presenter: Cooper Stevenson

Graduate School of Biomedical Sciences-Department of Pharmacology & Neuroscience

Second Place \$200 Title: Restoration of HIV infected astrocytes functions by utilizing CRISPR-Cas9

(# 596) Presenter: Boyan Leng

Graduate School of Biomedical Sciences-Department of Pharmacology & Neuroscience

First Place \$400 Title: Effect of dietary genistein on functional recovery and chronic post-stroke inflammation in ovariectomized middle-aged rats

(# 664) Presenter: Anthony Oppong-Gyebi

Graduate School of Biomedical Sciences Oral Presentation

Second Place \$200 Title: Age-related thymic atrophy impairs development and function of an antigen-specific tTreg clone

(# 528) Presenter: Rachel Thomas

Graduate School of Biomedical Sciences Oral Presentation

First Place \$400 Title: ER-associated Regulation of Astrocyte Mitochondrial Function during HIV-1 Infection

(# 514) Presenter: Jessica Michelle Proulx

Graduate School of Biomedical Sciences Postdoctoral Poster Presentation

First Place \$400 Title: Evaluation of effect of below-limit of quantitation (BLQ) data due to nonadherence in population pharmacokinetic (POPPK) modeling

(# 526) Presenter: Asama Tanaudommongkon

Graduate School of Biomedical Sciences Postdoctoral Oral Presentation

First Place \$400 Title: White Mountain Expedition 2019: The Impact of Sustained Hypoxia on Cerebral Blood Flow Responses and Tolerance to Simulated Hemorrhage

(# 450) Presenter: Alexander Rosenberg

Graduate School of Biomedical Sciences-Institute for Healthy Aging

Second Place \$200 Title: Long-term effects of late gestational maternal hypoxic stress on mood disorders: Sex and age differences

(# 456) Presenter: Steve Mabry

Graduate School of Biomedical Sciences-Institute for Healthy Aging

First Place \$400 Title: Characterization of Mitochondrial DNA Damage in Complex Disease Using Two Different NGS Platforms

(# 533) Presenter: Danielle Reid

Graduate School of Biomedical Sciences-Microbiology, Immunology & Genetics

Second Place \$200 Title: Characterization of rHDL Nanoparticles as a Delivery Vehicle for Glioblastoma Multiforme Chemotherapy

(# 488) Presenter: Ezek Mathew

Graduate School of Biomedical Sciences-Microbiology, Immunology & Genetics

First Place \$400 Title: An updated model for maternal separation with early weaning to study early life stress on immune competency

(# 651) Presenter: Jamie Y. Choe

Graduate School of Biomedical Sciences, Department of Physiology & Anatomy-Integrative Physiology Program

Second Place \$200 Title: Acute Intermittent Optogenetic Stimulation of Median Preoptic Nucleus (MnPO) Induces Sympathetic Long-term Facilitation (sLTF)

(# 480) Presenter: Obed Paundralingga

Graduate School of Biomedical Sciences, Department of Physiology & Anatomy-Integrative Physiology Program

First Place \$400 Title: Rats with placental ischemia and preeclampsia-like symptoms have increased circulating cell-free mtDNA

(# 418) Presenter: Jennifer Gardner

Graduate School of Biomedical Sciences Department of Pharmaceutical Sciences & Pharmacotherapeutics

Second Place \$200 Title: Sorafenib loaded In-situ Self-Assembling Nanoparticle: A novel approach to increasing oral bioavailability

(# 618) Presenter: Jaylen Mans

Graduate School of Biomedical Sciences Department of Pharmaceutical Sciences & Pharmacotherapeutics

First Place \$400 Title: Discovery of Small Molecule Slack Inhibitors for the Treatment of MMPSI: SAR Development in the Eastern Region of Hit Compound VU0606170

(# 400) Presenter: Alshaima'a M. Qunies

SaferCare Texas

Excellence in Patient Safety Research Award

Third Place \$100 Title: Patient Safety in the Hospital Pharmacy Setting: Overcoming Barriers and Identifying Solutions

(# 654) Presenter: Hannah Bond

Excellence in Patient Safety Research Award

Second Place \$200 Title: Implementation of a Pre-Operative Huddle at a Level 1 Trauma Center

(# 412) Presenter: Griffin Rechter

Excellence in Patient Safety Research Award

First Place \$300 Title: How Dirty is Your Phone?—Evaluating Healthcare Workers' Cell Phone Use & Cleanliness in an Ambulatory Clinic

(# 511) Presenter: Jeffrey Li

School of Health Professions

2021 Physical Therapy Program Poster Award

Second Place \$200 Title: Tai Chi and Cardiovascular Conditions

(# 399) Presenter: Mersida Kolenovic, SPT

2021 Physical Therapy Program Poster Award

First Place \$300 Title: The Use of Yoga in Children with Autism

(# 552) Presenter: Lezirel Gracia

School of Public Health

2021 School of Public Health & Public Health Student Government Association

Third Place \$250 Title: A Non-Parametric Alternative to The Cochran-Armitage Trend Test in Genetic Case-Control Association Studies: The Two-sided Jonckheere's Test

(# 524) Presenter: Sydney E. Manning

2021 School of Public Health & Public Health Student Government Association

Second Place \$400 Title: Women experiencing homelessness and their knowledge, attitudes, and beliefs about contraception and pregnancy: A systematic review

(# 503) Presenter: Annalynn Galvin

2021 School of Public Health & Public Health Student Government Association

First Place \$550 Title: Physical Inactivity Among High School Students: A Public Health Concern of the 21st Century

(# 715) Presenter: Amber Deckard

Texas College of Osteopathic Medicine

2021 TCOM Pediatric Research Award

First Place \$300.00 Title: Fort Worth Adolescent and Young Adult Cancer Registry: First Look at Initial Data

(# 568) Presenter: Sushreyta Rose

2021 Women's Health Research Award

First Place \$300.00 Title: Assessing Accessibility to Domestic Violence Resources within Tarrant County: A Community-Based Study of Prevalence, Barriers, and Proposed Solutions

(# 682) Presenter: Umar Siddiqui

2021 TCOM Pediatric Case Study Award

First Place \$200.00 Title: A Scholarly Review of NEJM Case 14-2017: A 20-Year-Old Man with Pain and Swelling of the Left Calf and a Purpuric Rash

(# 628) Presenter: Lauren McCormack

2021 PRECISION Pain Research Registry Award

First Place \$250.00 Title: Impact of Failed Back Surgery Syndrome on Health-Related Quality of Life

(# 520) Presenter: Colin Ly

2021 HSC Health Care Delivery Award

First Place \$250.00 Title: Telehealth Visit Satisfaction in Geriatric Patients

(# 453) Presenter: Mohammad Rashik

2021 TCOM Student Research Award

Second Place \$250.00 Title: Correcting occipitomastoid suture slippage using a high velocity low amplitude technique to improve coordination and balance

(# 392) Presenter: Carl Heinrich

2021 TCOM Student Research Award

First Place \$500.00 Title: Telehealth Visit Satisfaction in Geriatric Patients

(# 453) Presenter: Mohammad Rashik

2021 TCOM Student Research Award - Best Case Study

First Place \$250.00 Title: A 32-Day-Old Male Infant with a Fall

(# 642) Presenter: Hasti Barzkar

2021 TCOM Honors Student Research Award

First Place \$250.00 Title: A 32-Day-Old Male Infant with a Fall

(# 642) Presenter: Hasti Barzkar

2021 UNTHSC Interprofessional Award

First Place \$250.00 Title: Assessing Ecogeographic Variation in the Nasal Passages Utilizing 3D Semilandmarks

(# 710) Presenter: Lyndee Ward

2021 TCOM OMM-IM Korr, PhD Memorial Award

First Place \$250.00 Title: The Effect of Osteopathic Manipulation Techniques on the Lymphatic System

(# 473) Presenter: Madison Parker

2021 Medical Student Government Association Best in Second Year Class

First Place \$200.00 Title: Telehealth Visit Satisfaction in Geriatric Patients

(# 453) Presenter: Mohammad Rashik

2021 Medical Student Government Association Best in Third Year Class

First Place \$200.00 Title: Correcting occipitomastoid suture slippage using a high velocity low amplitude technique to improve coordination and balance

(# 392) Presenter: Carl Heinrich

2021 Medical Student Government Association Best in Fourth Year Class

First Place \$200.00 Title: Immunological alterations in murine systemic lupus erythematosus following $\alpha 7$ -nicotinic acetylcholine receptor antagonism

(# 608) Presenter: Dennis Kulp

2021 Medical Student Government Association Best in First Year Class

First Place \$200.00 Title: The Influence of Ecogeographic Variation in Human Nasal Morphology on Thermal Conditioning of Inspired Air

(# 534) Presenter: Elizabeth Thai

UNT System College of Pharmacy

UNT System College of Pharmacy Pharmaceutical Science Research Award

Third Place \$200 Title: Testosterone Replacement Therapy: Role in Modulating Oxidative Stress within the Entorhinal Cortex

(# 518) Presenter: Ammaar Tajani

UNT System College of Pharmacy Pharmaceutical Science Research Award

Second Place \$250 Title: Sex Differences in the Oxidative Stress and Inflammation Response During and After Simulated Hemorrhage in Humans

(# 610) Presenter: Haley J. Barnes

UNT System College of Pharmacy Pharmaceutical Science Research Award

First Place \$400 Title: Optimization of CRISPR-Cas9 via the synergy of MD simulation and machine learning

(# 521) Presenter: Duen-Shian Wang

UNT System College of Pharmacy Clinical/Outcomes Research Award

Second Place \$250 Title: Association of Prescription Opioid Use and Development of Infectious Diseases: A Systematic Review

(# 632) Presenter: Jennifer Ra

UNT System College of Pharmacy Clinical/Outcomes Research Award

First Place \$400 Title: Health Disparities and Risk Patterns of COVID-19 Case, Hospitalization, and Case Fatality in Texas Compared to the United States of America

(# 631) Presenter: Christy Xavier

People's Choice

People's Choice Award

First Place Title: Conducting Research as a First-Year Medical Student

(# 483) Presenter: Siri Tummala



Research Appreciation Day

ABSTRACTS

Addressing Refugee's Barriers to Healthcare in the COVID Pandemic

Research Area: Community Medicine

Abstract ID: UNTHSC694

Presenter Name: Cody Bly

Authors:

Garrett Jackson ^{1 *}

Cody Bly ²

Cassidy Weeks ³

Submission Type: Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: The COVID-19 pandemic has restricted healthcare access for the refugee population in addition to the usual monetary, educational, language, and cultural barriers. The refugee population is significant as Texas is among the top states for refugee resettlement, accepting more than 57,000 refugees from 2010-19. Refugee Health Initiative (RHI), a student-run clinic at University of North Texas Health Science Center (UNTHSC), developed a COVID protocol to address these needs for this ever-growing population. Methods: To decrease the exposure risk, our protocol was divided into two categories: volunteer practices and clinic logistics. The COVID protocol focused on a decentralized system where each volunteer was educated and equipped with best practices as outlined by the CDC. The clinic setting itself was altered to enhance ventilation which included hosting the clinics outdoors. Results: With the changes to the clinic structure RHI has been able to host 8 clinics since October of 2020, administering 150 flu shots, 20 school physicals, and screening and referring 30 patients with chronic illnesses. This includes community outreach to 100+ individuals from these communities who continue to spread awareness of our clinical services. Conclusion: To continue filling the gap between the refugee population and the healthcare system, RHI created a COVID protocol that utilized educating our volunteers in COVID symptoms and best practices and performing the basic health services in environments conducive to limiting virus spread. Commitment to these simple measures resulted in our ability to prioritize preventive care for this vulnerable population.

Association of Survivin in Liver Hepatocellular Carcinoma Patient Survival with an Emphasis on Race and Gender

Research Area: Cancer

Abstract ID: UNTHSC582

Presenter Name: Nora Tran

Authors:

Nora Tran ^{1 *}

Riyaz Basha ²

Victoria Ibarra-Aleman ³

Paul Spore ⁴

Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Liver hepatocellular carcinoma (LIHC) represents the most common type of primary liver cancer in many parts of the world. In LIHC, Survivin is associated with increased tumor aggression and a poorer prognosis. Survivin is a member of the inhibitor of apoptosis (IAP) protein family that inhibits caspases and thus plays a role in several molecular processes, including apoptosis. The objective of this study is to evaluate the association of Survivin expression with LIHC on the basis of race and gender. Methods: In silico analysis was conducted using information from UACLAN: A portal for facilitating tumor subgroup gene expression and survival analyses. UACLAN uses the data from The Cancer Genome Atlas (TCGA) and Clinical Proteomic Tumor Analysis Consortium (CPTAC). Results: Analysis showed a significant relationship between high Survivin expression and lower survival probability with Asian patients than those with tumors that expressed low/medium levels of Survivin. No significant relationship in survival probability was found when comparing Survivin expression among African Americans and Caucasians. There was also a significant relationship shown between low/medium and high Survivin expression in females and lower survival probability than in men with high and low/medium expression, respectively. Lastly, a significant relationship between expression of high levels of Survivin and lower survival probability than in men whose tumors expressed low/medium levels of Survivin was shown. Conclusion: Given the significance of Survivin's expression with survival probability in Asians and gender, Survivin is a promising prognostic biomarker and target for improving the prognosis or treatment of LIHC patients.

5-Methoxyindole-2-Carboxylic acid (MICA) as a potential caloric restriction mimetic

Research Area: Pharmaceutical Sciences

Abstract ID: UNTHSC543

Presenter Name: Zachary Evans

Authors:

Zachary Evans ^{1 *}

Liang-Jun Yan ²

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Calorie restriction (CR), as an intervention to influence aging and disease, has been demonstrated to show an inhibitory effect on dihydrolipoamide dehydrogenase (DLD), the E3 subunit of pyruvate dehydrogenase. Elevated DLD activity has been linked with an increased generation of reactive oxygen species (ROS). Increased levels of ROS contribute to aging effects and decreased life span. Theoretically, an inhibitor of DLD would produce the same decrease in ROS as CR. Methods: Searching PubMed with keywords such as caloric restriction, dihydrolipoamide dehydrogenase, 5-methoxyindole-2-carboxylic acid, reactive oxygen species, etc. Results: 5-Methoxyindole-2-Carboxylic acid (MICA) has been shown to inhibit DLD activity which could potentially limit the level of ROS produced in the body. Conclusion: Because of this mechanism of action, we have proposed that MICA has the potential to provide, at least in part, calorie restrictive mimicry by carrying out some of the beneficial physiological effects of CR.

5-Methoxyindole-2-Carboxylic Acid (MICA) Fails to Retard Development and Progression of Type II Diabetes in ZSF1 Diabetic Rats

Research Area: Diabetes

Abstract ID: UNTHSC398

Presenter Name: Liang-Jun Yan

Authors:

Liang-Jun Yan ¹ *

Submission Type: Non-Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: Faculty / Staff (Not for Competition)

Abstract: Purpose: 5-Methoxyindole-2-carboxylic acid (MICA) is a well-established reversible inhibitor of mitochondrial dihydrolipoamide dehydrogenase (DLDH). This chemical, as an indole derivative, has been shown to be neuroprotective against ischemic stroke injury when administered either before or after ischemic stroke in animal models. MICA has also been studied as a potential antidiabetic agent by numerous investigators, though the underlying mechanisms remain sketchy. To attempt to elucidate the mechanisms of its antidiabetic action, we tested the effect of MICA on ZSF1 rat, a widely used rodent model of type 2 diabetes. Methods: ZSF1 rats as well as its healthy controls were fed with control diet or MICA-containing diet (200 mg/kg/day) for 9 weeks, and then comparison of body weight changes and blood glucose levels at the end of the 9-week's feeding period were made. Conclusion: Our data indicate, unexpectedly, that MICA failed to show any anti-diabetic effect in the ZSF1 diabetic rats. The reasons for this failure were briefly discussed.

A 14-Month-Old Girl with Recurrent Vomiting

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC475

Presenter Name: Danielle Esteban

Authors:

Monica Rodriguez ^{1 *}

Danielle Esteban ²

David Donahue ³

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: Hydrocephalus is an abnormal accumulation of cerebrospinal fluid (CSF) in the brain's ventricles. As the ventricles enlarge, brain pressure increases, leading to cognitive difficulties, impaired vision, delayed development, and death. Epidemiologic studies estimate a yearly average of 6,000 hydrocephalus cases in newborns. Case Presentation: A 14 month and 19-day old female infant suffered recurrent episodes of vomiting. The first episode occurred at age 11 months and 12 days. The emergency room (ER) diagnosis was viral gastroenteritis; vomiting resolved with supportive care and antiemetic medication. The following two months she returned to the ER three times for recurrent vomiting. On the last ER visit, her parents reported developmental regression during the previous three months. Examination findings included frontal bossing, full fontanelle with visible pulsations, enlarged head circumference (>95th percentile), and signs of pyramidal tract dysfunction. Magnetic resonance imaging showed enlargement of the lateral and third ventricles with cerebral aqueduct stenosis. No masses or lesions were noted. In this case, the rapid increase in head circumference, developmental regression, and imaging results was key to the diagnosis of increased intracranial pressure due to aqueductal stenosis with hydrocephalus. Therapies for hydrocephalus include shunts and endoscopic third ventriculostomy (ETV). This patient was successfully treated with an ETV, creating an opening in the third ventricle to drain excess CSF. Untreated, hydrocephalus could have caused further developmental regression, brain damage, and even death. Conclusions: This case illustrates the importance of primary care continuity, tracking developmental milestones and head circumference using growth charts.

A 20-Year-Old Man with Sore Throat, Fever, Myalgias, and a Pericardial Effusion

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC643

Presenter Name: Sheena Ghalla

Authors:

Sheena Ghalla ^{1 *}

Jonathan Hatch ²

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: Adult Onset Still's Disease is rarely diagnosed, yet if missed, can lead to severe consequences. In this scholarly review of a case study, we analyze an article from the New England Journal of Medicine titled, "A 20-Year-Old Man with Sore Throat, Fever, Myalgias, and a Pericardial Effusion." Observations: The patient initially presented with a fever and diffuse myalgia that had progressively gotten worse over the following days. He developed sore throat, shortness of breath, and pain on the left side of his chest. Ant biotics were administered to the patient but showed no relief of symptoms. Eventually, the patient was admitted to the hospital, where he developed faint pink macules on his forearms and lower extremity pitting edema. Diagnosis: While this patient presented with a variety of signs and symptoms, he presented with 7 of the 8 Yamaguchi criteria, often used in diagnosing Adult Onset Still's Disease. These included temperature $\geq 39^{\circ}\text{C}$ lasting ≥ 1 week, arthralgias lasting for ≥ 2 weeks, rash, leukocytosis, sore throat, abnormal LFTs, and negative ANAs and RFs. Presence of the Yamaguchi criteria combined with an absence of other disease processes left Adult Onset Still's Disease as the final diagnosis. The patient was treated with burst steroids and IL-1 receptor antagonists for quick resolution. Consequences of Wrong Diagnosis: Diagnosing Adult Onset Still's Disease is crucial to preventing deadly sequelae such as macrophage activation syndrome, disseminated intravascular coagulopathy, thrombotic thrombocytopenic purpura, diffuse alveolar hemorrhage, and pulmonary arterial hypertension.

A 3-Year-Old Boy with Seizures

Research Area: Neuroscience

Abstract ID: UNTHSC578

Presenter Name: Chandana Tatineni

Authors:

Chandana Tatineni ^{1*}

Alexander Nguyen ²

Rebecca Luke ³

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: First described in 2007, Anti-NMDA Receptor Encephalitis is an autoimmune disease caused by immunoreactivity against the NR1/NR2 subunit of the NMDA receptor in the central nervous system. According to the California Encephalitis Project, Anti-NMDA was a more common presentation of encephalitis than viral causes. Case Presentation: A 3-year-old presents to the ER with a possible seizure and recent history of decreased language output and abnormal body stiffness with flexed arms and shaking movements that is prominent on the left side. His initial ER presentation shows signs of fever with unremarkable physical exam, labs and imaging. After no overnight seizures, he was discharged home. A week later, he developed mood lability and other behavioral changes. His second ER presentation shows lymphocytic pleocytosis and a brain MRI shows signs of cerebral inflammatory processes with bilateral non-specific hyperintense lesions. He was started on steroids and IVIG based on the suspicion of Anti-NMDA Receptor Encephalitis. On the 8th day, serum and CSF assays came back positive for the anti-NMDA Receptor antibodies. He continued to receive seizure medications to control his symptoms and was discharged 3 months later to in-patient rehab. Conclusion: This case presents a unique presentation of Anti-NMDA Receptor Encephalitis that was found in a young male instead of the typical tumor associated disease in a young female. This case study emphasizes the need to test for anti-NMDA Receptor antibodies when evaluating young patients with signs of encephalitis.

A 32-Day-Old Male Infant with a Fall

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC642

Presenter Name: Hasti Barzkar

Authors:

Hasti Barzkar ^{1 *}

Saqeeb Ali ²

Maxie Brewer ³

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: Abusive head trauma is a form of child abuse that leads to brain injuries. Currently, it's the most common cause of traumatic death in children less than 2 years old. Case presentation: A 32-day-old male infant was evaluated in the emergency department after the mother reported the infant fell from a bed while she briefly stepped away. The mother comforted the crying infant for several minutes before he suddenly became quiet which prompted her to call emergency medical services. After a benign physical exam, a head CT revealed multiple densities which were concerning for a cerebral hemorrhage and, thus, abusive head trauma. The patient was transferred to another emergency department where a thorough history and physical exam were conducted again. A head MRI at the second hospital revealed multiple foci of hemorrhage. The following differential diagnoses were considered: metabolic disease, benign hemorrhage, cerebral sinus venous thrombosis, birth trauma, accidental trauma and bleeding disorders. After reviewing the patient's family history and laboratory studies, an initial diagnosis of intracranial hemorrhage due to a bleeding disorder during parturition was made. The patient was discharged and followed up over multiple visits. Repeat physical exams, MRI, and laboratory studies were all negative for signs of a bleeding disorder. A final diagnosis of intracranial hemorrhage due to birth trauma was made. Conclusion: This case highlighted the importance of ruling out differentials that present similarly to abusive head trauma since a diagnosis of child abuse can lead to dire consequences for the child and parents.

A Biological Approach in Exploring Breast Cancer Disparities

Research Area: Cancer

Abstract ID: UNTHSC605

Presenter Name: Arkoon Ali

Authors:

Arkoon Ali ^{1 *}

Umesh Sankpal ²

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: In the United States, healthcare disparities lie across a multitude of diseases including breast cancer. These disparities are caused by multiple different factors such as socioeconomic status, education, environment, biology, and others. To overcome the disparities, each factor needs to be addressed with research and development. In the US, breast cancer death rates have significantly declined since the start of 21st century. However, looking closer at breast cancer outcomes between races, a significant racial disparity is seen between white and black women. Research has found that black women are diagnosed with breast cancer at an earlier age and with the most aggressive triple negative tumors. These factors attribute to the differences in outcomes between the black and white populations. Studies have also identified various biological differences between the two populations that can potentially affect outcomes for breast cancer. Method: Genomic data from breast tumor was used to obtain differentially expressed genes between the two populations. These were evaluated as possible biological markers for racial disparity in breast cancer. Results: Genes were identified that were expressed at higher levels in tumor tissue from black women compared to white. This also correlated with the lower survival rates observed for black women. Conclusion: In addressing the disparities of healthcare and more specifically those seen in breast cancer, novel approaches are needed to reduce mortality and improve outcomes for the black population. These approaches need to include a combination of public health strategies along with biological methods and techniques to improve outcomes.

A Cadaveric Investigation of the Long Thoracic Nerve

Research Area: Structural Anatomy

Abstract ID: UNTHSC393

Presenter Name: Libby Bradley

Authors:

Libby Bradley ¹

Howe Liu ^{2*}

Myla Quiben ³

Rustin Reeves ⁴

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: GSBS Student

Abstract: Introduction: Entrapment of the long thoracic nerve (LTN) is associated with pain in the thorax and back. Entrapment can occur at many places along the pathway of the LTN, including the cervical spine and the scalene muscles, which can make it hard to diagnose. The purpose of this study was to document the LTN's anatomy and measure the course it takes with regard to the serratus anterior muscle. Method: From 4 previously dissected, adult cadavers, 8 LTNs were documented regarding the nerve's anatomical route and muscular innervation. A transverse plane through the cricothyroid membrane was established and a t-pin was pierced into the nerve at that plane and measurements were taken using Vernier calipers. Results: The average length from the spinal origin of LTN to the insertion into the serratus anterior muscle was the width of 10.3 thumb interphalangeal joint (IPJ) on the right side and 9.75 IPJ on the left side. The average length from the origin to the cricothyroid membrane was 5.15 IPJ on the right side and 4.4 IPJ on the left side. The average length from the cricothyroid membrane to the serratus anterior insertion on the right side was 5.15 IPJ and 5.35 IPJ on the left side. Conclusion: Knowing the average lengths of the LTN can better help treat the entrapment with manual therapy, topical injections, or even surgery. The results will assist to help improve clinicians' ability to locate the site of LTN entrapment so appropriate management can be implemented.

A case of acute appendicitis presenting with mild symptoms on a routine diabetes follow-up visit

Research Area: General Medicine

Abstract ID: UNTHSC696

Presenter Name: Nur-Alhuda Shahub

Authors:

Nur-Alhuda Shahub ^{1 *}

Mashe ka Jackson ²

Submission Type: Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Worldwide, acute appendicitis is one of the most common reasons for emergency abdominal surgeries; incidence is approximately 100 per 100,000 person-years. Presenting symptoms, such as abdominal pain and nausea, can resemble many other disorders and although rare, can be diagnosed incidentally during routine office visits for other complaints. Case Presentation: A 57-year old African-American female presented for a routine follow up visit for diabetes mellitus at an outpatient clinic. During the visit, the patient stated that she had been experiencing generalized abdominal pain (with nausea) that had later localized to the right lower quadrant. Vitals were within normal limits. Pain was described as waxing and waning and worse with movement. Physical exam revealed pain elicited on deep palpation of the right lower quadrant, maximal at McBurney's point, and the patient was advised to go to the emergency room due to suspicion of acute appendicitis. Workup at the emergency room revealed no leukocytosis, fever, or systemic inflammatory response syndrome. CT scan revealed a focal outpouching arising from the cecum due to possible appendiceal origin or diverticulum with surrounding inflammatory changes and an appendicolith concerning for inflammatory process, without associated fluid collections or free air. Emergency appendectomy was performed and patient made a full recovery. Conclusion: This case illustrates a unique presentation of acute appendicitis diagnosed incidentally at a routine outpatient visit for diabetes follow up, and emphasizes the unique role of primary care physicians in recognizing this disease even in well-appearing patients with mild symptoms.

A Case of An Accessory Levator Scapulae Muscle

Research Area: Structural Anatomy

Abstract ID: UNTHSC659

Presenter Name: Joy Mong

Authors:

Lianne Wagner ¹

Joy Mong ^{2 *}

Cara Fisher ³

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: The levator scapulae is a posterior axioappendicular muscle that attaches the upper limb to the vertebral column. It originates from C1-C4 transverse processes and inserts on the margin of the superomedial angle of the scapula. This case report documents a variation of the musculature in the levator scapulae with a unilateral accessory muscle inserting into the trapezius instead of the scapula. There have been some documented cases of anatomical variations of levator scapulae, however these variations were usually found to be of atypical origin or insertion. There have not been any documented cases of an accessory levator scapulae muscle belly matching the morphology noted here. The clinical implications of anatomical variants such as this one must be considered. Case Information: During a detailed cadaver dissection, a left unilateral accessory muscle of the levator scapulae was discovered. It originated just anterior to the bulk of the levator scapulae at the C2 level and inserted into the superior descending trapezius. This accessory levator scapulae measured 6.5 cm long and 0.5 cm wide. Conclusion: Knowledge of anatomical variants of levator scapulae is relevant to clinicians working in the fields of surgery, neurology, radiology and musculoskeletal medicine. This muscle is frequently implicated in the etiopathology of neck and shoulder pain and increased tension in levator scapulae has also been linked to increased cervicogenic headaches. Structural variations, such as this, may be a contributing factor to postural abnormalities leading to chronic myofascial pain and headaches.

A Case of Fever of Unknown Origin in the Setting of an Uncommon Exposure History & Nonspecific Symptoms

Research Area: General Medicine

Abstract ID: UNTHSC479

Presenter Name: Olivia Tomasco

Authors:

Olivia Tomasco ^{1 *}

Kyle Yen ²

Shivani Desai ³

Submission Type: Non-Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: This case of fever of unknown origin with a broad differential illustrates the potential for multiple diseases to co-occur. Case Presentation: A 46-year-old female with a past medical history of malaria and TB presented with cough, shortness of breath, cyclical fever up to 103°F, diffuse rash, BRBPR, joint pain, multiple liver nodules, night sweats, and 20-lb weight loss following travel to Burma 6 months prior. Physical exam revealed tachycardia with irregular rhythm and a holosystolic murmur, suprapubic tenderness, 2+ lower extremity edema, and scattered small, round pruritic, erythematous rashes throughout all 4 extremities. Several fungal, parasitic, viral, and bacterial infectious etiologies were considered. Labs were significant for the following etiologies: infectious- EBV DNA and Brucellosis, Bartonella Hensleae, Coccidioides, and hepatitis A ant bodies; Malignancy- protein gap IgG 2x upper limit; Autoimmune- anti-dsDNA 1:640, CRP 9.7, protein:creatinine ratio 62.1 with decreased C3/C4, positive Coombs, positive ANA, elevated ACE-I levels, and anti-smooth muscle/anti-cardiolipin/anti-RNP/myeloperoxidase antibodies, leading to a broad autoimmune differential. Imaging showed multiple liver nodules, and liver biopsy revealed extramedullary hematopoiesis and diagnosis of stage III High Grade B Cell Lymphoma with CD20+, BCL-2+, Myc+, Ki67>90% cytology. Despite this diagnosis, there was clear concurrent autoimmune manifestation and the treatment team suspected rheumatologic etiology over malignancy prior to diagnosis. Conclusion: This unusual case shows how autoimmune and malignant symptomatology can co-occur, generating a clinical picture that is persistently nonspecific. This case also raises the question of how autoimmune disease can trigger malignancy.

A Case of Treatment-Resistant Catamenial Disease: Insufficiency in Mainstay Treatment Options

Research Area: General Medicine

Abstract ID: UNTHSC395

Presenter Name: Annum Faisal

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Sahar Fatima ³

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Introduction: Thoracic endometriosis syndrome (TES) is characterized by presence of ectopic endometrial tissue within the thoracic cavity, mainly the lung parenchyma and pleura. TES presents as catamenial pneumothorax (CP), catamenial hemothorax (CH), pulmonary nodules or hemoptysis. Hormonal therapy is considered first line treatment followed by operative thoracoscopy for removal of ectopic endometrial implants. Description: A 37-year-old G4P0040 female presented to the emergency department (ED) with worsening shortness of breath for 5 days. Associated symptoms included cough and right-sided chest pain localized to the lateral right mid-lower rib cage. Her past medical history is significant for hypertension, obesity, iron deficiency anemia, severe endometriosis and TES manifesting as recurrent, right-sided pleural effusions, CPs and CHs requiring surgical treatment. Her current medications include leuprolide 11.25mg injection/30 days, norethindrone and ferrous sulfate daily. She appeared in distress with a BP of 166/102. Physical examination revealed tachypnea, accessory muscle usage, and respiratory distress. Chest x-ray and CT were consistent with findings for right tension hemothorax. CBC revealed Hb of 5.7g/dl. She was initially started on BiPAP and a tube thoracostomy was performed to place a chest tube. She was transfused 4 units pRBC and admitted to the ICU for further monitoring. Leuprolide was administered to prevent recurrence of hemothorax, and patient was discharged after resolution of symptoms confirmed by imaging. Conclusion: This unique case illustrates the insufficiency in surgical and hormonal mainstay treatments. Novel treatments and multidisciplinary team approach should be used in conjunction to effectively treat TES and prevent disease relapse.

A Case Report of Multisystem Inflammatory Syndrome in Children Presenting as Typhus

Research Area: Microbiology / Infectious Disease

Abstract ID: UNTHSC574

Presenter Name: Anisha Mahajan

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Rachel Jalfon ⁶

Navid Anvaripour ⁷

Submission Type: Non-Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Multisystem Inflammatory Syndrome in Children (MIS-C) is described as a set of life-threatening clinical symptoms arising secondary to an inflammatory response triggered by SARS-CoV-2 infection, typically manifesting 25 days after initial symptom onset. Considerations for diagnosis include age < 21, fever, laboratory evidence of inflammation, and previous SARS-CoV-2 exposure or infection. MIS-C presents similarly to endemic or murine Typhus caused by *Rickettsia typhi*. Both pathologies present with Kawasaki's Disease-like features of fever, rash, conjunctivitis, and lymphadenopathy. Additional shared non-specific symptoms include headache, pharyngitis, abdominal pain, and diarrhea. Furthermore, they share similar inflammatory markers and laboratory values, including elevated ESR, elevated ALT, and anemia. Here, we report a case of MIS-C initially misdiagnosed as murine Typhus. A 15-year-old male presented with symptoms of murine Typhus to a hospital in an endemic region. Due to a positive *Rickettsia* panel, doxycycline was initiated to treat suspected murine Typhus. The patient did not improve, and additional differential diagnoses were considered. Clinical suspicion for MIS-C was heightened due to self-reported history of COVID-19 infection one month prior. Anti-inflammatory treatment with intravenous immune globulin, methylprednisolone, and anakinra was initiated to symptomatically treat MIS-C. This therapeutic regimen resulted in patient stabilization and discharge, thus corroborating diagnosis of MIS-C. Due to the shared clinical manifestations of murine Typhus and MIS-C secondary to COVID-19, we recommend MIS-C as a differential for a patient presenting with characteristic symptoms.

A Clinical Case of Neonatal Alloimmune Neutropenia

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC601

Presenter Name: Amit Aggarwal

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Keelie Bruce ²

Timothy McCavit ³

Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Congenital neutropenia is a common problem in neonates and has myriad etiologies. Neonatal alloimmune neutropenia (NAIN) is among the most common causes of congenital neutropenia with an incidence of 2 per 1000 live births and has an excellent prognosis. NAIN is defined by maternally produced IgG antibodies directed against paternal and fetal neutrophil antigens, most commonly HNA-1a, HNA-1b, and HNA-2a. Case: A 3-week-old female presented with omphalitis and was found to have an absolute neutrophil count (ANC) count of 0. Once admitted and started on IV antibiotics, serial CBC monitoring revealed persistence of neutropenia with ANC counts < 300. On hospital day 3, she was started empirically on subcutaneous filgrastim (G-CSF) 5 mcg/kg. Due to a modest response in her ANC, the filgrastim dose was subsequently increased to a max of 30mcg/kg before discharge. Evaluations for etiologies of neutropenia included antineutrophil antibody testing, genetic testing for severe congenital neutropenia (SCN), and a bone marrow exam. SCN was the initial, provisional diagnosis. However, the bone marrow aspiration revealed marked granulocytic hyperplasia with large clusters of promyelocytes, myelocytes, and metamyelocytes and a maturation arrest at the myelocyte – metamyelocyte stage. Antibody neutrophil antibody testing was positive for the HNA-1b antibody, whereas the genetic screen for SCN did not reveal pathogenic mutations. Therefore, she was diagnosed with NAIN and was subsequently weaned off G-CSF with a normal ANC. Conclusion: This case illustrates an unusual presentation of NAIN and demonstrates the clinical heterogeneity of this disease state.

A Longitudinal Study Among Permanent Supportive Housing Residents: Increase in Social Support Co-Occurring with Decrease in Depressive Symptoms and Substance Use Problems

Research Area: Psychology

Abstract ID: UNTHSC455

Presenter Name: Zhengqi Tan

Authors:

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Submission Type: Competition Poster

Department: School of Public Health: Biostatistics & Epidemiology

Classification / Affiliation: School of Public Health Student

Abstract: Purpose: Social support is a well-known protective factor against depressive symptoms and substance use problems, but very few studies have examined its protective effects among residents of Permanent Supportive Housing (PSH), a housing program for people with a history of chronic homelessness. We examined whether perceived social support improves when provided with regular health coaching visits and whether improved social support is associated with reduced depressive symptoms and substance use problems among this underserved population. Methods: Participants were 653 adult PSH residents in North Texas (56% female; 57% Black; mean age: 51 years) who participated in a monthly health coaching program from 2014 to 2017. We assessed their health behaviors at baseline and three follow-up visits for up to 18 months. We used latent growth curve models to capture changes over time and parallel process growth models to examine the associations between the trajectories of social support and the trajectories of each health measure. Results: PSH residents showed improved social support, and decreased depressive symptoms and substance use problems over time. In addition, individuals with greater needs at baseline tended to improve faster, although their improvements slowed over time. Further, those who improved in social support tended to show reduced depressive symptoms (coefficient: -0.67 , $p < 0.01$) and substance use problems (coefficient: -0.52 , $p < 0.01$). Conclusions: This study suggests that increases in social support may positively impact depressive symptoms and substance use problems among PSH residents. Future housing programs could emphasize social support as an early component. Supported by Medicaid 1115 Waiver & R01AA019511.

A Matter of Balance Fall Prevention Program Delivery to Underserved Populations

Research Area: General Public Health

Abstract ID: UNTHSC624

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Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Falls are the leading cause of injuries in older adults. A Matter of Balance (AMOB) is a national evidence-based fall prevention program. However, there is a lack of implementation to underserved populations. This study investigates the impact of cross-sector partnership delivery of AMOB on 1) access to serve underserved older adults in Tarrant County, Texas and 2) older adults' confidence in their ability to manage falls. Methods: Area Agency on Aging, Sixty and Better, University of North Texas Health Science Center, and Medstar collaborated to deliver AMOB in Tarrant County zip codes with the most emergency calls for falls in older adults. 354 older adults voluntarily participated and were surveyed for demographics and self-rated confidence in their ability to manage falls using the Falls Efficacy Scale (FES). Results: The average age was 78 ± 8.33 and most participants were female and white non-Hispanic. 49% of the programs were in hotspot zip codes and 31% of the participants were from hotspot zip codes. 53% of the participants completed the program and 48% of those who did not complete was due to COVID-19. Confidence in managing falls ($t=-8.222$, $p<0.001$) increased significantly with program completion. Conclusions: AMOB was effective in increasing confidence in managing falls for individuals who completed the program. Using zip code data is helpful in planning outreach, but less than half of the participants were in the desired areas. To address access barriers, stakeholder groups that represent underserved communities should be included.

A Non-Parametric Alternative to The Cochran-Armitage Trend Test in Genetic Case-Control Association Studies: The Two-sided Jonckheere's Test

Research Area: General Public Health

Abstract ID: UNTHSC524

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Submission Type: Competition Poster

Department: School of Public Health: Biostatistics & Epidemiology

Classification / Affiliation: School of Public Health Student

Abstract: Purpose: In genetic association studies with case-control design, standard practice is to perform the Cochran-Armitage (CA) trend test under the assumption of additive genetic model. The CA trend test is a parametric statistical test, and under the null hypothesis of no association between the genetic variant and disease, the test statistic asymptotically follows a chi-square distribution with 1 degree-of-freedom. However, when the sample size and/or variant minor allele frequency are small, asymptotic properties may not hold, which can lead to reduced statistical power in detecting genetic associations. Methods: To improve statistical power in this case, we consider the two-sided Jonckheere's test, which is a rank-based nonparametric test. By not imposing assumptions on the distributions of the data, it is expected to have better statistical power than parametric tests for small sample sizes and/or rare variants. We conducted extensive simulations to compare the statistical power between the CA trend test and the two-sided Jonckheere's test under various scenarios. Results: We found for small sample size (e.g., $n=200$) and low minor allele frequency (e.g., $p=0.05$), the two-sided Jonckheere's test outperformed the CA trend test for all genetic models ranging from recessive to dominant. Conclusion: This finding provides an alternative to the CA trend test in genetic association studies under these circumstances. With higher statistical power from the two-sided Jonckheere's test, genetic epidemiologists will be able to detect more genetic associations for complex diseases, which may lead to better prevention and treatment strategies.

A Presentation of a Rare Disorder: Hereditary Hemorrhagic Telangiectasia

Research Area: General Medicine

Abstract ID: UNTHSC490

Presenter Name: Sr jaa Kannan

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Sr jaa Kannan ^{1 *}

Stephanie Elmore ²

Michael Smith ³

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: The purpose of this case study is to describe a presentation of a rare disorder called Hereditary Hemorrhagic Telangiectasia (HHT), also known as Osler-Weber-Rendu syndrome. HHT is a rare autosomal dominant disorder that leads to malformed blood vessels in various body organs. Patients may be asymptomatic or have a wide range of clinical manifestations, thus making diagnosis of this condition difficult. Case Information: A 53-year-old Caucasian female with a history of intermittent epistaxis and multiple family members with HHT presented for a well woman visit and was found to be anemic with an H&H of 10.2 and 32.9 respectively. She was referred for a bidirectional endoscopy and was found to have multiple telangiectasias and polyps in her stomach and duodenum, some treated with argon plasma coagulation (APC). Since then, she has seen an HHT specialist biannually to rule out brain, heart, and lung involvement. She has had multiple colonoscopies and endoscopies with treatment of telangiectasias and arteriovenous malformations (AVMs) with APC since then. In 2018, she was treated for a left lower lung AVM. She requires parenteral iron therapy for her anemia every 3 months. Clinically, this patient presented with recurrent nosebleeds and anemia; however, her family history indicated a strong likelihood of HHT. Conclusion: Here I discuss the clinical features of this particular presentation of HHT as well as diagnostic criteria, management, and treatment with hopes of creating awareness in the scientific and medical community about how to diagnose and manage this rare condition.

A Rare Case of Pleural Metastasis from GIST

Research Area: Cancer

Abstract ID: UNTHSC656

Presenter Name: Jacqueline Nguyen

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Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Introduction:Gastrointestinal stromal tumors(GISTs) are rare mesenchymal tumors that originate in the gastrointestinal tract often characterized by the upregulated CD117(c-KIT) proto-oncogene.Histologically they can range from predominantly spindle-shaped(70%),epithelioid-in-character(20%),or a combination of both(10%).GISTs mainly metastasize to the liver(65%)or the peritoneum(21%), whereas metastasis to the lymph nodes(6%),bone(6%), or lung(2%) are significantly rarer.Here, we present a case of a rare metastasis to the lung pleura.Case:A 53-year-old Asian female with a history of type2 diabetes mellitus,hypertension,and hyperlipidemia initially presented to the ED with complaints of increasing shortness of breath.She received a chest x-ray which showed left sided pleural effusion with atelectasis and had a chest tube placed and pleural fluid tapped.She underwent a chest CT with contrast which revealed a left lower lobe mass;however, left lung biopsy showed benign pulmonary parenchyma.Following her visit to the ED,pathology results proved that the pleural effusion was a result of GIST metastasis to the pleura.TNM Staging was completed and was shown to be T4,N1,and cM1.The tumor was found to be C-KITpositive and also revealed an exon11 mutation.She was started on Imatin b after her initial diagnosis,but disease continued to progress the following year and she was switched to Sunitinib.She also underwent thoracotomy,partial pleurectomy,and pleurodesis which improved her breathing.Patient's current treatment plan is Sunitinib 25mg daily and continued follow up with oncology.Conclusion:Ultimately,this atypical presentation should encourage clinicians to consider GIST metastases as a potential diagnosis for patients with a history of recurrent pleural effusions without a known etiology or an epithelioid subtype pathology.

A Review of Community-Based Interventions to Address Colorectal Cancer Health Disparities Among the Black Population

Research Area: Health Disparities

Abstract ID: UNTHSC589

Presenter Name: Kendrick Lim

Authors:

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Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: From 1975 to 2016, 5-year relative survival rates for colorectal cancer have increased from 50% to 65%, largely due to the advent of novel therapeutic options that aid in prevention and treatment. However, the disproportionate gap in mortality rates has continued to exist among the white and black population. These health disparities and discrepancies have been well documented over the past several decades. The 5-year relative colorectal cancer survival rate for the white population has increased from 50% to 65% while that of the black population has increased from 45% to 59%. To close the disparity gap, community-based interventions have been implemented and studied with a focus on improving screening rates. While many studies have shown promising results, these studies are sparse, and a heavier emphasis on reducing these health disparities is warranted. In this review, community-based interventions for the black population over the past two decades were systematically evaluated for efficacy and reproducibility. A literature review was conducted to investigate different community-based health care interventions to assess the effect on cancer screening rates. On average, a positive increase in colorectal cancer screening rates was observed when community-based interventions were implemented. Thus, there is evidence supporting the use of community-based interventions to increase cancer screening rates in an effort to reduce the health disparities associated with colorectal cancer among the black population.

A Scholarly Review of NEJM Case 14-2017: A 20-Year-Old Man with Pain and Swelling of the Left Calf and a Purpuric Rash

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC628

Presenter Name: Lauren McCormack

Authors:

Lauren McCormack ^{1 *}

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: IgA vasculitis is characterized by a classic tetrad of purpura, joint pain, abdominal pain, and renal involvement. The incidence in adults is 0.8-1.8/100,000. Case Information: A 20-year-old male presented with a two-week history of left calf pain with swelling and purpura. The patient's history was significant for Crohn's disease, for which he took adalimumab. Additionally, the patient had a recent upper respiratory infection. A skin punch-biopsy demonstrating immunofluorescence with IgA, C3, and fibrin was instrumental in confirming the clinical diagnosis of IgA vasculitis. IgA vasculitis is commonly triggered by infection or medication. Anti-TNF-alpha medications not only predispose the patient to infection, but studies suggest they trigger IgA vasculitis. The patient's symptoms of purpura, non-erythematous asymmetric swelling, and lower extremity joint pain are also consistent with the diagnosis of IgA vasculitis. Conclusions: The positive impact of this study is two-fold. First, this case highlights how the diagnosis was missed early in the disease course. Early diagnosis and treatment are essential to preventing further complications including intussusception and glomerulonephritis. Secondly, the patient's presentation is unique, as he did not present with the abdominal pain or renal involvement classically associated with IgA vasculitis. By studying this case with an experienced rheumatologist, we acquired skills such as weighing differential diagnoses and collecting a thorough history. More specifically, we learned about the importance of long-term management to prevent glomerulonephritis, as well as the proper use of glucocorticoids as treatment for IgA vasculitis.

A Study of Pharmacologic Therapy in Patients with Chronic Low Back Pain

Research Area: Pharmacology

Abstract ID: UNTHSC626

Presenter Name: Jake Powell

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John Licciardone ²

Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: This study aimed to examine the effects of different pharmacologic therapies on patients with chronic low back pain, including nonsteroidal anti-inflammatory drugs(NSAIDs), opioids, antidepressants, muscle relaxants, antipsychotics, and anticonvulsants. Outcomes included low back pain intensity, back-related functioning, and quality of life. Methods: This was a cross-sectional study of patients within the PRECISION Pain Research Registry who met criteria for chronic low back pain established by the National Institutes of Health. Pharmacologic therapy was self-reported by patients. Back pain intensity was measured with an 11-point numerical rating scale (NRS). Back-related functioning was measured using the Roland-Morris Disability Questionnaire (RMDQ). Quality of life was measured using the SPADE cluster (sleep disturbance, pain interference with activities, anxiety, depression and low energy/fatigue) derived from the Patient-Reported Outcomes Measurement Information System (PROMIS-29). Higher scores represent worse health on all outcome measures. Results: Of 977 eligible patients, 323(33.1%) used opioids, 593(60.7%) used NSAIDs, 222(22.7%) used antidepressants, 160(16.4%) used muscle relaxants, 44(4.5%) used atypical antipsychotics, and 153(15.7%) used anticonvulsants. Mean NRS score for patients using opioids was 6.5 vs. 5.9 for non-users ($p=0.13, 95\%CI(-0.925 - -0.390)$). Mean RMDQ score for opioid users was 16.7 vs. 13.2 for non-users ($p< 0.001, 95\%CI(-4.287 - -2.720)$). Mean SPADE score for opioid users was 59.4 vs. 56.4 for non-users ($p=0.15, 95\%CI(-3.910 - -1.9798)$). Conclusion: Patients used a variety of pharmacologic therapies for chronic low back pain. Opioid users reported worse outcomes than non-users, including significant deficits in back-related functioning.

A Systematic Pharmacology Analysis of the Age-Related Eye Disease Study 2 (AREDS2) formula and its role in preventing Age-Related Macular Degeneration (AMD)

Research Area: Eye / Vision

Abstract ID: UNTHSC499

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Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: UNT System College of Pharmacy Student

Abstract: Purpose: According to the major clinical trial sponsored by the National Eye Institute (NEI), oral supplementation with the Age-Related Eye Disease Study 2 (AREDS2) formulation (vitamins C and E, zinc, copper, lutein, and zeaxanthin) has been shown to delay the progression of advanced age-related macular degeneration (AMD). However, the detailed pharmacological mechanisms of AREDS2 are not fully understood at the molecular level. In this study, we intend to develop a systematic approach to predict AREDS2-associated targets and to map the drug-disease-target network. Methods: Genes of interest were identified via the NCBI database for compounds in the AREDS2 formula. Cytoscape software was used to visually create a network of source and target nodes to analyze the similarities between them. The formula's relation to AMD was analyzed via the Gene2Function and GeneCard databases. Results: A total of 158 genes were identified as the targets of the AREDS2 formula. 27 of these genes were a result of multiple components of the AREDS2 formula. The main pathways that these genes affect were identified and mapped out to include lipid metabolism, DNA damage responses, and oxidative stress. The top 5 genes regulated by the most components of the AREDS2 formula are GSTP1, Nrf2, VEGFA, HIF1A, and CXCL8. Conclusions: A systematic pharmacology-based approach provides beneficial information for elucidating the potential mechanisms of action of the AREDS2 formula in treating AMD. Furthermore, it provides future direction for AMD treatment which may focus on anti-adipogenic, anti-inflammatory, and anti-oxidant pathways.

A Systematic Review of Concomitant Opioid and Sedative or Skeletal Muscle Relaxant Use on Patient Outcomes in Chronic NON-Malignant PAIN

Research Area: Patient Safety

Abstract ID: UNTHSC638

Presenter Name: Semhar Zerezghi

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Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmacotherapy

Classification / Affiliation: UNT System College of Pharmacy Student

Abstract: Purpose: Multiple studies show risks with concomitant opioid and benzodiazepine use in the general population, but few discuss effect of opioids with other sedatives, when policies are not in consensus. This review is a comprehensive outlook of current evidence analyzing the impact of concomitant opioid and sedative use in chronic non-malignant pain. METHODS: Literature search strategy using phrase "opioid AND CNS depressants OR benzodiazepine OR sedatives OR gabapentinoids NOT cancer" was conducted in PubMed, Embase, Web of Science, and Scopus. Excluded case reports, reviews, pediatric, duplicates, and non-opioid-related outcome studies(N=43,914) for total 14 articles. RESULTS: 12 studies were retrospective. Overall, concomitant use of sedatives or muscle relaxants with opioids was associated with hospitalizations(N=5), mortality(N=4), motor vehicle accidents(N=1), inappropriate drug utilization(N=4), or anxiety and depression(N=2). Higher dosages of opioids(N=4) corresponded to negative outcomes regardless of concomitant medications. South and increasing age had higher prevalence of concomitant use but was not always associated with negative outcomes. CONCLUSIONS: Considering increased incidence of co-prescriptions and adverse outcomes, policy changes recommending avoidance of concomitant opioid and skeletal muscle relaxant/sedative use are needed. All 14 studies are diverse but showed higher age, higher opioid dose, and South with more coprescription-associated negative outcomes. Overall consistency of negative outcomes needs further investigation of interactions despite limitations. Policymakers, clinicians, and patients should know the risks of concomitant prescribing to solidify current policy recommendations, ensure adequate drug monitoring and co-prescribing controls through prior authorization, reduce number of co-prescriptions, and improve clinical outcomes.

A Systematic Review on the Effects and Implications of Kratom Use on Cardiotoxicity

Research Area: Cardiovascular

Abstract ID: UNTHSC599

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Submission Type: Competition Poster

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Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: *Mitragyna speciosa*, referred to as kratom, is a plant native to Asia known for its opiate- and psychostimulant-like effects. Kratom use in the US has increased in the last fifteen years. Mitragynine, a kratom-derived alkaloid, has been shown to interfere with cardiac ion channels, leading to QTc prolongation and Torsades de Pointes. These findings are clinically relevant in the psychiatric population, where medications affecting QTc interval are commonly prescribed. This systematic review aims to bring awareness to the cardiac effects of kratom use and highlight the clinical significance for patients who are prescribed psychiatric medications. Methods: This systematic review was conducted using PubMed as the primary database. The query was specified as "All fields" with search terms: Kratom OR mitragynine OR mitragyna speciosa AND cardiac. This search yielded thirteen articles. Inclusion criteria included ability to access articles through the UNTHSC portal. Exclusion criteria included absence of search terms in the article title, abstract, and keywords. The final synthesis included five articles. Results: Two of the articles discussed the side effects of kratom, highlighting QTc prolongation. Three articles discussed the mechanism and interaction of kratom with other psychiatric medications. Conclusion: As kratom usage increases in the US, it is important to understand the mechanisms of kratom-induced cardiotoxicity. This is particularly relevant to the psychiatric population, where the use of medications known to affect QTc interval is prevalent. This systematic review highlights the need for increased awareness and research on the interactions between mitragynine and other psychiatric medications.

A VALIDATED METHOD FOR BIOANALYSIS OF ACETYLCHOLINE FROM CEREBROSPINAL FLUIDS USING LIQUID CHROMATOGRAPHY–TANDEM MASS SPECTROMETRY

Research Area: Neuroscience

Abstract ID: UNTHSC619

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Submission Type: Non-Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: Faculty / Staff (Not for Competition)

Abstract: Decreased acetylcholine [ACh, (CH₃)₃N+CH₂CH₂OCOCH₃] levels have been associated with several diseases of the central nervous system (CNS) such as Alzheimer's disease; therefore, it has been considered a potential biomarker. However, quantification of ACh in biological samples even in cerebrospinal fluids obtained through proximity sampling is difficult due to its often extremely low concentration owing to rapid enzyme-catalyzed hydrolysis to choline. Most limitations of previously used liquid chromatography-based (LC) assays relying on electrochemical detection have been addressed by coupling LC with electrospray ionization (ESI) tandem mass spectrometry (MS/MS). However, numerous applications have remained challenging because of inadequate detection sensitivity achievable with most commercial instruments and columns. We improved the method using atmospheric pressure spray ionization (APSI) as an alternative to ESI and ultrahigh-performance liquid chromatography (UPLC) resulting in an about 100-fold increase in detection sensitivity over the previous LC–ESI-MS/MS assay. The presentation will feature application of the method to the sensitive determination of ACh in rodent brain microdialysates, which indicates fit for purpose to use in translational research focusing on this important neurotransmitter. The developed assay also has been rigorously validated to show that it would meet regulatory requirements for application to assess ACh as a potential clinical biomarker of CNS diseases.

Aberrant Extensor Digitorum Tendon Lies Superficial to Extensor Retinaculum

Research Area: Structural Anatomy

Abstract ID: UNTHSC615

Presenter Name: Benjamin Son

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Submission Type: Non-Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: BACKGROUND: The extensor digitorum muscle (EDM) is located on the posterior aspect of the forearm. The tendons of this muscle typically run deep to the extensor retinaculum (ER), which is a fibrous sheath that stabilizes and aligns the extensor tendons. ER has been used in the past as a graft source to treat Boxer's Knuckle, an injury of the metacarpophalangeal (MP) joint capsule. This indicates the minor role ER plays in physiologic function. EDM is innervated by the posterior interosseous nerve, a branch of the radial nerve, and is used in extending digits 2 through 5. CASE INFORMATION: This case report presents an anatomical variance that was found within a 66-year-old male cadaver's EDM. The most medial tendon of the extensor digitorum lies superficial to the extensor retinaculum. We have theorized that this anatomical variance would present itself in a similar manner as the palmaris longus tendon. CONCLUSION: To our knowledge, this anatomic variation has yet to be documented. The donor's medical history reports no motor dysfunction to the phalanges, thus it has been concluded that this variation contributed to no complications. The lack of previous documentation on this variant, both in scientific literature and the donor's personal medical history, leads us to suspect that the variant is either uncommon or not of mechanical significance.

Accessory Iliacus Muscle with Split Femoral Nerve: A Case Report

Research Area: Structural Anatomy

Abstract ID: UNTHSC674

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Kalan Barnes ^{1 *}

Kristen Kluber ²

Yein Lee ³

Cara Fisher ⁴

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: The femoral nerve originates from the anterior rami of nerve roots L2, L3, and L4 of the lumbar plexus. In its usual course, the femoral nerve descends down between the psoas major and iliacus muscles of the posterior abdominal wall where it supplies branches to the iliacus and pectineus muscles prior to entering the thigh through the femoral triangle. Subsequently, it splits into multiple branches to supply the muscles and skin of the anterior thigh. Case Information: Herein, we report a variant of this course where during routine dissection of the posterior abdominal wall, an accessory iliacus muscle and split femoral nerve was observed on the right side of a 75-year-old female cadaver. The femoral nerve had divided into two branches that passed anterior and posterior to the accessory iliacus muscle prior to leaving the pelvis. After the two branches descended below the inguinal canal, the posterior branch split again into medial and lateral branches. The original anterior branch combined with the medial branch before splitting again. In addition, the accessory iliacus muscle had its own tendon that inserted a few millimeters below the lesser trochanter of the femur. Conclusions: Knowledge of the existence of muscle and nerve variants is useful in determining the pathology and proper treatment for tendinopathies, compressive neuropathies, and other pathological states. In this study, a rare nerve variant and accessory muscle has been described along with potential clinical implications.

Acute Intermittent Optogenetic Stimulation of Median Preoptic Nucleus (MnPO) Induces Sympathetic Long-term Facilitation (sLTF)

Research Area: Integrative Physiology

Abstract ID: UNTHSC480

Presenter Name: Obed Paundralingga

Authors:

Obed Paundralingga ^{1 *}

Caroline Gusson Shimoura Almeida Lima ²

Joseph Cunningham ³

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Acute intermittent hypoxia can produce a ramp increase in sympathetic nerve activity (SNA). The induction of this increase, termed sympathetic long-term facilitation (sLTF), involves the paraventricular nucleus (PVN). The median preoptic nucleus (MnPO) projects to the PVN and might mediate the induction of sLTF. This study used an intersectional viral approach to test the ability of acute intermittent optogenetic (AIO) stimulation of PVN-projecting MnPO neurons to induce sLTF. Male Sprague-Dawley rats were microinjected with CRE-containing retrograde-AAV in PVN and with either Channelrhodopsin 2-containing AAV or control virus in MnPO. This resulted in CRE-dependent expression of either ChR2 or mCherry in MnPO-PVN neurons. Following a 4-wk recovery, rats underwent AIO experiments where SNA, blood pressure (BP), and heart rate (HR) were recorded under anesthesia. MnPO terminals in the PVN were stimulated with a train of 5 Hz stimuli. A single optogenetic duty cycle did not alter splanchnic SNA, renal SNA, blood pressure, nor heart rate. AIO significantly increased splanchnic SNA ($P=0.0163$) in rats with ChR2 as compared to rats injected with the control vector 1h post-AIO. There were no differences in renal SNA, BP, and between rats injected with ChR2 as compared to those injected with the control vector 1h post-AIO. These results suggest that intermittent activation of PVN-projecting MnPO neurons may induce sLTF in the splanchnic SNA but not in renal SNA. Further study is needed to clarify the mechanisms responsible for the differential effects of MnPO-PVN AIO.

Advance Care Planning

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC523

Presenter Name: Katie Vu

Authors:

Maheen Ahmed ¹

Sarah Ross ^{2 *}

Katie Vu ³

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Advance care planning (ACP) is the process of communicating with patients and their families about the type of healthcare the patient wishes to receive. The Merit-based Incentive Payment System (MIPS) has ACP as a measure, communicating to providers the value of having ACP discussions with older adults. ACP provides an opportunity for patients to communicate what is most important to them for end-of-life healthcare. Each HSC Health provider is a Merit-based Incentive Payment System (MIPS) eligible clinician. The MIPS measure for ACP is assessed over a calendar year (from January 1st to December 31st). In September 2019, an online learning module educating providers on the basics of Advance Care Planning was made available for the HSC Clinical Practice Group. In this research project, we evaluate the effect of the online ACP module on primary care providers (Family Medicine and Geriatrics) performing and documenting advance care planning. Data from January 1, 2019 to December 31, 2020 was extracted, and descriptive statistics used to compare overall performance rates between 2019 and 2020. Results indicate that from 2019 to 2020 providers in Geriatrics and Family Medicine collectively improved in documenting that ACP was reviewed. Providing education on the importance of ACP and how to perform an ACP visit is one of the interventions that has promoted improvement in the overall practice performance on the MIPS measure of ACP from 2019 to 2020.

Age-related thymic atrophy impairs development and function of an antigen-specific tTreg clone

Research Area: Immunology

Abstract ID: UNTHSC528

Presenter Name: Rachel Thomas

Authors:

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Jiyoung Oh ²

Weikan Wang ³

Dongming Su ⁴

Submission Type: Oral Presentation

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose: The atrophied thymus generates an increased ratio of polyclonal thymic Regulatory T (tTreg) cells to thymic conventional T (tTcon) cells, and peripheral Treg (pTreg) cells accumulate during aging. So, why are pTregs in the elderly unable to effectively suppress age-related inflammation ("inflammaging")? Methods: We utilized a mock self-antigen (autoimmune pancreatitis) chimeric mouse model, in which irradiated rat insulin promotor (RIP)-driven mOVA mice received mixed OT-II TCR transgenic and wild-type bone marrow. Thus, we can easily visualize the generation and activation of an antigen-specific Treg cell clone. Additionally, our mOVA mice carry a FoxN1-floxed gene for induction of conditional thymic atrophy, analogous to the aged thymus. Results: The chimeric mice with thymic atrophy exhibited significant decline in central and peripheral OVA-specific (OT-II) Tregs, but not total (pan) Tregs. Further, intrinsic Treg changes in FoxP3 expression was observed, suggestive of reduced suppressive capacity. This was confirmed via functional assays showing that OVA-specific Tregs were significantly less able to suppress antigen-specific stimulation of Teffs in vitro. Additionally, we performed TCR sequencing and observed a trend for decreased TCR diversity in tTregs in mice with thymic atrophy. Conclusion: These data indicate that although the effects of age-related thymic atrophy do not affect pan-Treg generation, certain tissue-specific Treg clones may experience abnormal thymic selection, creating holes in Treg-mediated immunoregulation. This, combined with enhanced pan-pTreg cells, may help explain inflammaging.

An agent-based model for simulating viral infections

Research Area: Microbiology / Infectious Disease

Abstract ID: UNTHSC616

Presenter Name: Baylor Fain

Authors:

Hana Dobrovolny ^{1 *}

Baylor Fain ²

Submission Type: Non-Competition Poster

Department: TCU/UNTHSC School of Medicine

Classification / Affiliation: Community Partner (Not for Competition)

Abstract: As we have seen in the past year, new viruses can spread rapidly and cause outbreaks that need a quick response from researchers to develop or re-purpose treatments. While experiments and clinical studies form the basis of this response, the data generated by these studies can be further leveraged through the use of mathematical models. Properly calibrated and validated mathematical models can make predictions about scenarios that are difficult to test experimentally, but are also faster and cheaper when testing possible treatment regimens. We have developed a realistic agent-based model of viral infections that runs on graphical processing units (GPUs), so it runs fast enough to simulate typical in vitro viral studies in a few hours. We present here testing and validation of the model for influenza infections and show that it can be calibrated to simulate different viral infections.

An Atypical Presentation of Takotsubo Cardiomyopathy

Research Area: Cardiovascular

Abstract ID: UNTHSC429

Presenter Name: Holli Reynolds

Authors:

Holli Reynolds ^{1 *}

Juan Avila ²

Michael Smith ³

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Takotsubo cardiomyopathy is a reversible heart failure syndrome characterized by regional systolic dysfunction of the left ventricle. The syndrome mimics the presentation of myocardial infarction, yet it lacks evidence of obstructive coronary artery disease or plaque rupture. Case presentation: A 73-year-old Caucasian female presented to the Emergency Department with complaints of back pain following a non-syncopal fall after standing up too quickly and becoming dizzy the day previously. In addition, the patient complained of difficulty urinating and stooling for the past week. Her past medical history consisted of hypertension, hyperlipidemia, osteoporosis, and major depressive disorder. The patient was admitted, and a full workup was started. She was noted to have leukocytosis with blood cultures negative x2. Troponin I was also elevated at 5.42 and an ECG was performed which showed significant T wave inversions in V4 and V5 with a left axis deviation. CT Head, Cervical Spine, and Thoracic Spine without contrast showed no significant findings. An MRI of the lumbar spine was ordered to look for possible causes for her bladder and bowel retention but did not show spinal compression. In order to further evaluate the heart, an echocardiogram was performed and found global apical, septal, anterior akinesis with an estimated ejection fraction of 25-30%. Cardiology also performed a left heart catheterization (LHC), which found non-obstructive coronary artery disease. Conclusion: This case illustrates an atypical presentation of Takotsubo Cardiomyopathy due to the unique presentation and the unrelated symptoms that confused the clinical picture.

An Unusual Case of Pyogenic Liver Abscesses Presenting with Obstructive Jaundice

Research Area: General Medicine

Abstract ID: UNTHSC705

Presenter Name: Shannon Brewer

Authors:

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Pranav Patel ²

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Submission Type: Non-Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Pyogenic liver abscesses (PLA) are an uncommon, but potentially life-threatening infection that occur in 2.3 cases per 100,000 hospital admissions. Although the link between amebic liver abscesses and obstructive jaundice is well documented, there are few cases of PLA leading to this complication. Case Presentation: We present the case of a 48-year-old immunocompetent Hispanic male with multiple massive PLAs and obstructive jaundice on initial presentation. The results of liver-function tests were indicative of obstructive jaundice: total bilirubin 14.0 mg/dL, direct bilirubin 11.35 mg/dL, AST 388 U/L, ALT 271 U/L, a alkaline phosphatase 480 μ /L. Abdominal CT and triple phase MRI revealed innumerable masses throughout the liver, with the largest measuring up to 12 cm x 16 cm. Blood cultures grew *Streptococcus constellatus* and liver abscess cultures grew *S. intermedius* – commensal organisms most often found in the GI tract. The patient was treated in the hospital for six weeks with antibiotic therapy and two percutaneous drains were placed in the largest abscesses. After clinical improvement and the resolution of the hyperbilirubinemia, the drains were removed and the patient was discharged home. Conclusion: This case illustrates a unique presentation of PLA and secondary obstructive jaundice. This complication of PLA is rare and, to our knowledge, there are only two other reported cases of a similar nature. This case highlights the importance of clinician awareness of other etiologies when evaluating patients with signs and symptoms of painful obstructive jaundice.

An unusual presentation of Median Nerve Entrapment at the Ligament of Struthers

Research Area: Structural Anatomy

Abstract ID: UNTHSC714

Presenter Name: Oliver De Asis

Authors:

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Timothy McClellan ²

Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (4th Year)

Abstract: Patient with prior history of bilateral carpal tunnel release presented with pain, numbness, and tingling from the right elbow to thumb five weeks after lifting a heavy object. Patient had weakness in wrist pronation and flexor pollicis longus activation. Initial electrodiagnostic studies showed median neuropathy across the right wrist and appeared to be a recurrence of carpal tunnel syndrome. However, after three weeks the patient returned with worsening symptoms. Repeat electrodiagnostics revealed new findings in the right pronator teres and flexor digitorum profundus of the second digit, reflecting a more proximal lesion and indicated median nerve entrapment under the Ligament of Struthers (LS). The LS is a structure that originates from a supracondylar process and inserts into the medial condyle of the humerus. Both the median nerve and brachial artery pass under here creating a potential source of compression. This can lead to paresthesias and numbness of the hand and forearm, also known as supracondylar process syndrome. This process is rare due to the prevalence of the LS being 0.1% and 2.7% in the human population. can help confirm clinical findings. In symptomatic cases, surgical interventions were curative. Entrapment of the median nerve under the LS is a rare process that can lead to supracondylar process syndrome that presents similarly to carpal tunnel syndrome in addition to symptoms in a more proximal distribution. Further evaluation is warranted in such cases to rule out other causes of median nerve compression and guide further management. Subsequent referral to surgery provides definitive treatment.

An updated model for maternal separation with early weaning to study early life stress on immune competency

Research Area: Immunology

Abstract ID: UNTHSC651

Presenter Name: Jamie Y. Choe

Authors:

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Harlan Jones ²

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: Dual Degree Student

Abstract: Epidemiological data suggests early life stress (ELS) has negative effects on long-term health and a role in immune-mediated diseases. A significant challenge of studying ELS in the basic sciences has been difficulty developing a reliable mouse model with robust, reproducible stress effects. Although variations of maternal separation in rodents have been published, to date no mouse variant has demonstrated predictable effects on peripheral corticosterone. We describe an updated version of the maternal separation with early weaning (MSEW) paradigm and investigate how psychosocial stress during a defined perinatal window impacts the cytokine profile of select primary and secondary lymphoid tissues. Pups were produced through in-house breeding procedures and subjected to our modified MSEW procedure. Euthanasia occurred at postnatal day (PD) 14 or 21 for blood collection via cardiac puncture. Serum corticosterone and catecholamine levels were detected using commercially available ELISA. Corticosterone was significantly increased in stressed males at PD21 ($P < 0.001$). Thymocytes of stressed females showed increased secretion of IL-10 ($P < 0.001$), while stress males exhibited elevated IL-17A ($P = 0.003$) and IL-10 ($P < 0.001$). Splenocytes of stressed males produced decreased levels of IFN-gamma ($P < 0.001$) relative to the control. This pilot study demonstrates our updated MSEW model is capable of inducing increased peripheral corticosterone in C57BL/6 pups at PD21 and shows ELS skews cytokine production within select lymphoid tissues at PD21. Preliminary data also suggests sex-dependent effects of ELS on secretion of cytokines critical for T helper 17 and regulatory T cell phenotypes.

Anatomic relationships in a set of thoracopagus twins

Research Area: Structural Anatomy

Abstract ID: UNTHSC494

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Authors:

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Cara Fisher ²

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (4th Year)

Abstract: Background: Conjoined twins occur from aberrant embryogenesis, at an estimated incidence of 1 in 200,000 births, with many being stillborn. There are many subtypes of conjoined twins, with their classifications based on anatomical relationships between the two individuals. Similarly, twin survival to birth and potential for surgical separation are based largely on anatomy, especially organ sharing. In the field of pediatric surgery, advances have been made in the understanding of this unique condition and the factors that affect twin survival. This case details the specific anatomy of a set of conjoined female twins. Case Information: Detailed dissection of female conjoined twins reveals unique anatomic relationships and organ sharing between the two. The twins are thoracopagus, or joined at the thorax. Each twin has a separate head and a separate pair of upper and lower extremities. There are distinct, separate abdomens and pelvises. The twins share a heart, diaphragm, and liver. Each has separate sets of lungs, and separate foregut, midgut, and hindgut structures. Conclusions: Medical and surgical management of conjoined twins depends largely on the highly variable anatomy and the resulting impacts on physiology. This case report details a set of thoracopagus twins and their unique anatomy. The twins share a heart, which occurs in nearly all thoracopagus twins, and is rarely compatible with life. While the medical history of the twins described here is unknown, a detailed dissection of this well-preserved specimen and exploration of anatomic relationships adds to the current literature and understanding of this unique condition.

Anatomical Mapping of the Posterior Interosseous Nerve and Artery

Research Area: Structural Anatomy

Abstract ID: UNTHSC542

Presenter Name: Monica Penfield

Authors:

Monica Penfield ^{1 *}

Monica Penfield ²

Richard Bell ³

Submission Type: Competition Poster

Department: School of Health Professions: Physical Therapy

Classification / Affiliation: School of Health Professions Student

Abstract: Purpose: To determine variation of where the posterior interosseous artery (PIA) and nerve (PIN) converge in the distal, posterior aspect of the forearm. Methods: At the UNTHSC anatomy lab, 10 cadavers (five men and five women) were selected and dissected. The merging of the PIN and PIA was revealed in the left and right forearms for each cadaver. A digital caliper was used to measure from the middle point between the olecranon process and lateral epicondyle to the location of where the structures meet in the forearm. These measurements were then converted to average thumb interphalangeal joint (IPJ) widths (based on previous research). Results: The data collected from the ten cadavers indicate that the PIN and PIA converge, on average, 91.492 mm (9.1492 cm, about 4.5 thumb IPJ widths) down the length of the forearm. The variation between the left and right upper extremities within each cadaver ranged from 0 mm to 8.667 mm. Conclusion: The results provide a valuable clinic resource for medical professionals attempting to provide effective manual intervention or modalities to relieve the symptoms of PIA or PIN entrapment within the posterior forearm. The clinician can use an average of 4.5 thumb IPJ widths to measure distally down the forearm to identify the approximate convergence location of the PIA and PIN structures.

Anatomical Variation in a Deep Back Muscle and Possible Implications

Research Area: Structural Anatomy

Abstract ID: UNTHSC663

Presenter Name: Jillian Floyd

Authors:

Jillian Floyd ^{1 *}

Grace Meehan ²

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Alison Riggs ⁴

Olivia Hayes ⁵

Cara Fisher ⁶

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: The longissimus thoracis muscle is a part of the erector spinae muscle group, originating from the thoracolumbar fascia, and inserting onto the transverse processes of the first through twelfth thoracic spinevertebrae. The multifidus muscle originates from the posterior superior iliac spine (PSIS) and inserts into on the spinous processes; . ilt is involved in extension and stabilization of the vertebrae in localized movements. Dysfunctions of these muscles are often associated with low back pain, a common complaint among U.S. patients. Case Presentation: This case study describes a novel anatomical variation in the musculature of the deep back discovered during a routine dissection of a 72-year-old female cadaver. The variation identified in this subject is located unilaterally on the right side, from the PSIS, and ends at the transverse process of the third lumbar spinevertebrae. Conclusions: Based on our literature review, we have concluded that the variation is an atypical deep back muscle. Future studies could examine the effects of these variants, and their implication, in somatic and physiological dysfunctions, such as scoliosis.

Anterior Interosseous Syndrome: A Case Study in a Seventy-one-Year-Old Women with Multiple Nerve compressions

Research Area: Structural Anatomy

Abstract ID: UNTHSC431

Presenter Name: Nasim Shak bai

Authors:

Nasim Shak bai ^{1 *}

Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (4th Year)

Abstract: Background: Anterior interosseous nerve (AIN) syndrome is rare and accounts for less than 1% of all upper extremity neuropathies. AIN syndrome can be due to trauma, compression of the nerve, or neuritis. Case Information: A 71-year-old woman presented with numbness and tingling in the right thumb, index, middle and part of the ring finger. She had difficulty flexing her index finger and thumb. Nerve study demonstrated carpal tunnel syndrome, and right ulnar nerve dysfunction without motor involvement. On exam, there was thenar atrophy and tenderness over the proximal median nerve. She had a positive Tinel's and Phalen sign of the wrist; and positive Tinel's sign in the proximal border of the pronator teres and the ulnar nerve at the cubital tunnel. She had 0/5 strength in the flexor pollicis longus and flexor digitorum profundus of the index finger, and weakness with flexor digitorum superficialis flexion. She was not able to make an O sign. During surgery, an ulnar nerve decompression and carpal tunnel release were performed. During the proximal median nerve release, an anomalous intramuscular tendon near the early portion of the AIN nerve was found and divided. Conclusion: In the elbow and the forearm, the median nerve can be compressed by the lacertus fibrosus, heads of the pronator muscle, and anomalous structures such as the ligament of Struthers and Gantzer muscle. Patients will present with only motor weakness and will not be able to flex their interphalangeal joint of the thumb and distal interphalangeal joint of the index finger.

Assessing Accessibility to Domestic Violence Resources within Tarrant County: A Community-Based Study of Prevalence, Barriers, and Proposed Solutions

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC682

Presenter Name: Umar Siddiqui

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Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Intimate partner violence is a common issue affecting 1 in 4 women and 1 in 10 men in the U.S. Tarrant county has a higher incidence rate of 1 in 3 women. It is important to understand the impact of abuse on individuals and evaluate the access bility of resources available. In this study, we aim to perform a systematic review of the resources available to people at a national, state, and local level. Methods: Our study determined which resources at the national, state, and local levels were most likely sought out by domestic violence victims from Tarrant county. From database searches, we selected and interviewed various resources about those who sought their services and the barriers that victims typically face. Results: Locally, victims are able to access the following: National Domestic Violence Hotline, National Resource Center on Domestic Violence, Texas Family Violence Program, Texas Council on Family Violence, Freedom House, and SafeHaven. The interplay of national, state, and local programs depends on local entities providing a strong structure for support and referral. For example, SafeHaven is often overwhelmed by those seeking temporary housing, who are then discouraged to seek out further programs or services. Conclusion: Despite the various resources offered to victims, there are many barriers such as distance, finances, social, and cultural factors that can hinder a victim's access bility to these resources. The significance of these barriers is ultimately the social and health ramifications on victims: increased possibility of emotional distress and disease.

Assessing Benzodiazepine Use in the Elderly

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC693

Presenter Name: Pavithra Wickramage

Authors:

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John Gibson ²

Lesca Hadley ³

Submission Type: Non-Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Chronic benzodiazepines are frequently prescribed to patients above the age of 65 for anxiety and/or insomnia. They are listed in the Beer's criteria as medication that should not be prescribed to the geriatric population. In order to understand prescribing habits and limit the use of benzodiazepines in this demographic, a protocol following the Patient Monitoring Program (PMP) Narx Score was studied. Patients about the age of 65 who have a sedative score about 200 according to their PMP report were identified and recommended for tapering of medication and/or referral to psychiatry. Willingness to taper off medication was considered a positive result and compared to data gathered before this enhancement. After the implementation of the above-mentioned enhancement, 100% of patients were willing to be tapered off medication. This is in contrast to the 67% that were willing to be tapered off before. Significance for the terms of this study was set to be if greater than 50% of patients were willing, which was a success rate present before and after the enhancement. In conclusion, the utilization of the sedative NARX proved to be an effective method to identify patients who are at great risk of chronic benzodiazepine use. The age of the patient is used to calculate said score. Although the use of this score was beneficial to improving patient outcomes in the studied clinic, future studies should be implemented in clinics who did not have a prior history of geriatric patient education already implemented into the clinic culture.

Assessing Body Image Perception among Children aged 10-14, and their Caregivers

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC554

Presenter Name: Shivani Desai

Authors:

Shivani Desai ^{1 *}

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Kimberly Fulda ⁴

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Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: The incidence of Type 2 Diabetes Mellitus in children continues to rise in the country. According to the ADA, in 2011-2012, the annual incidence of diagnosed diabetes in youth was estimated at 5,300 with T2DM. Not only can T2DM be managed with appropriate measures but also be prevented if the risk factors are identified. Methods: 10-14 year-old children and their caregivers participated in a 2-hour research study in which questions about body silhouettes were asked. Child subjects identified which body silhouettes (gradient from 1: very thin to 9: obese) they currently looked like and the ones they wished to look like. Similarly, parents were asked to do the same for their child. Results: Male and female children wanted their desired silhouette number to be less than the number they picked for their current shape. The amount of male children who chose silhouette numbers 1-5 increased by 39% between their current and desired shape and for female children the increase was by 28%. For parents of male children, the increase was by 47% and for parents of female children, the increase was by 15%. Conclusion: This study suggests that the perception of desiring a thinner body were similar between male and female children and their parents. These body silhouettes may have potential as a screening tool for body image and healthy behaviors. Through this model, health care professionals can gauge their patient's perception on their body weight and help them facilitate conversation towards healthy behaviors.

Assessing Ecogeographic Variation in the Nasal Passages Utilizing 3D Semilandmarks

Research Area: Structural Anatomy

Abstract ID: UNTHSC710

Presenter Name: Lyndee Ward

Authors:

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Scott Maddux ²

Elizabeth Thai ³

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: GSBS Student

Abstract: Purpose: Prior research has shown strong statistical relationships between geographically-patterned variation in nasal skeletal morphology and global climatic conditions. Specifically, the nasal skeletons of individuals indigenous to cold-dry environments tend to be longer, taller, and especially narrower, than those from hot-humid environments. As the nose heats and humidifies inspired air, this morphological patterning is believed to reflect the specific air-conditioning demands of different climates. However, while it is widely assumed the morphology of the nasal skeleton accurately reflects that of the functional (soft-tissue) nasal passages, the existence of ecogeographic variation in the three-dimensional (3D) nasal soft tissues has yet to be empirically demonstrated. Thus, this study investigates 3D shape variation in decongested soft-tissue nasal passages of individuals of European (EA) and African (AA) descent (n=15). Methods: Using 3D Slicer and Avizo, a total of 260 semi-landmarks were collected from the decongested nasal passages of each individual. General Procrustes Analysis (GPA) was then used to align the semilandmark configurations and a Principal Component Analysis (PCA) was subsequently performed using the Geomorph package in R. Results: PC1 (20.2%) largely contrasts EA individuals with positive PC1 scores (relatively narrower nasal passages) from AA individuals with negative PC1 scores (relatively wider nasal passages). Conclusions: These results generally conform to morphological expectations, suggesting a concordance between skeletal and decongested soft-tissue nasal anatomy. This study thus provides the impetus for future research investigating the relationship between variation in nasal soft-tissue anatomy and air-conditioning physiology.

Assessing Fall Events in Geriatric Cancer Patients who are Prescribed an Opioid and/or Benzodiazepine

Research Area: Patient Safety

Abstract ID: UNTHSC510

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Rafia Rasu ²

Walter Agbor ³

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: IRBexempt#2020-013. Purpose: Opioids & benzodiazepines are commonly used in cancer pain treatment however their sedating effects increase a patient's fall risk. BEERS criteria was established to reduce adverse events related to medication use in elderly population. Falls are a leading cause of death in the geriatric population and seniors with cancer confer an estimated 20% increased risk. Objectives: (1) identify the demographics of cancer patients age 65+ who experienced a fall, (2) determine fall event trends based on patient-specific factors & medications (3) determine if BEERS criteria was followed. Methods: A cross-sectional study analyzing fall outcomes in cancer patients, age 65+, with analgesic medications used to manage acute/chronic pain. The population data was compiled from the CDC National Ambulatory Medical Care Survey (NAMCS). Diagnosis was based on ICD9/10 and medication codes. Database findings based on sample of office visits. Results: In the NAMCS database between 2006–2017 was 276,166,738 (weighted freq.) cancer patient visits, age 65+ with 83.16% experiencing a fall. 194,560,411 were taking Benzodiazepine only. 31,941,745 were taking Opioids and 68% were prescribed a benzodiazepine as adjunct therapy. Fall incidence: Opioid group 84.6% (p=.03); Benzodiazepine alone 97.1% (p<.001); Benzodiazepine+opioid 93.2% (p<.001). Of the 83.16% of patients who experienced a fall, majority were white and female; 54% were age 75+; Types of cancers: prostate (12.3%), breast (7.3%), lung (5.2%), colorectal (4.5%) and others (70.7%). Fall incident peaked during 2012-2014 with 41.9% of falls occurring and declined to 8.3% during 2015-2017 (p<0.001). Conclusion: The fall rates experienced by geriatric cancer patients taking opioids and/or benzodiazepines is far greater than the national average for the general geriatric population: 25% suffering a fall. In 2015 BEERS criteria and FDA advised against concurrent use of benzodiazepines+opioids. Our results indicate clinicians followed these changed guidelines, resulting in a decrease in fall events during data period 2015-2017 and illustrating the crucial role BEERS criteria plays in patient safety.

Assessing Fall Risk in the Geriatric Population

Research Area: General Medicine

Abstract ID: UNTHSC598

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Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose Falls in the geriatric population are a major cause of morbidity and mortality, and identifying patients at risk of falling can guide physicians in their next steps of preventative management. We implemented the Gait Speed Test into pre-wellness visits at the clinic to identify patients at greater risk of falling. Methods We tested the patients Gait Speed by having them sit in a chair, stand up and walk down a hallway that is marked on the side. When the patient passed the start line we began timing, and we stopped the timer when they walked 4 meters and passed the finish line. The time in seconds was divided by 4 meters, giving the "Gait Speed" which was recorded. Results were discussed at the wellness exam the following week. Results We tested 15 individuals during the month of November, which was 100% of the patients seen for pre-wellness exams. Of these, 5 were considered increased risk for fall (>5s/4m). We were able to counsel the patient on their individual situation and give them exercises to increase their strength and gait speed. Conclusions The Gait Speed Test proved to be a fast and efficient way to determine which patients need more time spent on education about fall prevention. The clinic is going to repeat the test annually to follow along with patients as they increase in age. This will hopefully be able to catch any decline in function in patients before it gets severe.

Association of baculoviral inhibitor of apoptosis repeat-containing 5 in the survival of clear cell renal cell carcinoma patients: In silico analysis

Research Area: Cancer

Abstract ID: UNTHSC502

Presenter Name: Paul Spore

Authors:

Paul Spore ^{1 *}

Riyaz Basha ²

Nora Tran ³

Victoria Ibarra-Aleman ⁴

Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose Inhibitor of apoptosis proteins (IAPs) regulate several cellular processes and impacts tumor development, progression and resistance to therapy in several cancers. Baculoviral inhibitor of apoptosis repeat-containing 5 (BIRC5) is a member of the IAP family, which block the release of caspases from the mitochondria, a step in the cell death signaling pathway, allowing uncontrolled growth. Clear cell renal cell carcinoma (ccRCC) is the 4th most common variant of renal cell carcinoma. The objective of this study is to determine the association of BIRC 5 in the survival of ccRCC patients and evaluate the expression of BIRC 5 with the survival of patients of differing race/ethnicity. Methods Data was obtained from the online data sets (The Cancer Genome Atlas utilizing the UALCAN platform). Data of all patients (both genders and all races) revealed that BIRC5 is over-expressed in ccRCC tumors when compared to normal tissue. Results Data analysis showed significant relationship between low BIRC5 expression and higher survival probability than those with tumors that expressed high levels of BIRC5 expression, especially in Caucasians. The African American group did not have a statistical difference in survival probability between the low expression and high expression groups. There was no statistical difference in survival probability when comparing males to females or Caucasians to African Americans with the same level of BIRC5 expression. Conclusion Considering the strong association of BIRC5 with ccRCC, BIRC5 potentially serve as a predictor of prognosis and a target of treatment for improving the outcomes in ccRCC patients.

Association of Prescription Opioid Use and Development of Infectious Diseases: A Systematic Review

Research Area: Microbiology / Infectious Disease

Abstract ID: UNTHSC632

Presenter Name: Jennifer Ra

Authors:

Jennifer Ra ^{1 *}

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmacotherapy

Classification / Affiliation: UNT System College of Pharmacy Student

Abstract: Purpose: Recent studies have demonstrated an increased risk of infection associated with opioid use. The objective of this systematic review is to gather and compare evidence related to prescription opioids and development of infection. Methods The protocol for this systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols (PRISMA-P) guidelines and was registered on PROSPERO (CRD42020205591). Studies about appropriate use of prescription opioids and subsequent development of infectious diseases were identified through an electronic search of PubMed, Embase, CINAHL complete, and Scopus databases. Inclusion criteria were adult patients with a prescription opioid who subsequently developed an infection. Exclusion criteria were studies related to pregnancy, human immunodeficiency virus (HIV), hepatitis C infection. Studies including prescription opioid misuse, overdose, or illicit or schedule I controlled substances were also ineligible. Results This systematic review yielded 25 studies that were highly variable in study design and target populations. Some studies included patients with immunocompromised states such as cancer and others included post-surgical populations or other disease states. The majority of studies established a correlation between prescription opioid use and risk of developing an infectious disease. Other trends associated with an increased risk of infection were current or recent use of opioids, extended-release opioid formulations, higher total daily morphine equivalents, and longer half-lives of opioids. Conclusion This systematic review showed a potential association between opioid use and acquirement of infectious diseases. Further randomized controlled trials are needed to validate these results.

AT1R sniffer cells detects spontaneous and evoke release of AngII in the AP-NTS pathway

Research Area: Neuroscience

Abstract ID: UNTHSC509

Presenter Name: Caroline Gusson Shimoura Almeida Lima

Authors:

Caroline Gusson Shimoura Almeida Lima ^{1 *}

Obed Paundralingga ²

George Farmer ³

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Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: Postdoctoral Fellow

Abstract: Although angiotensin II (AngII) has multiple actions in the brain, the existence of a brain RAS is still controversial. Our previous studies have used angiotensin sensitive sniffer cells to test whether angiotensin peptides are released from subfornical organ projections to the median preoptic nucleus. In these studies, we examined another pathway involving the area postrema (AP) and nucleus of tractus solitarius (NTS). The AP is angiotensin sensitive and projects to the NTS, so the purpose of this study was to test for the release of angiotensin peptides in the NTS after stimulation of AP. Sniffer cells were produced by transfecting Chinese Hamster Ovary cells with commercially available plasmids for the angiotensin 1a receptor (Origene Tech.) and R-GECO (Addgene #32462). These sniffer cells are sensitive to AngII and III but not angiotensin 1-7, bradykinin, or neurotransmitters such as glutamate or acetylcholine. Sniffer cells were placed on coronal brainstem slices containing both AP and NTS from adult male Sprague – Dawley rats. Changes in fluorescent intensity of sniffer cells in the NTS was determined following electric stimulation of the AP (100Hz, 10ms, 1mA). Electrical stimulation increased fluorescence intensity $134 \pm 11\%$, $n=13$ of sniffer cells on the NTS with a mean response latency of $4 \pm 0.7\text{sec}$, $n=13$. Some cells demonstrated spontaneous changes in fluorescence intensity 2 ± 0.1 , $n=28$ that were not observed in cells located outside of the NTS. The results indicate that sniffer cells placed on the NTS demonstrated evidence of spontaneous and evoked release of angiotensin peptides.

Atypical Case of Post Cholecystectomy Patient with Chronic Diarrhea

Research Area: General Medicine

Abstract ID: UNTHSC447

Presenter Name: Neal Bhachawat

Authors:

Neal Bhachawat ^{1 *}

Jennifer Trinh ²

Submission Type: Non-Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Introduction: Diarrhea is a common gastrointestinal complaint. One culprit that may often go overlooked is bile induced diarrhea, which is often preceded by a prior cholecystectomy. There are approximately 300,000 cholecystectomies performed annually in the U.S. Up to 20% of people undergoing gallbladder surgery develop diarrhea however this normally stops soon after the surgery. Rarely, will it last for years. Cholestyramine, a bile acid binder, has proven to be an effective medication for bile acid induced diarrhea. Here we present a case of post cholecystectomy diarrhea. Case: 70-year-old female with a past medical history of mixed hyperlipidemia, diverticulitis, and post-cholecystectomy 38 years ago developed episodes of diarrhea 29 years post-procedure. She had been having ongoing episodes of diarrhea and abdominal pain with some episodes being so intense it caused her to lose consciousness and one resulted in a fractured femur. She reports losing up to 50 pounds due to her diarrhea. Patient had tried Imodium and dicyclomine in the past with minor relief. Patient was started on Cholestyramine 4 gram packets daily as needed which resolved her symptoms of diarrhea and abdominal pain. Conclusion: With cholecystectomies being common procedures in the U.S., it is important for physicians to keep bile acid induced diarrhea in the differential diagnosis when treating chronic diarrhea in patients. Our case presented unusually in the aspect that the patient's diarrhea episodes occurred years after her cholecystectomy with such a long duration spanning over years however like the majority of bile acid induced diarrhea, it responded well to cholestyramine.

Baseline Range of Motion of the Lower Limb in Parkinsonian Gait is Consistent Among Treatment and Control Groups

Research Area: Physical Medicine / OMM

Abstract ID: UNTHSC647

Presenter Name: Zachary Terrell

Authors:

Zachary Terrell ^{1 *}

Sarah Moudy ²

Kendi Hensel ³

Rita Patterson ⁴

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Purpose: Tens of thousands of people are diagnosed with Parkinson's disease (PD) each year, making PD the second most common neurodegenerative disorder. The overarching goal for this project is to examine the efficacy of osteopathic manipulative treatment (OMT), and osteopathic cranial manipulative medicine (OCMM) particularly, in improving Parkinsonian gait. However, the purpose of this study is to serve as a preliminary analysis and comparison of the baseline joint angle data across experimental PD groups. We hypothesize that no significant differences will be found in the baseline range of motion (ROM) of each joint across randomly-assigned treatment and sham PD groups. Methods: An 18-camera motion analysis system was used in conjunction with 54 reflective markers on the body to capture three-dimensional position data in a short treadmill walking trial before the application of a whole-body (including OCMM techniques), neck-down, or sham OMT protocol. Ankle, knee, and hip joint ROM in the sagittal plane during the gait cycle was compared across treatment and control groups. Results: Baseline ROM at the hip, knee, and ankle joints across experimental groups (two treatment groups and one sham group) was comparable within one standard deviation of the mean of each group. 5.4, 11.4, and 5.7-degree variations in mean ROM were found between groups at the hip, knee, and ankle respectively. Conclusion: This preliminary analysis shows that experimental groups are not likely to significantly differ in baseline range of motion. These results validate the randomization of participants in our research design.

Beneficial effects of dietary methionine restriction in aging and disease

Research Area: General Medicine

Abstract ID: UNTHSC410

Presenter Name: Jonny Hatch

Authors:

Jonathan Hatch ^{1 *}

Liang-Jun Yan ²

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmacotherapy

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Methionine is an essential amino acid, meaning the body cannot synthesize it de novo. It must be obtained in the diet. Methionine plays a role in many biochemical processes but is most well-known for its role in DNA methylation. Although methionine is classified as an essential amino acid, recent studies have suggested that methionine excess may contribute to cancer, shortened lifespans, and other undesirable conditions. As such, investigators have hypothesized the benefits of methionine restriction. In this poster presentation, we will outline the various benefits of methionine restriction and the mechanism by which these benefits manifest. Methods: We searched PubMed with the keywords "methionine restriction," then analyzed articles pertaining to the usage of methionine restriction in disease prevention or treatment. Results: Methionine restriction has several benefits in animal and human models. These benefits include improved skeletal muscle and metabolic health, prolonged cognitive health, improved gut microbiome, reduced cancer growth, reduced reperfusion-induced myocardial injury, prolonged life expectancy, etc. Conclusion: As research into methionine restriction grows, methionine restricted diets may be adopted as a health maintenance strategy or as adjunctive targeted therapy for cancer treatment, treatment of cognitive disorders, disorders of metabolic health, etc.

Bilateral Absent Fibular (Peroneal) Arteries

Research Area: Structural Anatomy

Abstract ID: UNTHSC401

Presenter Name: Alexander Thomas

Authors:

Alexander Thomas ¹

Arkoon Ali ^{2 *}

Cassidy Faught ³

Rahul Vedantam ⁴

Submission Type: Non-Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: The most common branching pattern in the lower extremity is the popliteal artery branching into the anterior tibial artery and tibiofibular trunk. The documentation of aplastic fibular artery is quite rare in the scientific literary world and is mostly found incidentally in unrelated procedures. The absence of a fibular artery can lead to compensatory changes in the posterior tibial artery. Case Presentation: The bilateral absent fibular arteries described in this case report were found in a 75-year old female during routine cadaver dissection at The University of North Texas Health Science Center. The donor had no known complications from this anatomical variation and died from unrelated causes. In this case, the popliteal artery is seen branching into the anterior and then posterior tibial arteries. There is no formation of the tibiofibular trunk nor the fibular artery. The posterior tibial artery supplies the gastrocnemius and other muscles of the posterior compartment of the leg. In addition, the posterior tibial artery fills the role of the absent fibular artery by sending compensatory branches to the lateral compartment of the leg to supply fibularis longus, brevis, and lateral foot. These unique branches from the posterior tibial artery allow for blood supply to the lateral lower extremity and lateral foot musculature. This variation was found bilaterally in the cadaver. Conclusion: This case illustrates a unique presentation of a cadaver with an unusual anatomic variant: bilateral missing fibular arteries.

Bilateral Enlarged Testes: A Case Report

Research Area: Structural Anatomy

Abstract ID: UNTHSC482

Presenter Name: Paul Spore

Authors:

Paul Spore ^{1 *}

Connie Ly ²

Joel Mathews ³

Lauren West ⁴

Cara Fisher ⁵

Submission Type: Non-Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: The major components of the male reproductive system consist of the penis, scrotum, testes, and the epididymis. The testicles begin in the abdominal cavity in the fetus and descend through the processus vaginalis in the abdominal wall. If the processus vaginalis remains patent after birth, this can predispose a person to indirect inguinal hernias of the intestine. Case Information: During a routine cadaver dissection, a 76-year old male presented with bilateral enlarged testes, both nearly five times the size of an average male testis. Removal of the outer layers of the scrotum revealed solidified green, yellow, and grayish purulent exudate surrounding both testes between the layers of the parietal and visceral tunica vaginalis. The presentation of both testes differed greatly. The left testis was easily compressible and had a large varicocele, while the right testis was turgid and contained a large hematoma. The inferior pole of the left testis had extensive fibrous scarring and epididymal-testis junction and the anterior surface of left testis had two small nodules protruding from the tunica albuginea. In addition to the findings within the reproductive system, an indirect inguinal hernia was identified within the right spermatic cord. Conclusion: We believe the cause of the bilateral enlarged testes were from two different sources rather than a single disease or incident, due to the stark differences between the two. This case report attempts to further the understanding of the causes of enlarged testes and the relationship between gastrointestinal and reproductive disorders.

Biomechanic Comparison of Reconstruction Techniques for AC joint Dislocation

Research Area: Other

Abstract ID: UNTHSC689

Presenter Name: Apollo Tran

Authors:

Patrick Bibb ¹

Apollo Tran ^{2 *}

Submission Type: Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Acromioclavicular (AC) joint disruption comprises 8% of all shoulder injuries. There is still broad debate on when treatment with surgery is indicated and what surgery technique will provide optimal results. Purpose: In this study, we propose a modified technique that we hypothesize will provide the most security to a Rockwood type III AC joint dislocation with the least amount of post-operative complications. Materials and Methods: A rig to mount the cadaver specimens was constructed using a steel rails, screws, and L-brackets and fastened securely to the MTS apparatus. A total of 20 cadaveric shoulders will be gathered and each randomly assigned to one of three groups: 1) reconstruction with graft loop with fibertape augmentation and 2) reconstruction loop using two fibertapes and 3) reconstruction with the Mazzocca technique. The AC and CC ligaments will be released to simulate a Rockwood type III injury and reconstructed using one of the techniques listed above. The reconstructed specimen will then undergo load to failure (120 mm/min) in the superior direction to evaluate maximal loading capacity of the repair construct. Discussion: Difference compared to native for vertical migration of the AC joint, load to failure and mode of failure of the technique will be analyzed for variance if statistical significance is found ($P < 0.05$) followed by a Bonferroni post hoc analysis. With trials still underway, we anticipate the AC joint repair with augmented graft loop will decrease vertical migration and increase strength compared to previously described techniques.

Brain Low Grade Gliomas: Association of Specificity Protein Transcription Factor Sp1 and MAOB with Patient Survival

Research Area: Cancer

Abstract ID: UNTHSC581

Presenter Name: Victoria Ibarra-Aleman

Authors:

Victoria Ibarra-Aleman ^{1 *}

Riyaz Basha ²

Nora Tran ³

Paul Spore ⁴

Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose MAOB and SP1 are transcription factors expressed in low-grade gliomas (LGGs). MAOB and SP1 are both involved in the regulation of MAOB and have a positive feedback that leads to increased expression of MAOB in cells. We investigated the relationship between survival times in patients with LGGs and the transcription factors SP1 and MAOB. The levels of these markers in relation to gender and race were also evaluated. Methods Data was obtained through The Cancer Genome Atlas (TCGA) utilizing "UALCAN: A portal for facilitating tumor subgroup gene expression and survival analyses". Using Kaplan Meier plots, information was obtained on expression of SP1 and MAOB alone, levels of expression and race, and levels of expression and gender in patients with LGG. Results SP1 and MAOB had lower survival times with high levels of expression. Asians and African Americans had lower survival times than Caucasians with both high and low expressions of SP1 and MAOB. There was a stark difference in survival times between high and low expression of SP1 in females as compared to males. Conclusions It appears that chemotherapeutics that target MAOB could be helpful in extending the survival times for patients with low grade gliomas. Further studies should be done to determine whether the results of gender and race are due to genetic differences or a source of health disparities.

Brief Report: Vitamin D deficiency in SARS-CoV-2-induced ARDS

Research Area: General Medicine

Abstract ID: UNTHSC649

Presenter Name: Dennis Kulp

Authors:

Dennis Kulp ^{1 *}

Si Nguyen ²

Submission Type: Non-Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (4th Year)

Abstract: The SARS-CoV-2 virus has been an ongoing focus of research due to the severity of the pandemic on susceptible populations including older people. The inflammatory nature of SARS-CoV-2 infection suggests a dysregulated immune response as a primary component of pathogenicity and progression to acute respiratory distress syndrome (ARDS). Vitamin D levels are inversely associated with both clinically apparent upper respiratory viral syndromes as well as ARDS due to its effects in modulating the immune response. Vitamin D has been established as tempering inflammation by promoting T regulatory cell activity, increasing IL-10 release, and inhibition of interleukin-6 (IL-6) release from inflammatory cell subsets. Older populations show an age-related decline in Vitamin D levels, suggesting a susceptibility to deficiency and thus worse outcomes with infectious diseases that trigger inflammatory cytokine cascades such as SARS-CoV-2. Although not the only component, Vitamin D may be a safe and effective avenue in improving the morbidity of SARS-CoV-2 infection. Here, we evaluate the literature that Vitamin D deficiency plays a role as an independent risk factors in the pathogenesis of ARDS in SARS-CoV-2 patients through the disinhibition of IL-6 and the shift towards an inflammatory Th17 cell phenotype. The robust evidence within the literature prompt us to recommend monitoring of Vitamin D levels and sufficient Vitamin D supplementation in older patients before potential infection with SARS-CoV-2 to mitigate the development of severe symptoms including ARDS.

Case 19-2018: A 15-Year-Old Girl with Acute Kidney Injury

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC603

Presenter Name: Nandeeta Patel

Authors:

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Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Atypical Hemolytic Uremic syndrome (aHUS) in children is a thrombotic microangiopathy which causes acute kidney injury (AKI), anemia, and thrombocytopenia. As compared to typical HUS caused by Shiga-Toxin producing E. Coli, atypical HUS may result from pregnancy, drugs, malignancy, or complement factor deficiency (most likely cause in this case). Case presentation: A 15-year-old Caucasian female presented to the hospital in the summer with 8 days of abdominal cramping, bloody diarrhea, vomiting, fatigue, and insomnia. She visited NYC for a few days and ate street food before experiencing symptoms. VS: T: 36.9°C, HR: 71 bpm, RR: 18, O2 Sat: 100%, BP: 124/75. She appeared mildly ill and pale on PE with tenderness in the upper abdomen and moderate ascites in the lower abdomen. Pmhx includes ADHD, anxiety, and labial adhesions. Patient's medications include citalopram and methylphenidate. Patient used ibuprofen with no relief of symptoms. Blood chemistry showed elevated BUN (97 mg/dl) and Creatinine (7.71 mg/dl), Sodium diminished at 132 mmol/liter, elevated AST/ALT, and elevated lipase. BUN/Creatinine ratio was 12.58. CBC showed diminished hemoglobin, decreased MCV, diminished haptoglobin, and thrombocytopenia. PBS showed anisocytosis, microcytosis, 1+ polychromasia, and enlarged platelets. Urinalysis was 3+ protein, 2+ blood and 20-50 RBC/HPF. Abdominal ultrasound showed mildly distended bladder, pelvic ascites, and abnormal contents in the gallbladder. Patient's stool cultures and antigen-detection tests were negative for causative organisms. Treatment included a meningococcal vaccine before receiving biweekly Eculizumab infusions for 6 months supported by 6 hemodialysis sessions and a blood transfusion.

Case Study of Profound Uterine Fibroids

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC704

Presenter Name: Andrew Fletcher

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Emma Hsieh ³

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Submission Type: Non-Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (1st Year)

Abstract: Emma Hsieh, Konnie Le, Andrew Fletcher, OMS-I, Cara L. Fisher, Ph.D. Abstract: Background: Uterine fibroid, also called leiomyoma, is a common benign tumor that affects more than 200,000 individuals annually. It is often associated with conditions such as endometriosis or polycystic ovary syndrome, which are also common gynecological issues in the United States. Case Information: During a routine dissection of a 67-year-old African American female cadaver multiple uterine fibroids were found, including one large pedunculated fibroid located outside the uterus, as well as a pedunculated intracavitary fibroid filling the uterine cavity. The intracavitary fibroid caused an enlargement and hardening of the uterus. The intracavity fibroid was calcified with "tooth-like" structures on the surface. The uterine artery would have supplied the uterus and thus the fibroids, facilitating their growth. In this case, the tumor compressed the nerves and vessels around it and impinged the bladder, rectum, and other reproductive structures. Pelvic structures were difficult to identify in the dissection due to the size of the fibroids and the shifting of the pelvic viscera. Conclusion: This case study shows a rare incident of fibroids presentation in cadavers, as most women around her age have often undergone hysterectomy. In addition, the fibroids showed extensive growth and calcification, occupying a large space in her pelvic region. It is important to document findings of fibroids, like the ones discovered in this case study, as they are often associated with serious medical implications, such as pelvic pain, urinary issues, or intermenstrual bleeding.

Case Study Reviews as a Valuable Learning Tool for Medical Students

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC644

Presenter Name: Brooke McMinn

Authors:

Brooke McMinn ¹

Cassidy Lane ^{2 *}

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: Review of "Case 9-2004: An 18-Year-Old Man with Respiratory Symptoms and Shock" published in the New England Journal of Medicine provided second year medical students with valuable insight into the complexities of patient care. Case Information: The patient initially presented as an outpatient with non-specific symptoms including fever, myalgia, and cough and was treated for a bacterial infection. The patient decompensated upon admission to the hospital 5 days after presentation of his initial symptoms. He continued to decline as physicians placed him on various medications for pain, hypotension, bacterial infections, and multiorgan failure. The patient expired 32 hours after presentation to the hospital. Despite a negative rapid flu test upon presentation to the ER, autopsy results revealed an Influenza A infection that caused a systemic response, ultimately leading to shock and death. Conclusions: Case studies are vital learning tools for medical students and clinicians alike. Medical students in particular tend to spend much of their time memorizing diseases, symptoms, lab tests, and medications individually. It isn't until they are thrust into the clinic that they are able to see how all of these factors interact with one another to determine the patient's outcome. Having pre-clinical medical students review case studies allows them to gain a greater understanding of the complexities of patient care and allows them to see how physicians respond to the various challenges that are presented. This builds valuable critical thinking skills that will better prepare them for clinical rotations.

Case Study: Ruling in Multisystem Inflammatory Syndrome - COVID 19 (MIS-C)

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC678

Presenter Name: Sana Qureshi

Authors:

Sana Qureshi ^{1 *}

Sajid Surve ²

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Multisystem Inflammatory Syndrome in Children (MIS-C) is a new diagnosis that has come up recently in the pediatric population. It has been classified as a Kawasaki disease-like multisystem inflammatory disease occurring post-COVID-19 infection. The criteria for the diagnosis of MIS-C is a positive serology for COVID-19 along with fulfilling full or partial criteria for diagnosis of Kawasaki disease. MIS-C is treated with high-dose steroids, aspirin, heparin, and repeat EKGs and echocardiograms. The broad diagnosis criterion ensures no cases are missed but at the same time, it is not very sensitive. MIS-C can be deadly in the pediatric population but are there differentials that need to be ruled out to make this criterion more sensitive for MIS-C? In this case report, we present a 12-year-old girl who was diagnosed and treated for MIS-C. MIS-C will be contrasted with Rickettsia typhi, a common flea-borne disease diagnosed in the south Texas population. Rickettsia serology is used to confirm the diagnosis of typhus but most infections are treated without confirmatory tests in the scenario of high clinical suspicion as the test has a high false-negative rate, especially early in the course of the disease. The clinical presentation of typhus overlaps with that of Kawasaki disease. In this case, we present the argument for more specific markers to differentiate MIS-C from typhus, which may cause harm due to the unnecessary treatment of children with steroids and anticoagulation therapy.

Catheter Directed Thrombolytic Therapy for Pediatric Cerebral Sinus Vein Thrombosis

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC446

Presenter Name: Sarah Philip

Authors:

Sarah Philip ¹

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Jo Tilley ⁴

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Cerebral sinus vein thrombosis (CSVT) involves the thrombosis of the dural sinus and/or cerebral veins and is considered a form of stroke. No randomized clinical trials have been conducted on pediatric CSVT so current guidelines for treatment have been extrapolated primarily from adult studies. Method: This is a retrospective case review of patients treated with MT (Mechanical thrombectomy)/Catheter Directed Thrombolysis (CDT) for their CSVT at Cook Children's Medical Center. Results: Five children (aged 4 to 14 years) diagnosed with CSVT of multiple sinuses were treated with MT/CDT after failing anticoagulation treatment. Three patients had systemic bleeding prior to initiation of anticoagulation. All children were treated with UFH (unfractionated heparin) and due to neurologic deterioration and/or worsening of imaging findings needed MT/CDT. All cases had partial resolution of the sinus vein thrombosis, although 1 had quick re-occlusion. Post procedure bleeding happened in 1 patient and 2 patients developed petechial brain hemorrhages. Four patients had great neurologic recovery and minimal deficits, but 1 had significant neurologic deficits. One patient died from lupus complications. Conclusion: Endovascular therapy including MT and CDT with tPA (tissue plasminogen activator) in conjunction with systemic UFH, may have a role in pediatric patients with CSVT who have deterioration despite initial anticoagulation. In our series, after procedures, all patients had partial resolution of their CSVT (but 1 had quick re-occlusion) and 4 out of 5 patients had good neurologic outcomes despite coma or extensive CSVT.

CELL-FREE MEMBRANE-BOUND AND MEMBRANE-UNBOUND MITOCHONDRIAL DNA IN MATERNAL CIRCULATION IN PREECLAMPSIA

Research Area: Integrative Physiology

Abstract ID: UNTHSC661

Presenter Name: Spencer C Cushen

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Donna Santillan ⁹

Nicole Phillips ¹⁰

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Submission Type: Oral Presentation

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: Dual Degree Student

Abstract: PURPOSE: Cell-free circulating mitochondrial DNA (CFCmtDNA) is a damage-associated molecular pattern (DAMP) that activates Toll-like receptor-9 (TLR-9). Previous studies suggested that CFCmtDNA may be a potential pathogenic trigger or a contributor to the maintenance of preeclampsia. The main objectives of this study were 1) to determine absolute concentrations of CFCmtDNA, in membrane-bound and -unbound states, independent of nuclear DNA (nDNA) changes, in cases with preeclampsia and healthy controls and 2) to implement a penalized regression analysis to establish the contribution of CFCmtDNA to preeclampsia diagnosis and its interaction with commonly collected patient characteristics. METHODS: Plasma CFCmtDNA (MT-ND5 gene) concentrations were quantified using an absolute quantification protocol. DNase I concentrations in maternal plasma were measured using an enzyme-linked immunosorbent assay and TLR-9 activity was monitored using SEAP reporter 293 cells expressing the human TLR-9 gene. RESULTS: Concentrations of CFCmtDNA were reduced in preeclampsia compared to healthy controls both in lysis buffer-treated samples ($P=0.02$) and in samples not treated with lysis buffer ($P<0.0001$). Even though CFCmtDNA concentrations were reduced, plasma from women with preeclampsia induced greater TLR-9 activation than plasma from gestational age matched controls ($P<0.01$). Multivariate analysis showed that high concentrations of nDNA and DNase I, a prior history of preeclampsia, and a lower concentration of CFCmtDNA are predictors of preeclampsia diagnosis. CONCLUSIONS: In conclusion, our data demonstrate an increased immunostimulatory potential of CFCmtDNA and upregulation of DNA degradation mechanisms in women with preeclampsia at the third trimester.

Challenges in the management of obesity and comorbidities in an adolescent patient

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC668

Presenter Name: Jennifer Pham

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Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: Obesity is a common condition, especially among adolescents. In the United States, the Center of Disease Control states that as of 2019, 18.5% of adolescents are considered overweight. Case Information: 15-year-old female presents to a Weight Center for severe obesity. The patient had an uncomplicated gestation and was adopted at one month. No biological family history is available, except for a grandmother known to be overweight. Despite similar environmental factors, like dietary patterns and nutrition, her BMI at age 3 rose to the 97th percentile, unlike her siblings. After enrollment to a monthly weight control program, at age 8 on physical exam she appeared overweight with mild acanthosis nigricans of the neck. Upon a 15 kg weight increase from age 10 to 11, her pediatrician enrolled her in another weight control program. At age 13, she was diagnosed with obstructive sleep apnea and nocturnal somnambulation. At age 14, following menarche, she began to experience irregular menstrual cycles accompanied with worsening fatigue and rebound weight gain 20 kg. At age 15, severe acanthosis nigricans was noted on her neck and axillae with an android pattern hair growth. After numerous efforts and programs, a bariatric surgery was performed at 19 resulting in a 13 kg weight decrease and improvements of her acanthosis nigricans on her wrists and ankles, except for her neck. Conclusions: This case illustrates a unique presentation of severe pediatric obesity and the significant effect of biological determinants in comparison to developmental and environmental factors.

Characterization of adipose tissue and adipose-tissue derived stem cells in Lipedema

Research Area: Cell & Molecular Biology

Abstract ID: UNTHSC436

Presenter Name: Sara Al-Ghadban

Authors:

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Bruce Bunnell ²

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: Lipedema is a painful adipose tissue (AT) disorder that occurs almost exclusively in women, with onset manifesting at puberty or at times of hormonal change. This disorder is characterized by a symmetrical increase of fat deposition in the legs and the arms, sparing the hands and the feet. The goal of this study was to determine the histology of the skin and fat of lipedema tissue and characterize the adipose tissue-derived stem cells (ASCs) obtained from the stromal vascular fraction (SVF) of thigh AT of non-lipedema and lipedema patients. Methods: Histological sections from AT were stained with H&E. Adipocyte area was quantified using ImageJ software. Markers for macrophages (CD68) was investigated by immunohistochemistry. ASCs were characterized by the expression of stemness markers and their multi-differentiation potential. Flow cytometry, RT-PCR and immunofluorescence assays were performed. Results: The data show hypertrophic adipocytes, increased numbers of macrophages and blood vessels in thigh tissue of women with lipedema compared to non-lipedema patients. Additionally, at the cellular level, an increase in the adipogenic differentiation potential with no change in the expression of mesenchymal markers (CD73, CD90 and CD105) or extracellular markers (collagen, fibronectin and laminin) was detected in lipedema ASCs compared to non-lipedema ASCs. Conclusion: Infiltration of immune cells, increase in adipocyte size and adipogenesis stimulates angiogenesis and fibrosis in lipedema AT. Defining the structure and the components of AT will provide insights into the pathophysiology of lipedema and will help researchers develop potential treatment for the disease.

Characterization of Mitochondrial DNA Damage in Complex Disease Using Two Different NGS Platforms

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC533

Presenter Name: Danielle Reid

Authors:

Danielle Reid ^{1 *}

Nicole Phillips ²

Robert Barber ³

Alexandra Blessing ⁴

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose: The Hispanic/Latinx aging (65+) population is expected to increase through 2060 causing the number of Alzheimer's Disease (AD) cases in the Hispanic/Latinx population to quadruple. Several risk factors for developing cognitive impairment are prevalent among Mexican Americans (MAs), although the etiology of these associations remains unclear. Age-associated decline in mitochondrial function results in accumulation of reactive oxygen species (ROS) capable of damaging essential biomolecules, including DNA. The mitochondrial genome is particularly vulnerable to DNA damage, which has a strong correlation with AD pathology. Developing an improved method to assess mitochondrial oxidative damage may help resolve the potential association between abnormal mitochondrial function as indicated by oxidative DNA damage in cognitively impaired MAs. Oxidative damage to guanine (G) forming 8oxoG, is one of the most prevalent DNA lesions. Current methods for detection are limited and lack reproducibility. Lifestyle and/or metabolic health may contribute directly to age-related neurodegeneration. Methods: We aim to investigate the mutational load indicative of oxidative DNA damage in MAs compared to non-Hispanic white (NHW) participants in a human AD cohort, TARCC, who were diagnosed with AD, type-2 diabetes (T2D), and comorbidity (AD/T2D) using Illumina-based NGS. Additionally, we propose nanopore sequencing technology as an improved alternative to current detection/quantification methods. Results: We describe preliminary proof-of-concept results and future applications of this method to analyze mtDNA damage in participants of TARCC. Conclusion: Investigation of oxidative DNA damage may aid our understanding of the differences in manifestation of age-related dementia in MAs.

Characterization of rHDL Nanoparticles as a Delivery Vehicle for Glioblastoma Multiforme Chemotherapy

Research Area: Cancer

Abstract ID: UNTHSC488

Presenter Name: Ezek Mathew

Authors:

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Akpedje Dossou ³

Rob Dickerman ⁴

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Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: Dual Degree Student

Abstract: Purpose: Glioblastoma Multiforme (GBM), is a brain tumor that presents with a very poor prognosis; new approaches are needed to improve patient outcomes. Design of an effective therapeutic approach must include a suitable delivery vehicle, which can cross the blood-brain barrier, and can selectively target GBM tumors. Our project uses reconstituted high-density lipoprotein (rHDL) nanoparticles (NPs), which possess the above characteristics, amplifying efficacy of chemotherapy. To target the PI3K/mTOR pathway involved in the pathophysiology of GBM, we chose to encapsulate PI-103 in preliminary studies. Methods: After encapsulation and purification, the drug-containing rHDL NPs will be characterized with regard to their physical/chemical properties. We will assess drug loading, entrapment efficiency, stability, particle diameter, homogeneity and molecular weight. Afterwards, cytotoxicity against human GBM cells will be compared to normal human astrocytes. Because the scavenger receptor B type 1 (SR-B1) is known to interact with circulating HDL and the rHDL NPs, we will compare the cytotoxic efficiency of the drug transporting rHDL NPs against a high SR-B1 expressing GBM line (LN229) versus a low SR-B1 expressing GBM line (U87MG). SR-B1 levels will be assessed for all cell lines. Results: In this work we will demonstrate that after encapsulation of PI-103 into rHDL and characterization, we will observe cytotoxic effect against GBM cell lines, not normal astrocytes. Conclusion: If successful, future spheroid and mice studies, in addition to combination therapy studies, will advance the proof of concept of this therapy, allowing translation toward clinical applications.

Chronic Intermittent Hypoxia Alters the Chloride Gradient in Median Preoptic Nucleus (MnPO) Neurons of Rats

Research Area: Neuroscience

Abstract ID: UNTHSC403

Presenter Name: Gef Farmer

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Martha Bachelor ³

Nataliya Rybalchenko ⁴

Joseph Cunningham ⁵

Submission Type: Oral Presentation

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: Postdoctoral Fellow

Abstract: Rats exposed to chronic intermittent hypoxia (CIH), an animal model simulating the hypoxemia associated with obstructive sleep apnea, exhibit persistent elevations in blood pressure during normoxic periods. In MnPO neurons, angiotensin II type 1 receptor function mediates reductions in GABA_A inhibition that become excitatory following CIH. Here, we use the ratiometric Cl⁻ sensor, ClopHensorN, to monitor the chloride flux of MnPO neurons in normoxic (Norm) and CIH treated rats following GABA_A activation. Using isoflurane anesthesia, male Sprague-Dawley rats (250-350g) received microinfusions of AAV9-Cre in PVN and DIO-ClopHensorN in MnPO. After recovery, rats underwent 7 consecutive days of CIH (6 min cycles of 3 min 21% O₂, 3 min 10% O₂ repeated 10x/hr for 8 hours) or Normoxia. For ClopHensorN imaging, rats were anesthetized with isoflurane and coronal slices containing MnPO were cut using standard in vitro slice procedures. Images were captured every 3 sec. Cl⁻ flux was determined from ratiometric responses to 10 s focal application of muscimol (100 uM). Twelve rats (6 Norm, 6 CIH) were used for ClopHensorN studies. In MnPO CIH neurons, 20.1% showed decreased fluorescent ratios while 0.3% showed increased ratios indicative of Cl⁻ efflux. In MnPO Norm neurons, 41.9% showed a muscimol dependent decrease in fluorescent ratio with 0 cells showing an increase. The magnitude of muscimol dependent decreases in fluorescent ratios were reduced in CIH treated rats suggesting reduced GABA_A inhibition. Results demonstrate CIH alters Cl⁻ flux of PVN projecting MnPO. These changes may contribute to hypertension associated with CIH.

CMS MIPS Quality Measures Are Blind to High-Need High-Cost Homebound Older Adults Cared for in Home-Based Medical Care

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC548

Presenter Name: Shivani Bhatnagar

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Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Multiple studies find home-based medical care a solution for high-need, high-cost homebound older adults. However, home-based medical care needs proper representation among the Merit-based Incentive Payment System (MIPS) and Center for Medicare and Medicaid Services (CMS)-specified quality measures to be financially viable in modern value-based care. Unfortunately, many useful measures for this population are unusable due to inadequate home medical visit codes in these measures' denominators. The objective of this study is to determine what proportion of the CMS 2019 MIPS Quality Measures that are potentially appropriate for patients receiving home-based medical care have home visit codes in their denominators. Methods: All 257 CMS 2019 MIPS Quality Measures were reviewed for applicability to homebound older adults cared for by home-based medical care providers. Measure details were reviewed in public documents from five CMS websites across 2017-2019. Results: Of the 257 CMS 2019 MIPS Quality Measures, 179 were inapplicable for this population, most commonly because they applied to specialist physicians outside of geriatric or palliative providers. Of the 78 measures that were deemed potentially appropriate, only 37 (47%) had home visit codes. Conclusions: The majority of CMS MIPS Quality Measures that are potentially appropriate for the care of homebound older adults, who receive home-based medical care, are unusable by home-based medical care practitioners for MIPS reporting. This represents a barrier for home-based medical providers in delivering effective care to this high-need, high-cost vulnerable patient population.

Comparison of support vector machine, random forest, extreme gradient boosting and lasso and elastic-net regularized generalized linear model for Alzheimer's Disease prediction

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC424

Presenter Name: Fan Zhang

Authors:

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Melissa Petersen ²

Leigh Johnson ³

James Hall ⁴

Sid O'Bryant ⁵

Submission Type: Non-Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: Faculty / Staff (Not for Competition)

Abstract: Purpose: Machine learning based blood test shows promise in detecting Alzheimer's disease (AD) and pinpointing mechanisms underlying the process of neurodegeneration. Model selection plays a crucial role in building good machine learning models for AD prediction. Methods: The paper presents a comparison of four machine learning algorithms: support vector machine (SVM), random forest (RF), extreme gradient boosting (XGBoost) and lasso and elastic-net regularized generalized linear model (GLMNET) for Alzheimer's disease prediction using blood test data from serum. First, we implemented 10 times repeated 5-fold cross-validation to split the data into training set and testing set randomly 50 times to select the best hyperparameters for each selected machine learning method. Then we selected the best learning model based on the performance metrics in the testing set. Results: Of all compared prediction results in the training set, RF and XGBoost achieved the highest negative predictive value (100%) followed by SVM with 99.40% and GLMNET with 94.45%. Of all compared prediction results in the testing set, SVM achieved the highest negative predictive value (96.96%) followed by XGBoost with 95.94%, RF with 95.59%, and GLMNET with 94.27%. With 28-cores high performance computing, RF took 1.35 hours CPU usage, SVM 1.10 hours, XGBoost 48 seconds, and GLMNET 47 seconds, respectively. Conclusions: SVM, RF, and XGBoost are the top three best models for AD prediction. SVM performs better in handling overfitting problem in the training set with small size than RF and XGBoost and also achieved best performance in the testing set.

Compensatory tibial torsion as a component of turnout in professional ballet dancers

Research Area: Physical Medicine / OMM

Abstract ID: UNTHSC706

Presenter Name: Alissa Mirochnitchenko

Authors:

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Sajid Surve ²

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Submission Type: Non-Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose Classical ballet emphasizes external rotation (ER) of the hip joint as the primary mechanism of turnout, with ideal turnout being 90 degrees in each leg. Due to anatomical constraints, few dancers are able to achieve this ideal without compensating elsewhere in the kinetic chain. One mechanism of compensation for inadequate hip ER is tibial torsion. The purpose of this study is to determine the contribution of tibial torsion to turnout in a sample of professional ballet dancers. Methods The study sample consisted of five male and five female professional ballet dancers. Using motion capture technology, each dancer was filmed completing barre exercises at three times during the performance season. Rotational movement at the femoroacetabular, tibiofemoral and tibiotalar joints was approximated using motion markers. Results While the majority of external rotation during all movements originated at the femoroacetabular joint, females demonstrated 12-14 degrees of turnout originating at the tibiofemoral joint, and males demonstrated 15-17 degrees. Across all movements, females demonstrated more turnout originating at the hip joint than males. Conclusions According to classical ballet aesthetics, a turnout of 90 degrees is expected in each leg, with only 5 degrees of total turnout originating from each knee joint. The degrees of turnout originating from the knee in this sample exceed these values. Furthermore, the use of non-invasive motion-based testing such as motion capture allows for the creation of a three-dimensional model which may be used for performance tracking and injury prevention in dancers.

Conducting Research as a First-Year Medical Student

Research Area: Education

Abstract ID: UNTHSC483

Presenter Name: Siri Tummala

Authors:

Sruthi Tummala ^{1 *}

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Cheryl Harding ³

Jaime Cobb ⁴

Submission Type: Non-Competition Poster

Department: TCU/UNTHSC School of Medicine

Classification / Affiliation: TCU/UNTHSC School of Medicine

Abstract: During the past twelve months, in response to COVID-19, there have been evolving societal expectations and values, including some transformations in academic health sciences education and training to ensure that those graduating from medical school will be better equipped to deal with the demands of modern medicine and further education. The TCU and UNTHSC School of Medicine has immersed its students in research early to develop physicians who are life-long learners capable of critical inquiry and in medical information literacy to produce physicians suited for patient-centric care. Through self-directed discovery, students develop skills needed to understand and use evidence-based approaches for basic and clinical research. An important aspect of conducting research is identifying a core topic, which can be aligned to a specific theme or from topics discussed in coursework. The students are working closely with mentors they chose, course directors, and faculty who can provide collaborative guidance on these interest areas for students to develop scholarly research. The study (The Impact of COVID-19 Restrictions on Caregivers of Individuals with Dementia) used qualitative methods comprising of structured interview questions. The findings show that, despite a world-wide pandemic and the demands of beginning the first year of one's medical education, it is possible to effectively engage in scholarly evidence-based research. Medical schools need to ensure that students are provided with early exposure to environments that allow for the exploration of meaningful interactions by increasing opportunities to 'stand in' to the role of a researcher, even as students.

Correcting occipitomastoid suture slippage using a high velocity low amplitude technique to improve coordination and balance

Research Area: Physical Medicine / OMM

Abstract ID: UNTHSC392

Presenter Name: Carl Heinrich

Authors:

Eva Koster ^{1 *}

Carl Heinrich ²

Dante Paredes ³

Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Cranial osteopathic manipulative treatment (OMT) is a field with a lot of room for more research into the indications and efficacy of its application in patients with neurological symptoms and disturbances. Case Information: An 83-year-old Caucasian male with a history of chronic intermittent neurological disturbances is found to have significant occipitomastoid (OM) suture slippage. He had been experiencing significant vertigo, balance, gait, and coordination issues that were negatively affecting his quality of life and made him prone to severe falls. High velocity, low amplitude (HVLA) treatment was periodically performed to the OM suture bilaterally in biweekly intervals to address misalignment. After treatment, the patient reported significant and immediate improvement in balance and coordination. This case study reviews cranial osteopathic medicine and OMT, mechanisms of injury, clinical findings, and treatment for patients with OM suture slippage. Conclusions: Patients presenting with neurological variations from baseline represent a unique challenge to physicians in that an array of generalized symptoms as well as focal neurological deficits can all point to different diagnoses or the same. Furthermore, multiple systems influence a single sensory and/or motor function. This case illustrates a patient who had consistently received temporary relief from these neurological disturbances after cranial HVLA to the OM suture. Results could potentially be unique to the patient physiology and provider experience, however the success of using cranial HVLA to help with gait and coordination is an exciting endeavor that could help other patients with neurological disturbances.

Correlating DCE-MRI Vascular Changes and T2-MRI Contour Changes of the Muscles of Swallowing in Patients with Osteoradionecrosis of the Mandible following Intensity-Modulated Radiation Therapy for Head and Neck Cancers.

Research Area: Cancer

Abstract ID: UNTHSC419

Presenter Name: Luke Cooksey

Authors:

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Stephen Lai ³

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Submission Type: Non-Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: Dual Degree Student

Abstract: PURPOSE: Radiotherapy is a highly-effective mainstay of the standard treatment regimen for head and neck cancers. Though beneficial in most cases, radiotherapy in the head and neck area carries several toxicity risks associated with treatment: dysphagia, chronic aspiration pneumonia, and osteoradionecrosis are considered amongst those with considerable negative impact. Osteoradionecrosis (ORN), or death of bone tissue due to radiation, affects only a small percentage of those receiving radiotherapy. However, ORN carries significant risks and detriments to quality-of-life when it does occur. Our work in this area seeks to identify and correlate changes in Dynamic Contrast-Enhanced (DCE) MRI vascular parameters with changes in T2-MRI swallowing muscle contours in patients who have received a diagnosis of ORN following Intensity-Modulated Radiation Therapy (IMRT). METHODS: For 95 patients who received a diagnosis of ORN, swallowing muscles were precisely contoured on pre-treatment and during-treatment T2 MRI images. The images were then compiled and registered with pre-treatment CT-based radiation plans and DCE-MRI images using a software called "Dicompyler." RESULTS/CONCLUSIONS: While the work is still on-going, preliminary observations have indicated it is likely the overall aim to create a database registry and timeline for assessing patient risk of ORN development is very possible. Future directions, based on preliminary observations, should be to continue compiling and registering ORN patient correlation data and to begin preliminary work of establishing parameters and algorithms that can be safely utilized in patients for analysis of clinical efficacy and effectiveness.

Covid-19 Case and Mortality Trends across Incarcerated Populations in the U.S.

Research Area: Health Disparities

Abstract ID: UNTHSC703

Presenter Name: Megan Jodray

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Christy Xavier ²

Rafia Rasu ³

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmacotherapy

Classification / Affiliation: UNT System College of Pharmacy Student

Abstract: Purpose: Explore case and mortality rate differences across county, state, and federal facilities to identify places most vulnerable to coronavirus disease 19 (COVID-19). Methods: Secondary retrospective cohort analysis utilizing the UCLA's comprehensive COVID-19 research data on cases and mortality trends collected until January 29th, 2021. This data set is collected by UCLA volunteers directly from facility websites. Statistical analysis was conducted using SPSS. Results: Since March 2020, it is reported the total U.S. population of incarcerated residents has had 370,042 cases and 2,185 deaths nationally. County facilities have reported 19,099 (5.16%) cases and 43 (1.97%) deaths. State facilities have reported 305,616 cases and 1,913 deaths and have the highest case fatality ratio compared to all facilities. Federal facilities have reported 45,327 cases and 229 deaths. Out of total incarcerated resident population, Texas had 9.42% and 11.53% of cases and deaths, respectively. Moreover, there is a higher chance of dying from COVID-19 [RR: 5.55, 95%CI (3.36-9.17)] in a county prison compared to a federal prison in Texas. Conclusion: Limited information exists on the incarcerated population effected by COVID-19, especially amid an ongoing pandemic. There appears to be a higher risk of mortality in COVID-19 cases in state facilities compared to federal and in Texas we observed a 5 times higher risk of dying in county versus federal prisons. Identifying at-risk incarcerated populations can help control spread and reduce health gaps.

Craniofacial Bone Mineral Density During Growth in Mice with Osteogenesis Imperfecta (OI)

Research Area: Structural Anatomy

Abstract ID: UNTHSC465

Presenter Name: Courtney A. Miller

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Jason Organ ⁴

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Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Purpose: Osteogenesis imperfecta(OI) is a genetic connective tissue defect resulting in fragile bones due to mutations affecting formation of type I collagen. Low bone mineral density (BMD) in the post-cranial skeleton has been reported in human patients and murine models with OI, yet little is known about craniofacial biomineralization in the disorder. Typically, skeletal mineralization is responsive to the strain environment. The aim of this study is to investigate longitudinal changes in craniofacial BMD in a mouse model of OI type III (most severe form), and to quantify BMD in regions relative to feeding biomechanical forces. Methods: Homozygous recessive OI murine (OIM), a mouse strain with a COL1A2 mutation modeling OI type III, and unaffected wild-type (WT) littermates were micro-CT scanned at weeks 4, 10, and 16. BMD in eight regions was analyzed using Bruker CTAnalyzer software and Mann-Whitney U tests. Results: OIM mice had significantly ($p < 0.05$) lower BMD than WT mice in all eight regions during week 4, no significant differences in week 10, and significant differences at the parietal bone, mandibular symphysis, and maxillary incisor regions during week 16. Absolute BMD was higher within regions proximal to the bite point at skeletal maturity. Conclusions: These results support a trend that OIM mice have lower BMD in the craniofacial skeleton compared to WT mice throughout growth and BMD in all mice is affected by proximity to bite forces. Understanding craniofacial mineralization patterns in OI could assist in the implementation of pharmaceutical interventions to increase BMD.

De-tethering of MRI demonstrated tethered cord

Research Area: Neuroscience

Abstract ID: UNTHSC442

Presenter Name: Madeleine Howells

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Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Recognition of tethered cord syndrome (TCS) in children is important because as the child grows, the spinal cord is stretched; and for patients with TCS, this leads to ischemia and subsequent neurological deficits, including bowel or bladder dysfunction, back pain, or lower extremity weakness. Radiologically, the presence of a fatty filum, thickened filum, or conus medullaris located caudal to L2 is considered a marker for tethering. The objective of this study is to ascertain how symptomatic tethering is defined in our institution and assess the rationale for surgical detethering in asymptomatic patients. Charts for patients who underwent detethering surgery between 4/1/2015 and 3/31/2019 at our institution were examined. Univariate logistic regression analyses were used to determine whether demographic and diagnostic factors predicted symptoms at presentation with TCS. There were 289 patients included. The modal patient was < 5 years of age, male, had a fatty filum and thickened filum, and did not have a low-lying conus. Patients < 5 years of age were less likely to have urological, gastrointestinal, and neurological or orthopedic symptoms; males were less likely to have urological symptoms; those with fatty fila were more likely to have gastrointestinal and neurological or orthopedic symptoms; patients with thickened fila were less likely to have urological symptoms; patients with low lying conus were less likely to have urological and gastrointestinal symptoms. Timely diagnosis and treatment of patients experiencing signs and symptoms related to tethering offers the possibility of resolution of deficits related to tethering, or at least prevents their progression.

Delayed Recovery of a Prolonged Total IntraVenous Anesthesia Procedure with Risks of Malignant Hyperthermia

Research Area: Other

Abstract ID: UNTHSC550

Presenter Name: Amit Aggarwal

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Annum Faisal ²

Mahammad Hussain ³

Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Spinal Cord Ependymoma (SCE) is an intramedullary tumor that requires surgical intervention. Total Intravenous Anesthesia (TIVA) is indicated for such neurosurgery cases. The pharmacodynamics and pharmacokinetics of each drug used must be factored to safely extubate and maintain the airway postoperatively. Case: A 57-year-old male with a history of pulmonary hypertension presented to the hospital with complaints of gait difficulty and sensory deficits secondary to SCE. The patient was scheduled for surgery, and the decision was made to do TIVA due to a family history of Malignant Hyperthermia. Three continuous IV drips were placed: propofol, titrated between 125-300 mcg/kg/min, ketamine at 5 mcg/kg/min, and sufentanil at 0.3 mcg/kg/hr. The patient required a phenylephrine infusion at 35 mcg/min to maintain hemodynamics, which had to be titrated up to 75mcg near the 11-hour point due to severe hypotension. Following extubation, the patient was placed on an oral airway with a simple O2 mask in place. He was noted to have snoring respirations with oxygen desaturating to the low 80's. A jaw thrust was done, and he was placed on a non-rebreather mask. Due to a fixed obtunded state, a hasty decision to re-intubate was made without proper reevaluation and communication between providers. The patient was then re-extubated 1.5 hours later with minimal post-op complications. Conclusions: This case illustrates the challenges of prolonged TIVA in the assessment of safely extubating patients while maintaining the airway in the postoperative period.

Dermatitis in Stringed Instrumentalists

Research Area: General Medicine

Abstract ID: UNTHSC590

Presenter Name: Henry Lim

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Marshall Hall ²

Sajid Surve ³

Submission Type: Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Up to 25% of stringed instrumentalists suffer from dermatological issues. Although occupational contact dermatitis alone has been estimated to cost the United States a billion dollars in economic burdens there has yet to be a focused review of dermatologic diseases in stringed instrumentalists. The objective of this systematic literature review is to identify dermatologic diseases of stringed musicians and summarize the available treatment options. Methods: A literature search of PubMed, Scopus, and Medline were conducted for articles relevant to skin diseases in musicians. Two investigators independently reviewed and narrowed the search to 32 articles based on the inclusion criteria of stringed instruments. Data was then abstracted with a focus on violin, viola, cello, bass, guitar, and harp. Results: Stringed instrumentalists commonly had the highest practice frequencies ($p=0.031$). This was associated with instrument-related skin disorders ($p=0.022$) such as callosities. Fiddler's Neck was the most commonly reported finding in violinists and violists. the most common cause of allergic contact dermatitis were nickel and colophony. Mastitis was reported in guitarists and finger trauma in harpists. Beginner status made individuals more susceptible to dermatologic issues. Data on cello and bass players is lacking. Non-pharmacological treatments included cessation of playing, proper posture, modified instrument set-ups, and physical barriers between the instrument and skin. Conclusions: Stringed instrumentalists have a unique set of dermatological conditions. Further research is needed to investigate the local musician populations, promote proper body mechanics, and develop instrument set-ups that do not cause dermatological conditions.

Design and Characterization of Inhibitory Peptides (iPeps) derived from MIEN 1 Protein sequence

Research Area: Cancer

Abstract ID: UNTHSC449

Presenter Name: Amit Kumar Tripathi

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Jamboor Vishwanatha ³

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: MIEN1 is a tumor-specific protein that regulates migration and invasion of cancers. It is overexpressed in human breast, prostate, colorectal, ovarian cancers, making this protein a potential therapeutic target for these cancers. Our goal is to identify small inhibitory peptides (iPeps) derived from the native MIEN1 protein. Methods: CASTp server was used to identify the pockets or empty concavities on the MIEN1 protein surface into which potential inhibitory molecules can gain access. Peptide designing tools like AntiCp, Cancer PPD and Chimera program were utilized. The peptides were synthesized locally and the ability of the peptides to inhibit proliferation, migration and invasion were assayed. Results: All the peptides designed were cationic and hydrophobic. AntiCp, a support vector machine (SVM)-based web server, showed that the peptides had an SVM threshold of more than 0.5. The peptides were able to form hydrogen bonding with MIEN1 in chimera which is an indication of their MIEN1 binding. AntiCp server also indicated their anticancer activity. Of the 5 peptides tested, three peptides designed based on MIEN 1 protein sequence showed inhibition of MDA-MB-231 cell proliferation in the MTT assay at a concentration of 100 µg/mL. Ongoing experiments will examine the effect of inhibitory peptides on migration and invasion mediated by MIEN 1. Conclusions: Preliminary data demonstrated that peptide sequences potentially blocked MIEN1 functional activities. We will establish these peptides as the first inhibitory molecules of MIEN1 protein and determine their mechanism of action to further develop potent MIEN1 inhibitors

Determining the cytotoxicity of Clotam and Copper-Clotam against Cardiomyocytes

Research Area: Cancer

Abstract ID: UNTHSC508

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Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Chemotherapy (ChT) is required in the treatment of many cancers. Most ChT agents exhibit unwanted side-effects by causing damage to healthy cells. Side effects from many common ChT agents are leaving pediatric cancer survivors with lasting organ system damage, specifically damage to the heart. Past studies conducted by our group demonstrated the anti-cancer activity of clotam (tolfenamic acid-TA) and copper-clotam (CuTA). Our laboratory demonstrated the anti-cancer activity of CuTA against several cancer cell lines. CuTA is showing higher cytotoxicity against cancer cells even at much lower dose than TA. Our long term objective is to test CuTA to sensitize cancer cells to ChT. Methods: Cardiomyocytes H9c2 (cell line derived from rat heart tissue) originally obtained from the American Type Culture Collection (Manassas, VA) were cultured as per the supplier's instructions. H9c2 cells were treated with TA or Cu-TA or Doxorubicin and combinations (for example, TA and Doxorubicin) and cell viability assay was measured using CellTiterGlo (Promega) kit at 48 hours post-treatment following manufacturer's instructions. Results & Conclusion: We found that TA or CuTA were not cytotoxic in H9c2 cells at tested doses. TA kept more cells alive in conjunction with Doxorubicin than did the control. Our results also demonstrate that the IC50 values of TA and CuTA, determined with cancer cell lines, are not toxic to H9c2 cells. These results provide evidence that CuTA does not induce toxicity in cardiomyocytes and supports further testing for translational application in combination therapy with ChT.

Developing a stable drug delivery system for the mesoionic compound MIH 2.4BI using reconstituted high-density lipoproteins (rHDL) nanoparticles

Research Area: Cancer

Abstract ID: UNTHSC614

Presenter Name: R. Max Petty

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James Mathis ⁴

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Rafal Fudala ⁷

Submission Type: Non-Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: Faculty / Staff (Not for Competition)

Abstract: Purpose: In recent years, mesoionic compounds have displayed promising results as an anticancer agent due to their unique structure and properties. Specifically, the 1,3-thiazolium-5-thiolate derivative of a mesoionic compound, MIH2.4BI, has been shown to inhibit oxidative phosphorylation in mitochondria, induce expression of autophagy-related proteins (Beclin-1 and ATG5), and promote cell cycle arrest at the G2/M phase in breast cancer cells. However, due to the hydrophobic nature of the drug, the cellular uptake could be affected. The rHDL drug delivery technology has been successful in solubilizing several drugs. In the present study, we produced a stable rHDL-MIH2.4BI formulation for efficient drug delivery to breast cancer cells. Methods: The rHDL-MIH2.4BI nanoparticles were prepared using the cholate dialysis protocol enhanced by thermocycling. The size, polydispersity index, and zeta potential of the formulation were determined using a light scattering analysis instrument (Zetasizer, Malvern Panalytical Ltd). Anisotropy was determined by spectrofluorometry, and the entrapment efficiency was determined using the absorbance of MIH2.4BI at 480nm. Results: rHDL-MIH2.4BI formulations were successfully prepared with an entrapment efficiency of 20.3%, an average size of 38.7 ± 12.14 nm, and a zeta potential of -14.13 ± 0.41 mV. After 26 days of storage at 4°C, this formulation retained 97.6% of the drug with an increased anisotropy measurement from 0.189 on day1 to 0.323 on day 26. Conclusions: While additional studies need to be performed to optimize the current formulation, the rHDL-MIH2.4BI nanoparticle appears suitable to enhance the solubility and bio-availability of MIH2.4BI.

Development and in vitro characterization of gemcitabine loaded nanoparticles for pancreatic cancer therapy

Research Area: Cancer

Abstract ID: UNTHSC617

Presenter Name: Jennifer Pham

Authors:

Jennifer Pham ^{1 *}

Amalendu Ranjan ²

Jamboor Vishwanatha ³

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose: Pancreatic Ductal Adenocarcinoma (PDAC) is the 4th leading cause of cancer deaths in the United States and the most common type of pancreatic malignancy (90%). With a poor five- year survival rate of only 5-8%, complete surgical resection remains the only curative treatment. However, most patients are diagnosed at a later stage where chemotherapy and radiotherapy are the only options. Gemcitabine is the FDA-approved treatment for PDAC but the current therapy leads to more severe side effects due to the instability of gemcitabine in the blood stream and its poor membrane permeability. Nanoparticles are effective in cancer therapy because they allow modifications that make for a more effective delivery method which also reduces the toxicity to normal tissue. Methods: In this proposed study, we aim to formulate, optimize and evaluate the in vitro effectiveness of gemcitabine loaded nanoparticles in PDAC cell lines in order to improve the effectiveness of current chemotherapy treatments for pancreatic ductal adenocarcinoma. Results: We found that out of the three types of nanopatforms used for encapsulating gemcitabine (GEM-NPs): polymeric, liposomal and a hybrid of the polymeric and the liposomal forms, the liposomal nanoparticles were the most effective in the encapsulation of gemcitabine according to the physicochemical properties, such as average particle size, zeta potential, encapsulation efficiency or drug loading, etc., and in vitro functional evaluation in PDAC cell lines. Conclusion: This study suggests that the use of liposomal nanoparticles is the most beneficial in the encapsulation and delivery of gemcitabine.

Development of COVID Respiratory Failure in a Patient with B-cell Lymphoma: A Case Report

Research Area: General Medicine

Abstract ID: UNTHSC584

Presenter Name: James Oh

Authors:

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Daniel Mejia ⁴

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Yordanos Agajyelleh ⁶

Robel Ghebrekristos ⁷

Grant Fowler ⁸

Joseph Martin ⁹

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Few studies examine the care for patients with hematological malignancy complicated by COVID-19 and sequelae of treatment. Case description: A 60 yo Caucasian male presented to the ED with chest discomfort and dyspnea. He had a history of HTN, HFrEF, T2DM, Stage 3 CKD, and morbid obesity. CXR revealed a large mediastinal mass, prompting biopsy. One week later, he returned to the ED with worsening dyspnea, chest pain and edema. CXR revealed a right pleural effusion and ECG showed AFib. He was diagnosed with acute-on-chronic respiratory failure with hypoxia; O₂ nasal cannula, a thoracentesis, and antibiotics were started. The hospital course was complicated by multifactorial decompensation, tracheostomy placement, ICU admission for hospital-acquired pneumonia, septic shock, ATN, and AF b with RVR. Medical stabilization was achieved with combination therapy including antibiotics, supplemental O₂, anti-arrhythmics, and antiplatelets. Mediastinal mass biopsy demonstrated low grade B-cell non-Hodgkin's lymphoma and cyclophosphamide, vincristine, with prednisone were initiated. However, severe hyperglycemia ensued requiring an insulin drip and chemotherapy discontinuation. He later developed persistent diarrhea and tested positive for recurrent C.difficile; vancomycin was started. On day 34, he was again transferred to the ICU for respiratory distress and tested positive for COVID-19. High flow O₂, convalescent plasma, decadron and remdesivir were started. Eventually, the patient reached medical clearance on day 61 and was discharged with home health for rehabilitation and care. Conclusions: This case report presents the complex management required for patients with lymphoma and COVID-19.

Differences in race-specific outcome measures for chronic low back pain patients with relation to HTR2A variations

Research Area: Molecular Genetics

Abstract ID: UNTHSC565

Presenter Name: Jeremy Holden

Authors:

Jeremy Holden ^{1 *}

Nicole Phillips ²

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Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: The effects of many genes involved in the pathogenesis of chronic low back pain (CLBP) are not fully understood, especially concerning racial variation. This study aims to determine if variations of the serotonin receptor gene HTR2A, which has been implicated in psychological and pain disorders, correlate to differences in clinical outcome measures of patients with CLBP in the PRECISION Pain Research Registry. Methods: The base population includes 283 (68.4%) Caucasians and 131 (31.6%) African Americans who were genotyped for their haplotype in 2 haploblocks: A (rs6313;A/G, rs6311;T/C, rs1928040;A/G, rs9567746;A/G) and B (rs7997012;A/G, rs7330636;T/C). Race-specific Kruskal-Wallis analyses were used to determine differences in outcome measures when comparing haplotypes within haploblocks. Separate regression analyses looked at whether haplotypes that are overrepresented in one racial group versus the other had effects on the same outcomes. Results: There were differences in scores for the Roland-Morris Disability Questionnaire (RMDQ) ($p=0.04$), pain catastrophizing (PCS) ($p=0.04$), and pain self-efficacy (PSEQ) ($p<0.01$) within haploblock A for African Americans. There were also differences in the RMDQ ($p=0.02$) and PSEQ ($p<0.01$) scores within haploblock B for Caucasians. Regressions showed having at least one allele with the haplotype GC in haploblock B is associated with a lower numerical rating scale value for pain intensity after adjusting for additional variables ($\beta=-0.59$; $p=0.02$). Conclusions: Haplotypes of HTR2A may have a relationship with the pain intensity, disability, and pain response of CLBP patients. Further studies would look at additional race-specific factors and their interplay with HTR2A.

Discovery of Small Molecule Slack Inhibitors for the Treatment of MMPSI: SAR Development in the Eastern Region of Hit Compound VU0606170

Research Area: Pharmaceutical Sciences

Abstract ID: UNTHSC400

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Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: GSBS Student

Abstract: Purpose: Malignant Migrating Partial Seizures of Infancy (MMPSI) is a severe form of pharmacoresistant epilepsy. Slack channels are sodium-activated potassium channels, which are critical regulators of electrical activity in the CNS. MMPSI has been linked to gain-of-function mutations of Slack channels. Our objective is to develop small molecule selective Slack inhibitors through an iterative hit optimization library synthesis approach to identify lead compounds for development into MMPSI therapeutics. Methods: Classical and state-of-the-art synthetic chemistry techniques including microwave assisted organic synthesis and flow chemistry were employed. Purification was by automated liquid chromatography. Bruker Fourier 300HD and Agilent 6230 time-of-flight LC/MS were utilized to obtain NMR and HRMS, respectively. Inhibitory activity of Slack was measured utilizing a Thallium flux assay in HEK293 cells stably expressing either WT or Slack mutants. Results: SAR studies developed around hit compound VU0606170 revealed that a 2,5-di-substitution pattern on the eastern phenyl ring was optimal for Slack activity. Compounds were identified that are selective for the A934T Slack variant versus WT. Modifications to the linker portion led to a loss of Slack activity. Lastly, in vitro DMPK studies with selected compounds revealed high clearance, high protein binding, and good permeability. Conclusion: SAR was identified for Slack activity, mutant selectivity, and DMPK properties around the eastern portion of VU0606170. These findings are presently being combined with SAR obtained from other regions of the molecule in search of compounds with improved potency and a more favorable DMPK profile.

Discovery of Small Molecule Slack Inhibitors for the Treatment of MMPSI: SAR Development in the Western and Central Region of Hit Compound VU0606170

Research Area: Neuroscience

Abstract ID: UNTHSC537

Presenter Name: Nigam M. Mishra

Authors:

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Submission Type: Non-Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: Faculty / Staff (Not for Competition)

Abstract: Introduction: Malignant Migrating Partial Seizures of Infancy (MMPSI) is a severe and pharmacoresistant form of epilepsy. Slack channels are sodium-activated potassium channels regulating essential electrical activity in CNS. Gain-of-function mutations in Slack channels have been linked to MMPSI. Objective: To develop small molecule selective Slack inhibitors employing a library synthesis based iterative hit optimization approach to discover leads for development into MMPSI therapeutics. Methods: Classical and state-of-the-art synthetic chemistry techniques including microwave assisted organic synthesis and flow chemistry were employed. Purification was by automated liquid chromatography. Bruker Fourier 300HD and Agilent 6230 time-of-flight LC/MS were utilized to obtain NMR and HRMS, respectively. Inhibitory activity of Slack was measured utilizing a Thallium flux assay in HEK293 cells stably expressing either WT or Slack mutants. Results: SAR studies around hit compound VU0606170 identified a chiral-methyl analog in the piperazine core as optimal for potency. Other new core analogs were less potent than their piperazine counterparts. Several western urea and amide analogs were prepared, and a few moderately potent compounds were identified. Replacement of sulfamide linkers with a sulfonamide gave encouraging results. Lastly, in-vitro DMPK studies with selected compounds revealed high clearance, high protein binding, and good permeability. Conclusion: SAR was identified for Slack activity, mutant selectivity, and DMPK properties around the western and central region of VU0606170. At present, synthesis of analogs that combine optimal functional groups from the entire chemotype are underway with a goal of improving potency and DMPK properties.

Do Nutrition Labels Tell the Whole Story?: Analysis of Total Sugar, Added Sugar and Free Sugar on HbA1c

Research Area: Diabetes

Abstract ID: UNTHSC702

Presenter Name: Kayla Tate

Authors:

Kayla Tate ^{1 *}

Erica Spears ²

Submission Type: Competition Poster

Department: School of Public Health: Biostatistics & Epidemiology

Classification / Affiliation: School of Public Health Student

Abstract: Type II diabetes mellitus (T2DM) contributes significantly to the burden of disease in the United States and globally. Previous research has shown that nutrition labeling is an effective prevention strategy for T2DM. Furthermore, a growing body of evidence suggests that free sugar (sugars present in added sugar, 100% fruit juice, and syrups) as opposed to total and added sugar, may be more predictive of negative health outcomes than total or added sugar. Thus, free sugar may be a more informative sugar type for labeling purposes. The purpose of the present study was to examine associations between total, added and free sugar calculated from beverages reported in the 24h dietary recall in NHANES 2016-2017 (N = 2168), and HbA1c, a diagnostic test for T2DM. Total sugar and added sugar were calculated using NHANES supplemental data sets detailing the nutritional information for food items reported, and free sugar was calculated through a validated 10-step method which involved examining the ingredients of each beverage. Multiple regression modeling was utilized to examine the associations of each sugar type on HbA1c while controlling for confounding variables. As hypothesized, total sugar intake was not significantly associated with HbA1c. Inconsistent with hypotheses, intakes of free sugar and added sugar were not significantly associated with HbA1c. There is a complex relationship between obesity, sugar consumption and T2DM, and further research is needed to investigate these complexities in order to best inform future public health decisions regarding nutrition labeling.

DOES BIOLOGICAL SEX MODERATE ASSOCIATIONS BETWEEN POSITIVE/NEGATIVE AFFECT AND SIMULTANEOUS/CONCURRENT ALCOHOL AND MARIJUANA USE?

Research Area: General Public Health

Abstract ID: UNTHSC406

Presenter Name: Cassidy LoParco

Authors:

Cassidy Loparco ^{1 *}

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Melissa Lewis ⁵

Submission Type: Competition Poster

Department: School of Public Health: Health Behavior & Health Systems

Classification / Affiliation: School of Public Health Student

Abstract: Purpose. Using both alcohol and marijuana is risky, particularly when using both with overlapping effects. However, it is unclear how positive and negative affect are associated with simultaneous alcohol and marijuana use (SAM; using both with overlapping effect) and concurrent alcohol and marijuana use (CAM; defined in this study as using both substances in the past month without overlapping effect), and what role sex plays in these associations. Methods. Baseline data among past-year alcohol or marijuana users age 15–25 (N=417; mean age 21.2 (SD=2.7); 63.8% female) were used from a larger study. A logistic and an ordinal logistic regression model examined if sex moderated associations between positive/negative affect and past-month 1) CAM (yes/no) and 2) SAM use (ordinal categorical variable measuring occasions), respectively. Models controlled for age, sex, race, and ethnicity due to prior associations with outcomes. Results. Although the main effects of positive and negative affect were not associated with CAM or SAM use, the interactions suggest that with each increased unit of negative affect, males had a 7% (OR=1.07, 95% CI: 1.01–1.17) and 9% (OR=1.09, 95% CI: 1.01–1.17) higher odds of using CAM and higher level of SAM use, respectively. Females with higher levels of negative affect did not have higher odds of CAM or SAM use. Conclusions. Interventions aiming to decrease SAM/CAM use could target males who are experiencing high levels of negative affect. Future studies utilizing longitudinal data are needed to assess if causal associations between positive/negative affect, sex, and SAM/CAM use exist.

Early Life Stress in Summer Months Accelerates the Progression of Autoimmunity in Female Lupus-Prone Mice

Research Area: Integrative Physiology

Abstract ID: UNTHSC430

Presenter Name: Rusty Hartman

Authors:

Rusty Hartman ^{1 *}

Keisa Mathis ²

Submission Type: Oral Presentation

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Systemic lupus erythematosus (SLE) is an autoimmune disorder with a high prevalence of renal disease. The progression of SLE is tracked by plasma double-stranded (ds) DNA autoantibodies. We have used an established model of SLE, female NZBWF1 mice, to determine mechanisms associated with SLE-induced renal disease. Typically, mice arrive by truck from Maine at 5-6 weeks of age and are not manipulated until 30-35 weeks when renal inflammation/injury is evident. Based on anecdotal observations in different cohorts of SLE mice, we hypothesized that seasonal factors, along with the stress associated with travel in early life, accelerate disease course in aged SLE mice. We performed a retrospective analysis of 5-6 week old female NZBWF1 mice ordered between 2015-2019 and divided them into two groups based on their date of arrival: summer (April-September; n=38) and winter (October-March; n=51). Average temperature on dates of arrival was higher in summer (78.5 ± 1.8 vs. 52.5 ± 1.9 °F; $p < 0.001$). Plasma dsDNA autoantibodies at 34-35 weeks was higher in SLE mice that arrived in summer ($6.0e5 \pm 8.6e4$ vs. $4.1e5 \pm 5.1e4$ U/mL; $p=0.049$) and this coincided with higher indices of renal injury in SLE mice that arrived in summer (urinary albumin: $13.3e3 \pm 2.6e3$ vs. $6.0e3 \pm 1.5e3$ ug/mL; $p=0.0096$). Our findings suggest early life stress compounded with seasonal factors modulate autoimmunity. Future studies will investigate biochemical processes associated with warmer temperatures and their impact on the progression of SLE-associated renal disease.

Early stage diabetic neuropathy reduces foot strength and intrinsic but not extrinsic foot muscle size

Research Area: Diabetes

Abstract ID: UNTHSC611

Presenter Name: Weston Peine

Authors:

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Sarah Ridge ⁷

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Submission Type: Non-Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: To evaluate individual intrinsic and extrinsic foot muscle sizes and functional foot strength in participants with diabetic peripheral polyneuropathy (DPN). Methods: Thirty individuals participated in this cross-sectional study (15 DPN and 15 matched controls). Sizes of 10 separate muscles of the lower leg and foot were measured using ultrasound imaging. Functional foot strength was also quantified using custom great toe and lateral toe flexion tests along with a doming test. Muscle size and strength metrics were compared between groups using ANOVAs and paired t-tests ($p=0.05$). Correlations between strength and relevant muscle sizes were also evaluated. Results: The sizes of all four intrinsic foot muscles were smaller in individuals with DPN ($p\leq 0.03$), while only one (toe extensor) of the six extrinsic muscles was smaller ($p< 0.01$). Great toe ($p=0.03$) and lateral toe flexion ($p< 0.01$) strength were decreased between groups and showed moderate to strong correlations ($0.43\leq r\leq 0.80$) with several corresponding intrinsic muscle sizes. The doming strength test did not show any difference between groups and was moderately correlated with one muscle size ($r=0.59$). Conclusion: Diabetic peripheral polyneuropathy affects intrinsic muscles before extrinsics. Ultrasound imaging of individual muscles and functional toe flexion tests can be used clinically to monitor DPN progression and foot function. Participants need to be trained in the doming test before a relationship can be established between this test and DPN foot function. Future studies should include muscle quality measurements to better understand characteristics of affected muscles.

Effect of dietary genistein on functional recovery and chronic post-stroke inflammation in ovariectomized middle-aged rats

Research Area: Neuroscience

Abstract ID: UNTHSC664

Presenter Name: Anthony Oppong-Gyebi

Authors:

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Submission Type: Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: PURPOSE: Increasing age increases stroke risk in women after menopause. A drop in circulating estrogens after menopause has been described as a key reason for this age-related risk, considering that estrogen has shown neuroprotection preclinically. However, using estrogen therapy for chronic prevention of cardiovascular diseases is limited by inconsistent beneficial and detrimental outcomes. For this, other agents are investigated as alternatives to protect women against changes that come with aging and low estrogen concentrations. In this study, we hypothesized that genistein, a neuroprotective plant-derived estrogen will confer neuroprotection following hypogonadism and experimental stroke. METHOD: We used ovariectomized proven retired breeder Sprague-Dawley rats (aged ~9months old), categorized into two hypogonadal time points (2weeks=short-term deprivation(STD) and 12 weeks=long-term deprivation(LTD)) and treated with isoflavone-free diet, genistein diet(GEN) or 17- β estradiol(E2) implant. Animals were subjected to intraluminal middle cerebral artery occlusion or sham surgery followed by motor and cognitive behavioral tests and biochemical analyses for chronic post-stroke inflammation. RESULTS: Sham-operated animals showed locomotor symmetry after both STD and LTD. Both GEN and E2 improved locomotor symmetry after LTD. GEN but not E2 improved cognitive flexibility after STD. Both GEN and E2 reduced activated calcium-binding adaptor molecule 1(Iba1) after STD. GEN but not E2 increased transforming growth factor- β 1 and growth-associated protein at the contralateral hemisphere of stroke after STD. CONCLUSION: Dietary Genistein may improve locomotor function in the acute phase of stroke following LTD, improve aspects of cognition and reduce inflammation after STD.

Effects of Animal Assisted Intervention for Individuals with Dementia

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC536

Presenter Name: Kaitlyn Hollingshead

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Ann ka Bustos ²

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Howe Liu ⁴

Submission Type: Non-Competition Poster

Department: School of Health Professions: Physical Therapy

Classification / Affiliation: School of Health Professions Student

Abstract: Purpose: The purpose of this systematic review was to examine the evidence regarding the effectiveness of AAI for individuals with dementia. Methods: Two authors reviewed relevant literature and compiled a list of articles that were then sorted based on the predefined inclusion and exclusion criteria. Studies were included if they met the criteria of adult patients with a diagnosis of any type of dementia and included AAI with dogs. Articles were excluded if they were not available in English, included the use of robots or stuffed animals, or utilized other types of animals for the intervention. Study characteristics, such as the amount and duration of interventions, and specific methodological criteria, were related to reported effects. Results: The initial search resulted in retrieval of 306 articles. These articles were further reviewed to ensure that the methods coincided with established inclusion criteria and resulted in 20 articles. A variety of animal assisted activities were used with a focus on improving quality of life, mood, behavior, cognitive state, and functional activities. Various outcome measures were used to measure the effects of AAI including those that were specific to patients with dementia, and other non-specific measures to assess quality of life, mood, behavior, cognition and functional activities. Conclusion: The evidence suggests that AAI may have a positive effect on quality of life, agitation and depression, social interaction and physical activity in individuals with dementia. There was significant variability between studies regarding prescription of intervention, sample size and outcome measures used to document change.

Effects of Urinary Tract Infection on Hip and Knee Arthroplasty Outcomes

Research Area: Other

Abstract ID: UNTHSC602

Presenter Name: Laura M. Garcia

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Russell Wagner ⁵

Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Introduction: Total hip arthroplasty (THA) and total knee arthroplasty (TKA) are common procedures performed in the United States. However, the effects of periprosthetic joint infections (PJI) can be devastating leading to invasive interventions and potentially impaired functionality, decreased patient satisfaction, and increased mortality. Risk factors for the development of PJIs have been well-documented, however, the association between urinary tract infections (UTIs) and PJIs remains controversial. Our aim was to establish the risk of developing a PJI in patients with an identified UTI in the preoperative, perioperative, and postoperative periods. Methods: Through retrospective chart review, data was abstracted from electronic medical records from JPS Health Network of all patients with a scheduled THA and TKA since 2014. We identified patients with UTIs 15 days prior to surgery and followed up with 12 months post-surgery for subsequent development of PJI. Results: A total of 2,220 surgeries were scheduled, and 1,697 surgeries were completed. Forty-six patients with a UTI completed surgery within 15 days of the UTI diagnosis, and 2 patients developed a PJI (4.3%, 95% Confidence limits: 0.5%, 14.8%) within 12 months post-surgery. Out of 1,274 patients with a surgery without UTI, 47 (3.7%, 95% confidence limit: 2.7%, 4.9%) developed a PJI. Conclusions: Our data does not suggest UTI in the preoperative period increases the risk of PJIs after THA and TKA. However, the study needs more power to establish significant results. Future analysis will look at the association between UTIs in the postoperative setting and PJI development.

Efficacy of the Geriatric Depression Scale-30 and 15 for Elderly Patients in a Primary Care Setting

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC557

Presenter Name: Debini Banh

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Sandra Davis ²

Submission Type: Non-Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: The Geriatric Depression Scale (GDS) was developed to be used as a screening tool specifically for the geriatric population and categorizes patients into no depression, mild depression, moderate depression, and severe depression based on their total scores (Yesavage, 1982). The original GDS-30 (30 survey items) was shortened to GDS-15 (15 survey items) in hopes of maintaining the efficacy in a shorter administration time. The prevalence of geriatric depression is estimated to be about 15-20% of patients (Mitchell). Unfortunately, many of the elderly also believe that they do not need help managing their depression, and thus do not seek help from their primary care physicians (Brenes). Properly screening all patients for depression with a shortened GDS may reduce the number of depression cases missed during the yearly health exams compared to purely relying on patients' reports of their symptoms. The data were collected from the one hundred forty-two patients' first visit over a 12 month period from June 2019 to June 2020. We concluded that the GDS-15 is an easier way to screen all geriatric patients for depression while patients wait to begin the clinic visit with their physician. Further studies will focus on the treatment plan for the mild, moderate, and severe depression as defined by the GDS-30 and GDS-15.

Efficacy of two escalated enoxaparin dosing regimens in achieving target anti-factor Xa levels for venous thromboembolism prophylaxis among obese, hospitalized patients

Research Area: General Medicine

Abstract ID: UNTHSC629

Presenter Name: Caitlin M Gibson, PharmD, BCPS, BCCP

Authors:

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Submission Type: Non-Competition Poster

Department: UNT System College of Pharmacy: Pharmacotherapy

Classification / Affiliation: Faculty / Staff (Not for Competition)

Abstract: Purpose: Due to pharmacokinetic and pharmacodynamic differences, standard enoxaparin dosing regimens may not provide adequate venous thromboembolism prophylaxis in obese hospitalized patients. Both weight-based and fixed-dose escalated prophylaxis regimens have been compared to routine dosing, but no studies have compared the escalated approaches to each other. The purpose of this study is to compare the effects of a weight-based and a fixed-dose escalated enoxaparin dosing regimen on attainment of target anti-Factor Xa levels, a surrogate marker for anticoagulation. Methods: In this prospective, multi-center trial, enoxaparin 0.5 mg/kg daily (weight-based) and enoxaparin 40 mg twice daily (fixed dose) were compared to determine if either resulted in more frequent attainment of anti-Factor Xa levels within the goal range of 0.2-0.5 IU/mL. Patients with a BMI ≥ 40 kg/m² were included. Exclusion criteria were pregnancy, creatinine clearance < 30 mL/min, and trauma during the index stay. Results: Eighty patients were enrolled in a 1:1 fashion between the weight-based and fixed-dose groups. There was no difference in percent of patients achieving target anti-Factor Xa levels (72.5% in weight-based versus 70.0% in fixed-dose). More patients had sub-therapeutic levels than supra-therapeutic levels. No bleeding or thrombotic events were observed. Conclusions: Both weight-based and fixed-dose escalated enoxaparin dosing regimens appear effective in attaining target anti-Factor Xa levels, and no safety events occurred. Future studies should examine the clinical significance of this finding.

Engineering a Nanotherapeutic for Metastatic Prostate Cancer with Bone-targeting Specificity

Research Area: Cancer

Abstract ID: UNTHSC535

Presenter Name: Jana B. Lampe

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Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Prostate cancer (PCA) derived bone metastases account for 90% of metastatic tumors with a five-year overall survival rate of 29.5%. Our objective is to develop a clinically feasible nano-delivery system targeting bone-metastatic sites to prolong overall survival and improve quality of life. The purpose of this project is to engineer a cabazitaxel-loaded, poly-lactic(co-glycolic) acid (PLGA) nanoparticle (NP) with alendronate (ALN) coating to target and treat metastatic bone lesions. We hypothesize that a bone targeted nano-delivery system will ameliorate bone lesions and trigger tumor cell apoptosis. Methods: NPs were formulated using a water-in-oil-in solvent evaporation method. NPs were prepared by sonicating 50 mg/ml PLGA in dichloromethane (DCM), 5% polyvinyl alcohol (PVA), and Bis(sulfosuccinimydyl)suberate (BS3) linker. Later, ALN was conjugated to the NP. Results: Our average NP size was around 200 nm in diameter with a Zeta Potential (ZP) of – 28 mV. Our drug loading capacity (DL) was 12.4% and encapsulation efficiency was 25.3%. The IC₅₀ value is 10 μ M. NPs have also shown to be easily taken up by cancer cells. Conclusion: We have shown that our PLGA NPs have an optimal size, PDI, ZP, DL%, and EE%, which indicates that we have developed a NP that will function as a nanotherapeutic for bone metastatic PCa. The next steps will include spheroid cultures and in vivo studies.

Eosinophilic Gastritis: An Imposter of Gastric Malignancy

Research Area: General Medicine

Abstract ID: UNTHSC513

Presenter Name: Hamza Salim

Authors:

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Prianka Gajula ²

Ali Raza ³

Submission Type: Non-Competition Poster

Department: Non-UNTHSC

Classification / Affiliation: TCOM DO Student (4th Year)

Abstract: Introduction: Eosinophilic gastroenteritis (EGE) is an uncommon condition characterized by eosinophilic infiltration into the lining of the GI tract with a predilection for the stomach and proximal small bowel. Symptoms are non-specific, and the disease is known to take a chronic, relapsing/remitting course. To date, approximately 300 cases are described in literature. Here, we present a case of EGE closely mimicking gastric malignancy. Case Description: A 57-year-old male with a past medical history of DM II, HTN, GERD, and ESRD was admitted to the hospital with 30 lbs weight loss, postprandial fullness, and intractable vomiting. Physical examination showed moderate tenderness to deep palpation in the upper abdomen. CT scan revealed gastric outlet obstruction from an incidental finding of gastric antrum mass. An EGD was performed and revealed a malignant appearing mass in the pre-pyloric region of the stomach. Biopsies showed peptic duodenitis without any evidence of malignancy or H. Pylori infection. After a multi-disciplinary discussion, the decision was made to perform diagnostic laparoscopy, followed by gastrojejunostomy, for the gastric outlet obstruction. Discussion The pathogenesis of EGE is not well understood. Available evidence suggests that it is a hypersensitivity reaction. Histopathological analysis can confirm the diagnosis. Eosinophilic infiltration can involve any layer of the stomach (mucosa, muscularis propria, or serosa), which impacts clinical presentation. The treatment is primarily based on dietary modifications and systemic steroids. In conclusion, eosinophilic gastroenteritis should remain on the differential diagnosis in appropriate clinical cases where the diagnosis of cancer is unclear.

ER-associated Regulation of Astrocyte Mitochondrial Function during HIV-1 Infection

Research Area: Microbiology / Infectious Disease

Abstract ID: UNTHSC514

Presenter Name: Jessica Michelle Proulx

Authors:

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Kathleen Borgmann ²

Submission Type: Oral Presentation

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: Purpose: Astrocytes are key regulators of central nervous system (CNS) health and neuronal function. However, astrocyte mitochondrial dysfunction, such as induced by HIV-1, threatens the ability of astrocytes to provide the essential metabolic and antioxidant support to neurons. This study examined the endoplasmic reticulum (ER)-mitochondrial interface in response to HIV-1 infection to characterize changes in mitochondrial function, the unfolded protein response (UPR), and the regulation of mitochondria associated membranes (MAMs). We hypothesized that the ER regulates astrocyte mitochondrial function via UPR/MAM signaling during HIV-1 infection. Methods: The effects of chronic HIV-1 infection were examined using pseudotyped HIV-1 to infect primary human astrocytes. Astrocyte mitochondrial function and metabolic status were assessed using Seahorse extracellular flux analyzer while expression of UPR/MAM mediators was determined using protein expression assays. Pharmacological inhibition of the UPR pathways was used to delineate key regulatory mechanisms mediating changes on astrocyte mitochondrial function. Results: Our studies demonstrate increased astrocyte metabolic capacity in response to chronic HIV-1 infection which corresponded to increased expression of UPR/MAM mediators. Moreover, pharmacological inhibition of IRE1 α impaired astrocyte mitochondrial activity. Conclusion: These findings illustrate the importance of ER-mitochondria communication in regulating astrocyte mitochondrial function and identify a novel possible mechanism to manipulate the metabolic and antioxidant coupling between astrocytes and neurons during HIV-1 pathogenesis.

Ethmoid Sinusitis as a Possible Differential in Orbital Complications: A Case Study

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC466

Presenter Name: Esther Jung

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Michelle Marcincuk ²

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Reoccurring orbital complications due to sinusitis are rare and are evidenced in limited literature. This case study attempts to provide insight into the broad differential of periorbital swelling through a pediatric patient who presented twice with orbital complications due to ethmoid sinusitis. Case Presentation: An 8-month-old male presented to the emergency department with periorbital cellulitis and evidence of ethmoid sinusitis in the left eye. Following intravenous clindamycin, the patient improved and was discharged. A year and a half later, the patient presented with fever and swelling in the same eye; however, this time he was unresponsive to antibiotics. A computerized tomography (CT) scan identified left postseptal orbital cellulitis with a subperiosteal abscess. After an endoscopic left maxillary antrostomy, total ethmoidectomy, and decompression of the orbital abscess, the patient recovered well with no changes in vision and no reoccurrences of orbital complications to date. Conclusions: Although orbital abscesses due to ethmoid sinusitis are quite rare, it is important to consider ethmoid sinusitis as a primary cause. The treatment options include surgical intervention that must take place rapidly to avoid irreversible consequences. The risk of radiation exposure in this population is further complicated since orbital abscesses due to primary sinusitis can only be definitively diagnosed by CT imaging. It is important for healthcare providers to keep ethmoid sinusitis in mind when considering the differential of periorbital swelling to minimize the risk of permanent complications in their pediatric patients.

Evaluating new treatment strategy for medulloblastoma

Research Area: Cancer

Abstract ID: UNTHSC551

Presenter Name: Shanzay Mohammad

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Umesh Sankpal ³

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Medulloblastoma is the most common malignant pediatric brain tumor. Although chemotherapy, radiation, and surgical resection are often successful, patients in remission often suffer from long-term side effects and face the potential for re-growth of their cancer. This raises a need for effective, less toxic therapeutic strategies. An anti-apoptotic protein, Survivin, and its transcription factor, Sp1, are over-expressed in most cancers including medulloblastoma and are associated with a poor prognosis. Metformin, an anti-diabetic drug with relatively low toxicity profile, was found to have anti-cancer properties in many cancers. This study was conducted to evaluate the effects that Metformin has on the inhibition of medulloblastoma cells. We hypothesize that Metformin treatment will decrease the growth of medulloblastoma cells, possibly by inhibiting Survivin expression through Sp1 transcription factor downregulation. Methods: Human medulloblastoma cells were treated with increasing Metformin doses, then cell viability was assessed at 24 and 48 hours post-treatment using a CellTiter-Glo cell viability assay. Survivin and Sp1 expression in Metformin-treated cells was assessed by Western blot analysis. Results: As the concentration of Metformin increased, the number of metabolically active cells decreased. Sp1 and Survivin protein levels were reduced by Metformin in a dose/time dependent manner. Conclusion: The results validated that Metformin treatment resulted in reduced cell proliferation and decreased Survivin expression. Given that high Survivin levels are associated with resistance to chemotherapy and radiation, future studies will evaluate whether inhibiting Survivin using Metformin will sensitize cancer cells to chemotherapy.

Evaluating the anti-leukemic effect of clotam and copper-clotam using CCRF-CEM cell lines

Research Area: Cancer

Abstract ID: UNTHSC573

Presenter Name: Krishna Patel

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Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Acute lymphoblastic leukemia (ALL) is the most common type of cancer in children younger than 5 years. Patients with ALL have bone marrow that produces immature white blood cells, which are unable to effectively fight infections. NSAIDs are common pain relieving agents that act through COX inhibition, which stops the production of prostaglandins. Clotam (Tolfenamic Acid/TA) is an NSAID that has anti-tumor proliferative effects. It works through targeting specificity protein (Sp) transcription factors that assist cancer cells in inhibiting apoptosis. Our objective is to test TA and copper-TA (Cu-TA), a derivative of TA, to induce an anti-leukemic response. Methods: The T-cell ALL cell line CCRF-CEM was obtained from the American Type Culture Collection (Manassas, VA) and cells were cultured as per the supplier's instructions. A cell viability assay was performed in which cells were plated in a 96-well plate and treated with increasing concentrations of TA and Cu-TA. After 48-hours, the cells were lysed, and the amount of ATP in the cells was measured using luminescence. Using this data, IC50 values were calculated. Results: The IC50 values showed both TA and Cu-TA had anti-cancer proliferative effects. Cu-TA was 15 times more potent than TA in its ability to kill CCRF-CEM cells. Conclusion: Our results demonstrate that Cu-TA is more effective than TA for killing CCRF-CEM cells. This study suggests better implications of Cu-TA in ALL therapy, if further tested using pre-clinical models.

Evaluating the Relationship between Race and Amblyogenic Risk Factors in Preschool Children in Fort Worth, Texas

Research Area: Eye / Vision

Abstract ID: UNTHSC553

Presenter Name: Gopal Karsaliya

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Submission Type: Competition Poster

Department: North Texas Eye Research Institute

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background Amblyopia (lazy eye) is the most common cause of vision loss in children. The prevalence is between 2-5% in the United States. Amblyogenic risk factors include early visual deprivation, strabismus, anisometropia, and media opacities such as a cataract. If treatment for amblyopia is not initiated before the age of 7, the likelihood of successful correction begins to drastically decline with age. Previous studies have found correlations between race and various vision abnormalities. This study aims to assess the incidence of myopia, hyperopia, and astigmatism among pre-Kindergarten children of different racial groups in Fort Worth, TX, as well as evaluate any racial differences in the presence of amblyogenic risk factors. Methods Using the PlusoptiX refractometers at 37 local elementary schools, researchers collected refractive error data of N=2,258 children under the age of 6, allowing for the detection of hyperopia, myopia, astigmatism, and anisometropia. The children's age, race, and sex were also recorded. A chi-square test was done to compare proportions of male/female participants, and odds ratios were calculated for each amblyogenic risk factor between racial/ethnic groups. Results Those with at least one amblyogenic risk factor accounted for 27.82% of the sample. There was a significant difference in astigmatism as an amblyogenic risk factor between Black and Hispanic groups (OR=0.6039, 95%CI 0.46-0.79) and between White and Hispanic groups (OR=0.2387, 95%CI 0.17-0.34). Conclusion The results of this study suggest Hispanic children were at increased risk of developing amblyopia compared to Black and White children in Fort Worth.

Evaluation of effect of below-limit of quantitation (BLQ) data due to nonadherence in population pharmacokinetic (POPPK) modeling

Research Area: Other

Abstract ID: UNTHSC526

Presenter Name: Asama Tanaudommongkon

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Ayyappa Chaturvedula ²

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmacotherapy

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: Data below lower limit of quantitation of analysis method is generally handled using likelihood-based approaches (M3 method) in POPPK. Medication nonadherence can cause BLQ data. Objective of current work is to evaluate the efficiency of M3 method on handling BLQ data generated through non-adherence. Methods: Stochastic simulation and estimation method was used. A two-compartment model with first order absorption was used to simulate a clinical trial with plasma samples collected at steady-state. Non-adherence was simulated with a priori fixed probability in dose omissions resulting in 100%, 70% and 50% of doses taken before plasma sample collection. The simulated dataset was used for estimating parameters with full adherence assumption and M3 method using NONMEM (version 7.4). Process was repeated 200 times for each non-adherence scenario. Parameter bias and precision were calculated for both fixed and random effects parameters using mean estimation error and root mean square error, respectively. Results: The %BLQ data in 100%, 70% and 50% nonadherence scenarios were 10%, 22% and 34%, respectively. The mean estimation error for fixed effect parameters were within the acceptable limits of bias in 100% adherence scenario except V_p showed mild bias (6%). The bias was >5% in fixed effect parameters with 70% and 50% adherence scenarios and increased with level of nonadherence. Between subject variability parameters showed bias >10% in all scenarios. Conclusion: Non-adherence induced BLQ data caused parameter bias although M3 method was used. Further research is warranted to find solutions to this problem.

Evaluation of Gait Abnormalities in Patients with a History of Retinoblastoma: One Year Follow Up

Research Area: Cancer

Abstract ID: UNTHSC637

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Toyya Goodrich ³

Tyler Hamby ⁴

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: The frequency of metastatic retinoblastoma (Rb) is rare, occurring in about 5% of Rb cases. This makes recognition and diagnosis of these patients challenging. The treatment outlook for metastatic Rb is far less promising than the primary malignancy. Current studies estimate survival rates of 80-90% for patients having metastatic disease without central nervous system (CNS) involvement, and 8% with CNS involvement. Case Information: A 5-year-old female with a history of unilateral Rb was ultimately treated with enucleation after unsuccessful effort to control intra-ocular disease with intra-arterial chemotherapy. Seven weeks after this procedure, she presented to clinic with an insidious onset limp. Symptoms progressed to include intermittent fevers and low back pain. Further imaging and work-up revealed relapse of Rb with widely metastatic disease involving multiple bones and bone marrow, but without CNS involvement. She then began chemotherapy per a national clinical protocol. She completed the treatment protocol thirteen months after the diagnosis of metastatic Rb. Disease re-evaluation via MRI of the brain, spine, and orbits was performed, and these studies were negative for residual identifiable disease. She continues with close follow-up and monitoring in her current state of remission. Conclusion: This patient initially presented with non-specific symptoms such as an intermittent limp with vague extremity and back pain. Thorough evaluation, diagnosis, and initiation of aggressive systemic treatment led to a rapid response and attainment of complete remission despite the widespread extent of disease at the time of relapse.

Evaluation of Neuroprotective Effect of hybrid compound SA-2 Nanosuspension in Optic Nerve Crush Mouse Model.

Research Area: Eye / Vision

Abstract ID: UNTHSC572

Presenter Name: Charles Amankwa

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Charles Amankwa ^{1 *}

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Biddut Debnath ⁴

Wei Zhang ⁵

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Dorette Ellis ⁹

Dorota Stankowska ¹⁰

Suchismita Acharya ¹¹

Submission Type: Competition Poster

Department: North Texas Eye Research Institute

Classification / Affiliation: GSBS Student

Abstract: This study examines the cytoprotective effects of hybrid antioxidant-nitric oxide (NO) donating compound SA-2 nanosuspension in normal trabecular meshwork-5 cells (NTM-5) and optic nerve crush (ONC) induced-mouse retinal ganglion cell (RGC) death model. SA-2 was encapsulated in poly-lactic-co-glycolic acid (PLGA) nanoparticles and reported earlier. Total nitrite concentrations of SA-2-NPs was determined using Griess assay in both buffer and NTM-5 cell supernatants. NTM-5 cells were treated with tert-butyl hydrogen peroxide (TBHP, EC50 = 5.5mM) at varying concentrations of SA-2 NPs (1, 0.5, 0.25, 0.125 % w/v) and cell viability was measured. 12-week-old C57BL/6J mice were subjected to ONC injury in the left eye and were administered with either vehicle or 1% SA-2-NPs via intravitreal injections (2uL) or eye drops (5uL). Pattern ERG (PERG) was used to assess retinal function and RGC survival was determined using RBPMs-positive RGCs. Data were presented as mean \pm SEM, n=3-8. 1% SA-2-NPs dose dependently increased NTM-5 cell viability and total nitrite concentrations (~50%) lasting over 4 days. There was significant improvement in PERG amplitudes (1.7-1.9 times) following SA-2-NP administration as well as increased RGC numbers (by ~20%) relative to ONC-ed eyes. SA-2 nanosuspension shows strong positive trend in protecting RGC's from oxidative stress-induced apoptosis in ONC rodent model. Further investigation is being done for improved dosing and signaling changes in response to SA-2 NPs therapy.

EXAMINING ASSOCIATIONS BETWEEN YOUNG ADULT ANXIETY, DEPRESSION, AND WILLINGNESS TO ENGAGE IN ALCOHOL, MARIJUANA, AND SIMULTANEOUS ALCOHOL AND MARIJUANA USE

Research Area: General Public Health

Abstract ID: UNTHSC532

Presenter Name: Abby Seamster

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Cassidy Loparco ²

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Submission Type: Competition Poster

Department: School of Public Health: Health Behavior & Health Systems

Classification / Affiliation: Dual Degree Student

Abstract: Purpose: Research indicates that young adults use alcohol and marijuana independently, or simultaneously (SAM; alcohol and marijuana use at the same time so that effects overlap) to cope with emotional distress (i.e., anxiety, depression). Given that behavioral willingness (i.e., openness) can be viewed as a predisposition to behavior, understanding mental health-related factors associated with willingness to engage in different types of substance use (i.e., alcohol, marijuana, SAM) may aid in identifying young adults at risk for harmful substance use. Methods: Participants ages 18-25 (N=363;60.1% female) completed baseline of a larger ecological momentary assessment study. Linear regression analyses controlling for age, gender, and past-month substance use examined associations between depressive and anxious distress and a willingness to engage in alcohol, marijuana, and SAM use. Results: Reports of higher depressive symptoms were associated with more willingness to use alcohol ($B = 0.21, t = 2.85, p < .01$) and engage in SAM use ($B = 0.13, t = 2.25, p < .05$). Anxious symptomology was associated with less willingness to use alcohol ($B = -0.22, t = -2.99, p < .01$), and more willingness to use marijuana ($B = 0.15, t = 1.99, p < .05$). Conclusions: Findings suggest that depressive and anxious distress are differentially associated with a willingness to engage in different types of substance use, depending on whether alcohol and marijuana are used independently or simultaneously. Therefore, targeted intervention strategies for young adults with depressive or anxious symptoms through early identification of willingness cognitions could prevent harmful substance use.

Examining Fear of Missing Out (FoMO) as a Moderator of the Association Between Peak Drinks and Alcohol-Induced Blacking Out

Research Area: General Public Health

Abstract ID: UNTHSC476

Presenter Name: Ashley Lowery

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Submission Type: Competition Poster

Department: School of Public Health: Health Behavior & Health Systems

Classification / Affiliation: School of Public Health Student

Abstract: Purpose: Heavy drinking remains a public health concern among adolescents and young adults due to adverse outcomes including blackouts. Moreover, studies have also linked heavy drinking to the Fear of Missing Out (FoMO). Further investigation into the relationship between FoMO and alcohol-induced blackouts is merited. Therefore, this study aims to examine whether FoMO moderates the association between peak alcohol consumption and experiencing alcohol-induced blackouts. Methods: Participants ages 15-25 (N = 233; Mean age = 21.54 (SD = 2.46); 36% male) completed both baseline and daily surveys as part of a larger EMA intervention study. Zero-inflated Poisson model was fit to examine the interaction effect between FoMO and peak drinks on self-reported experiences of alcohol-induced blackouts, controlling for relevant covariates (i.e., age, biological sex). Results: Findings indicated the effect of peak alcohol consumption was moderated by FoMO on both the likelihood (log odds ratio = 0.048, p-value = 0.017) and average number (log incidence rate ratio = 0.296, p-value = 0.003) of alcohol-induced blackouts. Specifically, the effect of peak alcohol consumption on alcohol-induced blackouts was stronger for the average number of blackouts but weaker for the likelihood of experiencing any blackouts among those with higher level of FoMO. Conclusions: Findings support previous literature examining FoMO as a risk factor for experiencing alcohol-related harm among adolescents and young adults. Therefore, future research should seek to target FoMO cognitions as an additional way to reduce heavy drinking among adolescents and young adults.

Examining Reasons for Intent to Discontinue and Remove LARCs: National Survey of Family Growth 2017-2019

Research Area: General Public Health

Abstract ID: UNTHSC686

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Er ka Thompson ²

Submission Type: Non-Competition Poster

Department: School of Public Health: Biostatistics & Epidemiology

Classification / Affiliation: School of Public Health Student

Abstract: Background Long-acting reversible contraception (LARC) are highly-effective forms of contraception, which can reduce the risk of unintended pregnancy. Despite LARCs effectiveness, women may desire to discontinue this method. This study will examine reasons for intent to discontinue and remove LARCs among US women aged 15-49 from 2017-2019. Methods The National Survey of Family Growth 2017-2019 was utilized with a sample of 6141 female respondents. Descriptive statistics for intention to discontinue LARCs, difficulty removing LARCs, and reasons for LARC discontinuation and removal were examined. Rao-Scott chi-square tests were conducted in SAS. Results Overall, 22.9% of women reported ever using LARCs. Among LARC users, most women (81.2%) reported using LARC in the past 10-years. Among these women, 63.9% intended to discontinue LARCs, and 11.5% had difficulty removing LARCs. Reasons for wanting to discontinue LARCs include decided to get pregnant (15.9%), side effects (29.6%), LARC complications (19.3%), and LARC expiration (26.8%). Primary reasons reported for difficulty removing LARCs included: complications (68.3%), discouragement by provider (6.8%), provider's inability to remove (4.9%), removal not covered by insurance (3.8%), and could not get removed (3.7%). Conclusion Given that women who use a LARC method rely on providers to remove this contraceptive method, understanding the reasons for discontinuation and difficulties encountered are needed. Findings from this nationally representative sample identified provider-level and system-level barriers for LARC removal. In order to respect the reproductive autonomy of LARC users method for pregnancy prevention, these barriers must be overcome.

Examining Tarrant County Resources for Attention Deficit and Hyperactivity Disorder

Research Area: General Public Health

Abstract ID: UNTHSC567

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Submission Type: Non-Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Attention Deficit Hyperactivity Disorder (ADHD) is a highly prevalent behavioral disorder affecting about ten percent of children and adolescents between the ages of two and seventeen and is predominantly seen in males (2:1 predominance). The disorder is diagnosed clinically and may include inattention, hyperactivity, or a combination of these two aspects that can affect the child's daily life. ADHD is a disorder of particular concern because it often presents with an additional mental, emotional, or behavioral disorder and, more commonly, may severely impede the scholarly and social performance of persons it affects. Methods: We examined multiple resources in the Tarrant County area utilizing PubMed and local resource catalogues. Our resources were divided into three major categories: those that assist with diagnosis of ADHD, those that assist with treatment of ADHD, and those that support persons with ADHD. Additionally, multiple barriers to care were identified. Results: We found that these resources, while freely available and easy to find, may present additional barriers to care including strict requirements for use, physical distance, and societal misconceptions. Numerous resources exist in Tarrant County for both patients with ADHD and family members of those patients. Conclusions: These resources are readily accessible and provide beneficial lifestyle modifications for patients and families, specifically aimed at increasing quality of life by providing outlets such as diagnostic evaluations, accommodation testing, various therapy programs, and education for families. Along with addressing barriers to care, we also recommend increasing public awareness of these programs.

Exercise is a Protective Factor for Motor and Cognitive Function in Early-Stage Parkinson's Disease

Research Area: Neuroscience

Abstract ID: UNTHSC665

Presenter Name: Isabel Soto

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Maria Soto ^{1 *}

Submission Type: Non-Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: Parkinson's disease (PD) is a neurodegenerative disease with no known cure. Previous research has identified aerobic exercise as a non-pharmacological therapeutic option to potentially reverse or slow the progression of motor decline. However, the impact of regularly maintaining aerobic activity on domains of cognition remains poorly understood. Here, the primary goal was to identify which cognitive domains may be more responsive to aerobic exercise to better understand its therapeutic benefits on motor and cognitive function in early-stage PD. Independent groups included exercising and non-exercising early-stage PD patients compared to matched non-Parkinson's healthy controls (NPHC). Neurocognitive testing revealed that PD exercise subjects made significantly fewer errors on Trail-Making Test (TMT) B ($p < .05$; cognitive flexibility, attention) than the non-exercise group and performed comparably to NPHC. The longer number of years PD subjects regularly exercised the better their cognitive flexibility, attention (TMT A and B; $p < .001$) and visuospatial memory (CLOX2, $p < .05$). Several significant relationships emerged between motor (Timed Up and Go, Gait speed, and 6-minute Walking Test) and cognitive flexibility, attention (TMT-A, $p=0.001$; TMT-B, $p=0.000$), and verbal fluency (FAS, $p=0.009$; Animal Naming, $p=0.002$). In summary, PD subjects maintaining a regular aerobic regimen of activity show better motor function, cognitive flexibility, attention, verbal and visuospatial memory than their sedentary counterparts. Future directions include translating these findings using a genetic PD rat model to further elucidate the neural mechanisms underlying exercise-related cognitive and motor performance.

Exoskeleton & Gait Speed in Patients with Spinal Cord Injury

Research Area: Rehabilitative Sciences

Abstract ID: UNTHSC688

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Submission Type: Non-Competition Poster

Department: School of Health Professions: Physical Therapy

Classification / Affiliation: School of Health Professions Student

Abstract: Purpose: Robot assisted gait training (RAGT) is an intervention used to improve gait in individuals with lower extremity motor dysfunction. The purpose of this review is to evaluate both prior and recent literature on the effectiveness of exoskeleton use as an intervention for gait speed in individuals with spinal cord injury. Methods: Electronic databases used in the search included PubMed, CINAHL, PEDro, & Scopus. Two reviewers searched all results from the databases and categorically organized relevant articles based on inclusion & exclusion criteria. Studies were included if they involved exoskeleton as an intervention for gait speed and were conducted on adults diagnosed with spinal cord injury. Results: 37 final articles were reviewed. The sample sizes ranged from 1 to 170 participants. Participant ages ranged from 18 to 81 years old. Duration of treatment ranged from a single session to 16 weeks, frequency ranging from 1-2 sessions to 5 per week. Length of sessions ranged from 20 to 90 minutes. The primary outcome measure for gait speed used in most studies was the 10MWT. Others included the 6MWT, 2MWT, TUG, treadmill speed, and motion capture analysis. Conclusion: The evidence suggests that the use of robotic assistance may effectively improve gait speed in individuals with spinal cord injury. However, evidence is inconclusive as to whether RAGT is more effective in improving gait speed when compared to other interventions. Studies report that robotic assisted interventions are safe & feasible interventions without adverse events or exacerbation of symptoms for patients of this population.

EXOSOMAL ISOLATION AND CHARACTERIZATION TO IMPROVE TRIPLE NEGATIVE BREAST CANCER OUTCOMES.

Research Area: Cancer

Abstract ID: UNTHSC546

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Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: Triple negative breast cancer (TNBC) is an aggressive form of breast cancer associated with poor clinical outcomes and lack of targetable molecular signatures. It was previously reported that serum exosomal-annexin A2 (Exo-ANXA2) is higher in TNBC patients. Additionally, higher levels were reported in African-Americans compared to Caucasian-Americans. Therefore, we propose to examine novel exosome isolation and characterization techniques to measure exo-AnxA2 levels in serum samples of TNBC patients that would be easily adaptable in a clinical setting to improve treatment strategies in African-American TNBC patients. Methods: A novel magnet-activated cell sorting (MACS) technology which employs microbeads (diameter=50nm) to isolate exosomes will be used to determine the exo-AnxA2 levels in serum samples. Exosomes isolated will be subsequently characterized through bead-associated exosomal flow cytometry, exo-ELISA, western blot, RNA isolation, and proteomics to analyze exo-AnxA2 levels and other cargo proteins. Results: Protein estimation of MACS-isolated exosomes revealed an average of 1.75 µg/µl of intact exosomes from 1.0 ml serum sample. These results suggest that approximately 200µl of patient serum sample would yield approximately 2.0 µg of exosomes for exosomal flow cytometry. Technical challenges include creating a clump-free exosome isolate for cytometry analysis without and adapting a non-specialized flow cytometer for exosomal analysis. Conclusion: We expect the results to identify significant co-expressive molecules with exo-ANXA2 that could improve detection, prognosis, and treatment choice of aggressive forms of TNBC. Funding: Award Number R01CA220273 (JKV).

Extensor Tendon Repair Outcomes Based on Timing of Repair

Research Area: Other

Abstract ID: UNTHSC685

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Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (4th Year)

Abstract: Purpose: Extensor tendons lie superficially on the dorsum of the hand, and are covered by relatively thin soft tissue. As such, they are prone to injury and are associated with morbidity. Mechanism of injury can vary from simple lacerations to more complex injuries with severe tissue damage. Appropriate acute management of flexor tendon injuries has been shown to be associated with more favorable outcomes; however, the extensor tendon has only recently begun to receive the same attention. There is a known correlation between surgical outcomes of flexor tendon lacerations and time from injury to repair, but the same data does not exist for extensor tendon injuries. In the present study, we aim to determine if a correlation exists between the time from injury to tendon repair, and post-surgical joint stiffness as a predictor of surgical outcomes. Methods: We have conducted a retrospective chart review of patients who have undergone extensor tendon repair surgery at JPS Health Network since 2012. Results: Our preliminary data analysis reveals that among patients that experienced surgical stiffness, there was a statistically significant relationship between increased time to surgery and increased occurrence of post surgical stiffness. Conclusion: Our preliminary data indicates that early repair of extensor tendon repair should be considered in order to avoid post operative joint stiffness.

External Fixation vs Plaster Splintage in Maintaining Reduction of PER Stage 3 Ankle Fracture Dislocations; A Cadaveric Study

Research Area: Structural Anatomy

Abstract ID: UNTHSC609

Presenter Name: Weston Peine

Authors:

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Travis Motley ²

Weston Peine ³

Rees Checketts ⁴

Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Unstable bimalleolar ankle fractures are a common injury. Typical initial treatment involves closed reduction with splinting. Occasionally the ankle is so unstable that external fixation is used to provide increased stability to the reduced ankle. In such cases the patient is subjected to additional anesthesia risks and pin site infections. Our study assesses the biomechanical difference between stabilization modalities. Our null hypothesis is that external fixation does not provide increased stability compared to plaster splintage in treatment of Pronation External Rotation (PER) type 3 fractures. Methods: Using 7 cadaveric limbs we simulated PER stage 3 bimalleolar ankle fractures and applied plaster splintage or delta frame style external fixation to the fracture-dislocations. A pronatory/external rotation force was applied to the splinted ankles until the talus was dislocated (defined as greater than 50% displaced of the talus relative to the tibia). The stabilization modality was then removed and the process was repeated using the alternative method of stability on each limb. Results: The mean load to failure in the splintage group was 14 lbs. while the external fixation group had a load to failure of 10.14 lbs (p-value = .03). There was no significant difference in load to failure between plaster being applied first to the limbs (p-value = .83) nor if external fixation was applied first (p-value = .67) Conclusions: From our results we can conclude that plaster splintage provided greater stability than delta frame style external fixation in maintaining PER ankle fractures post reduction.

Factors associated with HPV vaccination intention among U.S. 27-45-year-olds

Research Area: General Public Health

Abstract ID: UNTHSC497

Presenter Name: Jonathan Moore

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Jonathan Moore ^{1 *}

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Annalynn Galvin ³

Monica Kasting ⁴

Christopher Wheldon ⁵

Er ka Thompson ⁶

Submission Type: Competition Poster

Department: School of Public Health: Biostatistics & Epidemiology

Classification / Affiliation: School of Public Health Student

Abstract: Introduction: HPV vaccination recommendations now include shared clinical decision-making for adults aged 27-45 years. We investigated how knowledge, attitudes, and beliefs were associated with likelihood of asking a healthcare provider about the HPV vaccine and the likelihood of getting the HPV vaccine among adults ages 27-45 years old. Methods: A cross-sectional survey was distributed to U.S. adults between 27-45 years old between April-May 2020 (n=691). Outcomes of interest included likelihood of asking their provider about the HPV vaccine and likelihood of getting the HPV vaccine. Covariates included demographic factors, knowledge, attitudes, and beliefs. Adjusted models were estimated for each outcome variable using a log function and Poisson distribution. Results: Likelihood of asking their provider about the HPV vaccine was significantly associated with perceived likelihood of benefitting from the vaccine (aOR=2.45, 95% CI: 1.69-3.57). Likelihood of receiving the vaccine was associated with HPV vaccine attitudes (aOR=1.04, 95% CI: 1.01-1.07), perceived effectiveness against HPV infection (aOR=4.03, 95% CI=1.20-13.53), and perceived likelihood of benefitting from the vaccine (aOR=4.31, 95% CI=2.64-7.03). Conclusions: These findings suggest increasing positive vaccine attitudes, perceived effectiveness, and perceived likelihood of benefitting from the vaccination are important factors in facilitating a shared clinical decision for HPV vaccination. Understanding factors associated with likelihood of discussing and receiving the HPV vaccine among 27-45-year-olds is important to implement guidelines for shared clinical decision-making.

Factors Influencing U.S. Women's Willingness for Utilizing Human Papillomavirus Self-Sampling

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC515

Presenter Name: Ashvita Garg

Authors:

Ashvita Garg ^{1*}

Annalynn Galvin ²

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Zeev Rosberger ⁴

Ellen Daley ⁵

Er ka Thompson ⁶

Submission Type: Competition Poster

Department: School of Public Health: Biostatistics & Epidemiology

Classification / Affiliation: School of Public Health Student

Abstract: Purpose. HPV self-sampling is a novel method of HPV testing that is widely accepted in various countries. Recent modifications in the U.S. cervical cancer screening guidelines includes HPV testing and provides HPV self-sampling as another screening option, especially for underserved populations. Due to the scarcity of research regarding the process factors for HPV self-sampling, the current study examines the correlates of the willingness of women to have HPV self-sampling. Methods. A cross-sectional study was conducted among women between the ages of 30-65 years, with no history of hysterectomy (n=812). The outcome variable was a willingness to have HPV self-sampling test (yes/no). Predictor variables included various process factors. Adjusted logistic regression recognized correlates of HPV self-sampling willingness. Results. Higher odds of HPV self-sampling willingness were found among participants who preferred receiving self-sampling information from healthcare providers (OR=2.64; 95%CI 1.54, 4.52) or media (OR=2.30; 95%CI 1.51, 3.48). However, lower odds of self-sampling willingness were found among participants who did not want to pay for the self-sampling kit (OR=0.21; 95%CI 0.14, 0.32) or were not sure which method they preferred for receiving the kit (OR=0.15, 95%CI 0.07, 0.31) as compared to those preferred the mail. Conclusions. Prior to implementing any HPV self-sampling program, it is essential to understand women's preferences for process factors for this screening method for a successful implementation. Strengthening the infrastructural supports can help ensure improved and equitable access to this convenient and private screening method.

Fall Risk Screening in the Elderly

Research Area: Patient Safety

Abstract ID: UNTHSC437

Presenter Name: Jacob Scr bner

Authors:

Jacob Scr bner ^{1 *}

Evan Colmenero ²

John Gibson ³

Lesca Hadley ⁴

Submission Type: Non-Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: The purpose of this project was to increase fall screening for patients over the age of 65. Elderly individuals are at increased risk for falling, and at an increased risk of injury from falls. We set out to investigate if implementing more screening for this vulnerable population would identify those at risk. Methods: We used a simple “yes or no” questionnaire during Medicare annual wellness visits that identifies at-risk individuals based on different attributes that put an individual at higher risk for falling. Based on the answers, we evaluated if a patient is at risk, and, if so, what interventions can be implemented in order to decrease the risk of falling. Results: We were able to identify patients who required intervention to prevent future falls. Because there was no prior method of screening patients over the age of 65 for falls at this clinic, our post-intervention data was able to screen 75% of eligible patients. Conclusions: We found that a simple questionnaire can be a useful tool to determine which patients are at an increased risk. There were some limitations; due to COVID-19, many staff members were out for extended periods of time, thus limiting the amount of data collected. Additionally, as the questionnaire required additional time during a patient encounter, there was not time to survey every eligible patient. Moving forward, a systematic implementation for all Medicare visits would streamline the process and allow for further identification of those at risk for falls.

Finding the PIN in the Haystack: Case report on the localization of a Posterior Interosseous Nerve lesion

Research Area: Rehabilitative Sciences

Abstract ID: UNTHSC489

Presenter Name: Patricia Colucci

Authors:

Patricia Colucci ^{1 *}

Alissa Mirochnitchenko ²

Preston Ooi ³

Submission Type: Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Posterior interosseous nerve (PIN) lesions are uncommon, with an incidence of 0.003%. This case report investigates a PIN lesion distal to the Arcade of Frohse with an unknown etiology. Case Information: A 45 year old male with a history of multilevel anterior cervical spine discectomy and fusion (ACDF) and right cubital tunnel release presented to clinic with persistent right hand weakness. Although his numbness had improved in the fourth and fifth digits, he still experienced dorsal forearm fatigue and thumb extension weakness on the right side. He denied recent trauma or any other comorbid chronic conditions. Physical exam revealed 5/5 strength in bilateral upper extremities, 1/5 strength in first digit extension and abduction, 2/5 strength in second digit extension, and 4/5 strength in third through fifth digits. A nerve conduction study (NCS) was conducted and revealed appropriate amplitudes, latencies and conduction velocities in the median and ulnar sensory and motor nerves, and radial sensory nerves bilaterally. Electromyography (EMG) revealed residual abnormalities attributed to recent ulnar nerve impingement and chronic findings due to C5-6 ACDF. EMG was further suggestive of a radial neuropathy between the takeoff of the nerve to abductor pollicis longus (APL) and extensor pollicis brevis (EPB). The patient was referred to surgery for further management. Conclusions: This case demonstrates the importance of the investigation of new pathology when multiple, chronic pathologies exist. Furthermore, this case highlights that EMG, NCS, and anatomical knowledge play crucial roles in uncovering complex pathology.

Fluorescence Characterization and Cellular Localization of the Mesoionic Compound MIH 2.4BI

Research Area: Cancer

Abstract ID: UNTHSC545

Presenter Name: Dipti Debnath

Authors:

Dipti Debnath ¹

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James Mathis ⁷ *

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Breast cancer is the most frequently diagnosed cancer and the leading cause of cancer death in women worldwide, making this disease a critical public health problem. Mesoionic compounds, which possess a 5-membered heterocyclic aromatic ring associated with a sextet of electrons, have shown remarkable promise as anti-cancer agents due to their unique structure and reaction properties. We previously reported the synthesis of a new 1,3-thiazolium-5-thiolate derivative of the mesoionic class (MIH 2.4BI) and characterization of its selective cytotoxicity in a panel of breast cancer cell lines. Our studies suggest that treatment with MIH 2.4BI mediates apoptotic death in breast cancer cells through mitochondrial dysfunction. To advance potential translational studies toward therapeutic applications, we have begun studies of the fluorescence properties of MIH 2.4BI, using steady-state and time-resolved fluorescence techniques. Our preliminary steady-state measurements showed that the absorption spectrum of the drug is similar in different tested solvents. All samples, dissolved in various solvents, exhibited maximum absorbance between 440 and 480 nm; excitation at 480 nm elicited the highest emission at approximately 615 nm. These results may allow for future detection and localization of MIH 2.4BI in vitro and in vivo. Follow-up studies utilizing fluorescence confocal microscopy are anticipated to reveal the site(s) of drug accumulation in situ and how cytotoxicity is induced in cancer cells. In addition, fluorescence lifetime measurements will be conducted to provide assessments of changes in the macromolecular conformational and experimental dynamic range of the drug.

Fort Worth Adolescent and Young Adult Cancer Registry: First Look at Initial Data

Research Area: Cancer

Abstract ID: UNTHSC568

Presenter Name: Sushreyta Rose

Authors:

Sushreyta Rose ^{1 *}

William Bowman ²

Riyaz Basha ³

Karen Albritton ⁴

Joanna Garcia ⁵

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: The adolescent and young adult (AYA) cancer population, defined as patients diagnosed between the age of 15-39, may benefit from focused research in improving health outcomes as compared to younger and older patients. A retrospective data registry was created to collect protected health information (PHI) on AYA cancer cases from four Fort Worth healthcare systems to foster collaboration in research. Methods: Initially testing feasibility, the registry is currently collecting a limited dataset of demographic, diagnostic and treatment information on incident AYA malignant cases between January 2016 through December 2019 via a secure database. A descriptive analysis was performed on the current data. Results: 3 of 4 institutions have submitted data on 514 AYA cancer patients. Even though expected cancer incidence rates increase with age, 195 patients were between 15-19 years of age followed by 128 patients in the 35-39 years of age range. 59% of the total patients were females. The top five cancers with the highest incidence rates were Thyroid cancer, Breast Cancer, GI tract cancer, Germ Cell cancer and Hodgkin's Lymphoma. In terms of insurance, 47% of the total patients were covered by private insurance followed by 18% covered by Medicaid. Conclusions: Initial analysis highlighted the need for further improving the data collection process in terms of handling delays retrieving data and ensuring good data quality. In the future, the registry seeks to increase institutions submitting data with PHI. This repository should be a useful resource for community partners for AYA research.

Functions of glutaredoxin 2 (Grx2) in the retina: Mechanisms and Protection

Research Area: Eye / Vision

Abstract ID: UNTHSC501

Presenter Name: Myhoa Tran

Authors:

Myhoa Tran ^{1 *}

Yu Yu ²

Hongli Wu ³

Submission Type: Non-Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: UNT System College of Pharmacy Student

Abstract: Purpose: Glutaredoxin 2 (Grx2) is a glutathione-dependent oxidoreductase that reduces S-glutathionylated proteins. Previously, we found that Grx2 could protect the retina from light-induced retinal degeneration (LIRD). However, the mechanisms that coordinate thiol-repair processes in the damaged retina remain unknown. To better understand the protective effects of Grx2, our study was extended to analyze the transcriptome changes of 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. Retinal damage confirmed by electroretinogram (ERG) and spectral domain optical coherence tomography (SD-OCT). The transcriptome of the retinal tissue in WT and Grx2 KO mice were compared using transcriptome shotgun sequencing (RNA-seq). DESeq2 software utilized to analyze gene network. Real-time PCR and Western Blot further confirmed the genes of interest. Results: Light-exposed Grx2 KO mice showed compromised visual function indicated by loss of a- and b-wave amplitudes and thinning of the outer nuclear layer (ONL). Thousands of genes identified with statistically significant expression changes and were then classified into cellular processes and molecular pathways. Among these pathways, many genes that contribute to complement activation, inflammation, and cell survival system were significantly upregulated. Conclusions: Our results suggest that Grx2 could protect the retina from LIRD. Grx2 plays an important role in regulating light-induced retinal inflammation which may be associated with its ability to repair S-glutathionylated substrates.

Glial cell line-derived neurotrophic factor and Parkinson's disease: Is its family receptor the missing link?

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC670

Presenter Name: Ella Anle Kasanga

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Ella Kasanga ^{1 *}

Christopher McElroy ²

Marla Shifflet ³

Michael Salvatore ⁴

Submission Type: Oral Presentation

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: Purpose: Glial cell line-derived neurotrophic factor (GDNF) improved motor function in Parkinson's disease (PD) preclinical and Phase I trials whereas mixed results were generated for Phase II trials. This disparity in outcome may be attributed to several factors including disease severity at treatment onset. Although GDNF is delivered to the striatum, increasing reports suggest that its recovery in the substantia nigra (SN) is vital for motor recovery, a process which may be compromised with PD progression. GDNF delivery in aged rats, wherein bradykinesia is evident, induces expression of its family receptor, GFR- α 1, in the SN. Indeed, replenishment of GFR- α 1, which is decreased in the SN in aged models, improves motor function, suggesting that GFR- α 1 may be critical for motor benefits. Using a hemi-Parkinson's model wherein bradykinesia is also evident, we evaluated for changes in GFR- α 1 expression with lesion progression. Method: 3-month old male Sprague-Dawley rats were euthanized on days 7 and 28 post-lesion induction for neurochemical assays. Results: A lesion-associated decline in GFR- α 1 protein expression was observed in the striatum at both time points. Also, there was a more significant reduction in the 28-day versus 7-day cohort denoting a progressive loss of GFR- α 1. Conclusion: These results suggest that GFR- α 1 in the striatum declines with nigrostriatal dysfunction progression and thus, may be a limiting factor in GDNF efficacy. Maintaining GFR- α 1 expression in the striatum may therefore be a link in the restorative capacity of GDNF.

Glucocorticoid-induced ocular hypertension alters synaptic plasticity and neurotransmission during the progression of glaucomatous neurodegeneration

Research Area: Eye / Vision

Abstract ID: UNTHSC635

Presenter Name: Prabhavathi Maddineni

Authors:

Prabhavathi Maddineni ^{1 *}

Ramesh Kasetti ²

Gulab Zode ³

Submission Type: Competition Poster

Department: North Texas Eye Research Institute

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: Elevated intraocular pressure (IOP) is the major risk factor for Primary Open Angle Glaucoma (POAG). The neurodegeneration in POAG extends beyond the eye into the visual centers of the brain (VCB). Unfortunately, the underlying mechanisms responsible for IOP-induced neurodegeneration still remain unclear. We have developed a glucocorticoid (GC)-induced mouse model of glaucoma and determined the role of GC-induced ocular hypertension (OHT) on synaptic dysfunction, and how alterations in synaptic plasticity in VCB contribute to neurodegeneration. Methods: C57BL/6J mice were injected with either Dexamethasone (Dex) or Vehicle (Veh) via periocular-route, once a week for 10-weeks. IOP was measured every week and the electrical response of VCB was measured by VEP. Expression of synaptic markers in VCB were assessed by immunostaining. Results: Dex-induced OHT led to glaucomatous neurodegeneration in 10-weeks Dex treated mice compared to Veh mice. We observed RGC hyper excitability during the early stages of axonal damage with significantly increased VEP amplitudes with decreased latencies in 5-weeks Dex treated mice (32 μ V;73ms) compared to Veh mice (26 μ V;79ms). Interestingly, we observed complete collapse of neuronal excitability, with decreased VEP amplitudes and increased latencies in 10-weeks Dex treated mice (12 μ V;132ms) due to chronic OHT. Also, we observed an altered synaptic plasticity with decreased expression of both pre and post synaptic markers in the VCB of the 10-weeks Dex treated mouse. Conclusion: These data highlights that GC-induced OHT alters neurotransmission and axonal synaptic plasticity in VCB during the progression of glaucomatous neurodegeneration.

Harder foods make hardier heads among post-weaning rats

Research Area: Structural Anatomy

Abstract ID: UNTHSC445

Presenter Name: Rex Mitchell

Authors:

Rex Mitchell ^{1 *}

Rachel Menegaz ²

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Submission Type: Non-Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: The impact that material properties of foods have on the mammalian skull has been studied extensively. However, research that compares cranial morphologies in response to dietary shifts during growth is limited. We analyzed the crania of Sprague-Dawley rats raised on contrasting post-weaning diets. Methods: Four groups of rats were fed different diets from weaning (week 4) to adulthood (week 16): powdered pellets only (SS); hard pellets only (HH); powdered pellets followed by a switch to hard pellets at week 10 (SH); and hard pellets switched to powdered pellets. We employed shape analysis (Geometric Morphometrics) and computational biomechanics (Finite Element Analysis) to quantify the impact of food hardness on the morphology of their crania. Results: We found significant differences in cranial shape between SS and HH groups, and SH and HH groups. In both cases, similar shape differences were found in the region of the temporal zygomatic root, suggesting that a diet of hard foods may have a consistent impact on morphology. Biomechanical modelling demonstrated clear differences in bone stress distributions during incisor biting between diet groups, indicative of bone remodeling in response to the introduction/removal of hard foods; groups fed hard pellets experienced less stress indicating bone deposition for reinforcement. Conclusions: These findings suggest juvenile diets are an important predictor of intraspecific cranial morphology. More extensive analyses incorporating larger sample sizes will help to further elucidate the nature of these relationships and will contribute to our understanding of mammalian osteology and mastication, post-weaning development, and orthodontics.

Health Disparities and Risk Patterns of COVID-19 Case, Hospitalization, and Case Fatality in Texas Compared to the United States of America

Research Area: Health Disparities

Abstract ID: UNTHSC631

Presenter Name: Christy Xavier

Authors:

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Rafia Rasu ²

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmacotherapy

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: Explore age, sex, race, and underlying condition distribution with COVID-19-related case, hospitalization, and mortality rates. Methods: Secondary retrospective cohort analysis used CDC's and TDSHS's COVID-19 Data Tracker to obtain hospitalization, intensive care, mortality, and demographic counts of confirmed COVID-19 cases from submitted state and territorial health departments and case reports in U.S.A. and Texas (2020). Statistical analysis was conducted using SPSS. Results: In U.S., there were 12,573,876 COVID-19 cases, 688,911 hospitalizations, 74,933 ICU admissions, and 222,575 deaths compared to 1,551,250 cases and 30,741 deaths in Texas. 48% U.S. cases were male compared to 63.3% in Texas. Females had 19% and 22.5% lower risk of hospitalization and mortality compared to males ($P < 0.001$). Whites (54.1%) and Hispanics (21.3%) consisted of most cases. Blacks had 2.47 [RR 2.47, 95%CI(2.42-2.52)] times higher risk of ICU admission and 16% higher mortality risk. Hispanics had 20% higher ICU risk but 35% [RR 0.647, 95%CI(0.638-0.656)] lower risk of death compared to Whites ($P < 0.001$). Pediatric cases had 80% lower mortality risk; older adults with 15.3% case fatality ratio had 87.31 [RR 87.31, 95%CI(84.55-90.16)] times mortality risk compared to adults 20-39 years old. Underlying conditions had 17 times higher risk of mortality compared to no health conditions ($P < 0.001$). Conclusions: Increasing age, male sex, underlying conditions, and Black race are associated with poorer outcomes in COVID-19. Healthcare professionals should be aware of COVID-19 health disparities and risk factors for poor outcomes to better address public health gaps and promote targeted interventions.

HIV Prevalence and Associated Risk Factors among Female Truck Stop and Street Sex Workers

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC577

Presenter Name: Siri Tummala

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Martha Felini ²

Submission Type: Competition Poster

Department: TCU/UNTHSC School of Medicine

Classification / Affiliation: TCU/UNTHSC School of Medicine

Abstract: Female sex workers have disproportionately high rates of HIV compared to the general population due to unique behavioral and structural risk factors. While there are well established risk factors associated with HIV, there is a lack of US population-based studies due to the transient and illegal nature of exchanging sex for survival or for drugs and money. A secondary analysis of 1138 women in substance use treatment and with histories of sex exchange was conducted using data originally collected from 2012-2016 through a street level cervical cancer prevention services program in Dallas, Texas. Using a cross-sectional study design, we assessed self-reported behavioral risk factors (number of sexual partners, condom use, injection drug use), mental health history, and sociodemographics (age, race, and homelessness) by HIV screening status. The prevalence of HIV was 0.99%, 11 of 1116). HIV prevalence was statistically different between race/ethnicity groups ($p = 0.001$), number of sex partners ($p < 0.0001$), and STI positive screens ($p < 0.0001$). Considering the observed HIV prevalence rate against the female US population and female sex worker population in the US, findings demonstrate the need for development of targeted HIV screening and prevention efforts in this high-risk population.

HIV-1 impairment via UBE3A and HIV-1 Nef interactions utilizing the ubiquitin proteasome system

Research Area: Immunology

Abstract ID: UNTHSC666

Presenter Name: Inwoo Park

Authors:

Inwoo Park ^{1 *}

Submission Type: Non-Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: Faculty / Staff (Not for Competition)

Abstract: HIV-1 life cycle regulation has thus far focused on viral gene stage-specificity, despite the quintessence of post-function protein elimination processes in the virus life cycle and consequent pathogenesis. Our studies demonstrated that a key pathogenic HIV-1 Nef interacted with ubiquitin-protein ligase E3A (UBE3A/E6AP), suggesting that interaction is integral to regulation of viral and cellular protein decay and thereby the competing HIV-1 and host cell survivals. 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, thus significantly inhibiting HIV-1 replication in Jurkat T cells only in the presence of Nef, indicating that interaction between Nef and UBE3A was pivotal for UBE3A-mediated degradation of the viral proteins. Nef and UBE3A were specific and antagonistic to each other in regulating proteasome activity and ubiquitination of cellular proteins in general, wherein specific domains of Nef overlapping with the long terminal repeat were essential for the observed actions. Further, Nef itself reduced the level of intracellular Gag by degrading a transcription regulator, Tat, demonstrating a broad role for Nef in the regulation of the HIV-1 life cycle. These data demonstrated that the Nef and UBE3A complex plays a crucial role in coordinating viral protein degradation and hence HIV-1 replication, providing insights into the nature of pathobiologic and defense strategies of HIV-1 and HIV-infected hosts.

How Dirty is Your Phone?—Evaluating Healthcare Workers' Cell Phone Use & Cleanliness in an Ambulatory Clinic

Research Area: Patient Safety

Abstract ID: UNTHSC511

Presenter Name: Jeffrey Li

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Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Preventable medical errors are the 3rd leading cause of death in the United States, 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 monitoring efforts have set their focus on device-associated infections. Given the rising prevalence of clinicians using smartphones, these may also be contributing to infectious spread. Phase 1 of this initiative found that health professional students use their phones in the restroom, clean it less than once weekly, and are unlikely to remove the case. These behaviors were associated with surface contamination levels exceeding cleanliness benchmarks by 3-to-17 fold. Phase 2 aims to repeat this paradigm in healthcare workers. Methods: Using an interval sampling model, healthcare workers at the UNTHSC Health Pavilion completed a survey and had their cellphone swabbed during normal business hours. Contamination levels were assessed using ATP Luminometry, an established test for surface cleanliness. Results: Healthcare workers were likely to use their cellphones in clinic. They were unlikely to use their cellphone in patient rooms or restrooms, but also unlikely to clean them at the end of each workday. Healthcare workers were unlikely to wash their hands in all instances. Cellphone surfaces exceeded cleanliness benchmarks by 2-to-9 fold. Conclusions: Cellphones may improve care delivery by providing quick access to resources but are easily contaminated and rarely disinfected. Despite their utility, more work is needed to ensure safe cellphone use in healthcare.

Hyperbaric Oxygen Therapy: a potential Alzheimer's disease modifier?

Research Area: Pharmacology

Abstract ID: UNTHSC657

Presenter Name: PAAPA MENSAH-KANE

Authors:

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Philip Vann ²

Lad Dory ³

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Submission Type: Oral Presentation

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: Purpose: Current treatment of Alzheimer's disease (AD) is symptomatic, involving anti-cholinesterase and an NMDA antagonist. Over time, this increase in AD incidence, will bring dire consequences not just on the quality of life but also as an economical burden, as Medicare spending for AD is projected to increase to 1 trillion by the year 2050. Based on these numbers, it necessary to identify a solution. It is therefore, not surprising that the Alzheimer's Project Act was passed about 9 years ago to support this course. Though a complex disease, oxidative stress and neuroinflammation are key factors in the pathogenesis. Procedures or treatments that tend to reduce these two factors could probably reverse/modify the progression of the disease. Hyperbaric Oxygen Therapy (HBOT) seems promising for neurological conditions. Therefore, we aim to explore whether HBOT can improve cognition Methods: Young and adult mice were each divided into 4 groups consisting of control-HBOT, control+HBOT, 5xFAD-HBOT and 5xFAD+HBOT. HBOT was started at either 4 or 9 months and continued until the mice were euthanized. Two behavioral tests to study cognition were used. Results: HBOT reversed the deficits in the 5xFAD in the adult mice but not in the young ones. Conclusion: This work though preliminary does support HBOT as a viable option. More work is needed to determine the optimal timing and frequency of the treatment, as well as the mechanism of action underlying its benefits.

Identifying Congenital Disorders of Glycosylation

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC451

Presenter Name: Krishna Gorrepati

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Krishna Gorrepati ^{1 *}

Tyler Hamby ²

William Bowman ³

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Congenital Disorders of Glycosylation (CDG) constitute a diverse group of errors involved with protein glycosylation, a post-transcriptional modification that is essential for life. Due to the diversity of clinical presentations of CDG, they lead to multiple organ systems that are affected and delayed diagnosis. CDGs are usually diagnosed through whole exome sequencing, but carbohydrate deficient transferring (CDT) testing is a quick and cost-effective alternative that can be used as a screening tool for CDG. Although CDGs are rare and have varying presentations, there are two main subtypes, CDG I and CDG II; both of which we explored. We reviewed findings of seven confirmed cases of CDG (5 boys and 2 girls, with a mean age of 6.42 years at diagnosis) followed at Cook Children's Medical Center. We looked at the most common symptoms and age of diagnosis to determine which symptoms led to a diagnosis of CDG. The most frequent symptoms include ataxia (n=6), developmental delay (n=7), and hypotonia (n=7). Typically, within a year of documentation of these symptoms, a diagnosis was established either through CDT testing or WES. In cases that both CDT testing and WES were done, the CDT test proved to show results that correlated with WES. We believe that this is an important finding because when children present with ataxia, with or without developmental delay, and hypotonia, a CDT test can be ordered by a primary care physician as a rapid and economical screening tool that could lead to a quicker diagnosis of CDG.

Identifying the role of Annexin A2 in acquired chemoresistance in triple negative breast cancer (TNBC)

Research Area: Cancer

Abstract ID: UNTHSC444

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Jamboor Vishwanatha ²

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose Triple negative breast cancer accounts for 20% of all breast cancers. Chemotherapy remains the standard of care due to lack of targeted therapy, but patients frequently develop resistance which renders the tumors untreatable. AnnexinA2, a Ca²⁺-dependent phospholipid binding protein is abundant in TNBC cells. In chemoresistant breast cancer cells, AnnexinA2 is highly overexpressed and shown to reduce sensitivity to chemotherapy drugs by inhibiting apoptosis. Here, we demonstrate the role AnnexinA2 in imparting chemoresistance in TNBC cells. Methods MDA-MB-231 and MCF-7 breast cancer cells were treated with frontline chemotherapy agents to determine the half-maximal inhibitory (IC₅₀) concentration using cell cytotoxicity assay. The cells will be treated with predetermined concentration of drugs and AnnexinA2 protein levels will be analyzed using western blot. AnnexinA2 will be knocked-down or overexpressed to detect the change in sensitivity to the drugs. Results MDA-MB-231 cells were treated with Doxorubicin at concentration of 50 to 10,000 nM for 48 hours and inhibited cell viability in a dose-dependent manner yielding an IC₅₀ of 2,351 nM. AnnexinA2 expression analysis upon Doxorubicin treatment is currently ongoing. AnnexinA2 expression as a function of Doxorubicin, Paclitaxel and Carboplatin exposure to MDA-MB-231 and MCF-7 cells will be presented. Conclusion Preliminary data indicate that Doxorubicin has significant anti-cancer activity on MDA-MB-231 cells with concentrations above 2,000 nM. Future experiments will determine the effect of other chemotherapeutic drugs on TNBC cells and the role of AnnexinA2 in chemoresistance in TNBC.

Immunological alterations in murine systemic lupus erythematosus following $\alpha 7$ -nicotinic acetylcholine receptor antagonism

Research Area: Integrative Physiology

Abstract ID: UNTHSC608

Presenter Name: Dennis Kulp

Authors:

Dennis Kulp ^{1 *}

Keisa Mathis ²

Cassandra Stubbs ³

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: TCOM DO Student (4th Year)

Abstract: Systemic lupus erythematosus (SLE) is an autoimmune disease associated with pathology of multiple organs and the morbidity and mortality that ensues can be reduced with anti-inflammatory strategies. The cholinergic anti-inflammatory pathway, is an endogenous neuroimmune reflex that inhibits pro-inflammatory cytokine release through stimulation of $\alpha 7$ nicotinic acetylcholine receptors ($\alpha 7$ nAChR) on splenic immune cells. Our published studies demonstrate anti-inflammatory capability of $\alpha 7$ nAChR activation via nicotine, but loss-of-function studies are needed to further delineate the role of this receptor in SLE. Thus, we hypothesized that $\alpha 7$ -nicotinic receptor antagonism with methyllycaconitine would exacerbate SLE's inflammatory cascade. Female SLE (NZBWF1) mice were administered methyllycaconitine (MLA; 10 mg/kg/day IP) or saline for 14 consecutive days starting at 33 weeks of age and were then euthanized with their spleen and bone marrow processed for flow cytometry (n = 4/group). The percentage of splenic CD3+CD8+ T cells was higher in SLE mice treated with MLA (27.9 ± 4.8 vs. $20.4 \pm 3.5\%$; P=NS), but CD3+CD4+ T cells (66.6 ± 4.3 vs. $73.8 \pm 3.2\%$; P=NS) and CD11c dendritic cells (1.9 ± 4.8 vs. $9.2 \pm 5.0\%$; P=NS) were lower in MLA-treated compared to saline-treated SLE mice. CD3+CD8+ T cells were also higher in the bone marrow of MLA-treated SLE ($21.3 \pm 0.3\%$ vs. $13.9 \pm 3.9\%$; P=NS). Although not significant, these results suggest blockade of $\alpha 7$ nAChRs potentiates the cytotoxic inflammatory profile in SLE mice. Future work will confirm the role of the $\alpha 7$ nAChR in potentiating inflammation and end organ damage in SLE.

Impact of Cognitive and Behavioral Disturbances on Insomnia Symptom Frequency Among Medical Students

Research Area: Psychology

Abstract ID: UNTHSC699

Presenter Name: Shahana Momin

Authors:

Shahana Momin ^{1 *}

Brandy Roane ²

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: About 30% of medical students report insomnia. Insomnia increases risk of depression, anxiety, and mental health disturbances. Both behavioral (e.g., clock watching) and cognitive factors (e.g., worry) contribute to insomnia. We hypothesized that experiencing cognitive and behavioral disturbances would predict more frequent insomnia symptoms among medical students. Methods: Participants were 128 1st/2nd year medical students. Mean age was 24.2 years (SD=3.5) with 61% female, 6% Hispanic, 51% Caucasian, 37% Asian American, and 2% Black. Data were collected during Fall/Spring semesters from 2016/2017. Students gave informed consent prior to reporting on sleep disorder symptoms including insomnia, daytime sleepiness, and sleep habits. Students reporting sleep apnea symptoms were excluded from analyses. Univariate regression analyses determined significant predictors of insomnia symptom frequency. Results: Clock watching ($p < 0.001$), strong emotions 1-hr before bed ($p < 0.001$), going to bed upset ($p < 0.001$) and worrying about school in bed ($p = 0.037$) were significant predictors of more frequent insomnia symptoms. Results also showed trends for napping after 6pm; calm/relaxing activity or being very active 1-hr before bed; stomachache when going to bed; and falling asleep in bright light predicted insomnia symptom frequency. Conclusion: Cognitive disturbances were more likely to predict insomnia symptom frequency among medical students. Behavioral and cognitive disturbances increase physiological arousal, which contributes to insomnia; however, cognitive disturbances are more often associated with a negative interpretation (e.g., worrying about school versus being very active). Findings suggest that sleep hygiene, which targets mainly behavioral factors, is likely not a sufficient intervention for this population.

Impact of Failed Back Surgery Syndrome on Health-Related Quality of Life

Research Area: General Medicine

Abstract ID: UNTHSC520

Presenter Name: Colin Ly

Authors:

Colin Ly ^{1*}

John Licciardone ²

Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Failed back surgery syndrome (FBSS) is a complex condition often described as persistent, residual, and neuropathic back pain of unknown origin following surgical intervention. The FBSS has proven to be troublesome for patients who experience symptoms and for clinicians tasked with providing effective treatment. As treatment options are still being explored, the progression of FBSS remains uncertain. The aim of this study was to determine the impact of FBSS on health-related quality of life. Methods: The PRECISION Pain Research Registry collects data from participants with chronic low back pain. Registry data were accessed for the Patient-Reported Outcomes Measurement Information System with 29 items (PROMIS-29) to compare a FBSS group with a control group without FBSS over 6 months. Results: A total of 30 participants had surgery following enrollment in the registry, including 14 in the FBSS group and 16 in the control group. The FBSS group reported worse outcomes than the control group at various intervals in the domains of depression (3 month mean: 61.0 vs 53.5, $p=.04$), sleep disturbance (3 month mean: 60.5 vs 54.9, $p=0.04$; 6 month: 61.5 vs 55.9, $p=0.04$), participation in social roles and activities (6 month mean: 37.4 vs 44.4, $p=0.04$), and pain interference with activities (3 month mean: 68.7 vs 61.5, $p=0.01$; 6 month: 68.5 vs 61.3, $p=0.003$). Conclusion: These findings provide insight on the longitudinal impact of FBSS on health-related quality of life, particularly depression, sleep disturbance, participation in social roles and activities, and pain interference with activities.

Impact of Lifestyle Intervention using Family Central

Research Area: General Public Health

Abstract ID: UNTHSC562

Presenter Name: Debini Banh

Authors:

Debini Banh ^{1 *}

Aimee Lopez ²

Christina Robinson ³

Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Chronic diseases due to preventative causes are becoming increasingly prevalent among Americans. The Pediatric Mobile Clinic provides free medical care and vaccines to uninsured children in underserved areas of Fort Worth. These underserved populations have health concerns that demonstrate the need for lifestyle medicine interventions that can promote healthful eating, physical activity, sleep, and other healthy behaviors in order to help prevent chronic disease while also improving the wellbeing of the family. Participants were placed into three groups that initially met once a month to discuss a Family Central topic (i.e Nutrition, Physical Activity, Tobacco Avoidance, Sleep, Stress Management, and Social Connection). Sessions were converted to a virtual platform due to the COVID-19 pandemic. Participants engaged in discussion on the topic of the week and created SMART goals. A general linear mixed-effects model was used to examine the impact of lifestyle intervention including health lifestyle education classes on participants' knowledge, attitude, and behaviors, and clinical outcomes. Due to the small sample size and the incomplete survey responses, the results were non-parametric. However, the survey responses showed that the Family Central sessions were highly effective in all participants in increasing awareness of good health behaviors and improving health status. The Family Central program is both important and necessary for improving the health behaviors of the community. With proper education and improved health behaviors, we will see reduced likelihood of chronic disease. We hope to see a positive impact as caregivers model the health behaviors for their children.

Impact of Sleep Quality on Cardiovascular Responses to Simulated Hemorrhage in Humans

Research Area: Integrative Physiology

Abstract ID: UNTHSC547

Presenter Name: Vincent Hua

Authors:

Vincent Hua ^{1 *}

Haley Barnes ²

Alexander Rosenberg ³

Garen Anderson ⁴

My-Loan Luu ⁵

Caroline Rickards ⁶

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Poor sleep quality may limit cardiovascular responsiveness to physiological stress. We hypothesized that subjects with poor sleep quality would be less tolerant to simulated hemorrhage, which would be associated with lower arterial pressure and cerebral blood flow, and higher heart rates compared to subjects with good sleep quality. Hemorrhage was simulated in 20 human subjects with lower body negative pressure (LBNP). Sleep quality was classified as POOR in 5 subjects (Global Pittsburgh Sleep Quality Index (PSQI) score ≥ 5), and GOOD in 15 subjects (Global PSQI score < 5). Markers of cardiovascular function were measured continuously throughout the LBNP protocol. Sleep quality had no effect on LBNP tolerance (POOR: 1453 ± 223 s vs. GOOD: 1535 ± 88 s; $P=0.34$), and there were no differences in the magnitude of central hypovolemia at presyncope ($\% \Delta$ stroke volume, POOR: -53 ± 8 % vs. GOOD: -49 ± 4 %; $P=0.32$). However, there were differences in the magnitude of hypotension ($\% \Delta$ mean arterial pressure, POOR: -18 ± 3 % vs. GOOD: -22 ± 2 %; $P=0.08$), cerebral blood flow reduction ($\% \Delta$ MCAv, POOR: -19 ± 6 % vs. GOOD: -28 ± 2 %; $P=0.03$), and reflex tachycardia ($\% \Delta$ heart rate, POOR: 103 ± 30 % vs. GOOD: 72 ± 9 %; $P=0.09$). There was a moderate association between sleep quality and the magnitude of MCAv reduction at presyncope ($r=0.53$; $P=0.02$). Sleep quality did not affect tolerance to simulated hemorrhage in healthy human subjects. While there were differences in hemodynamic responses, this may be related to premature termination of the protocol due to early onset of subjective presyncopal symptoms.

Impact of Smoking on Opioid Use in Patients with Chronic Low Back Pain

Research Area: General Medicine

Abstract ID: UNTHSC506

Presenter Name: Easlie Chen

Authors:

Easlie Chen ^{1 *}

John Licciardone ²

Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Low back pain is a leading cause of disability and healthcare costs. The costs to society are estimated to be up to \$100 billion per year in the United States. Current cigarette smoking has been linked to physical impairment and severe chronic pain and studies have shown that daily smoking increases the risk of low back pain in a dose-dependent fashion. However, few studies have closely examined smoking cessation as a possible intervention for chronic low back pain and reduction of opioid use. Methods: This cross-sectional study utilized data from the PRECISION Pain Research Registry to examine the quantity of opioids used daily by patients with chronic low back pain according to smoking status (either current or former smokers). Reported daily opioid use was converted into morphine milligram equivalents (MMEs) using guidelines established by the Centers for Disease control and Prevention. Multiple linear regression was used to study the relationship between smoking status and opioid MMEs, including adjustment for age and gender as potential confounders. Results: There were 923 patients (264 male, 659 female). A total of 164 patients reported specific opioid drug use for MME conversion. Smoking status was not significantly associated with opioid MMEs (standardized beta coefficient= 0.062; P= 0.55). Neither age nor gender were associated with opioid MMEs. Conclusion: These findings show that smoking status may have little effect on the opioid MMEs used to treat chronic low back pain. However, smoking cessation may still provide substantial health benefits and reduce cancer risks.

Implementation of a Pre-Operative Huddle at a Level 1 Trauma Center

Research Area: Patient Safety

Abstract ID: UNTHSC412

Presenter Name: Griffin Rechter

Authors:

Harrison Scofield ¹

Griffin Rechter ^{2 *}

Brian Webb ³

Submission Type: Competition Poster

Department: TCU/UNTHSC School of Medicine

Classification / Affiliation: TCU/UNTHSC School of Medicine

Abstract: Purpose: Medical errors resulting in patient harm occur frequently. Surgery is a high-risk specialty that requires standardization of communication and processes to decrease errors. We sought to determine whether the implementation of a pre-operative huddle could improve communication and decrease medical errors. Methods: A pre-operative huddle was developed and implemented at a level 1 trauma center. The hospital database was used to review data before and after the huddle implementation. We analyzed patient surveys and comments, percentage of on-time OR starts, OR turnover times, and number of sentinel events. Statistical analysis was performed using chi-square testing for OR start time differences, and the Mann-Whitney U Test was used to compare turnover time and delayed starts. Results: After implementation, we observed a trend of improvement in patient survey results regarding patients' perception of overall understanding following the explanation of their procedure by the healthcare team, $p < 0.001$. There was an increase in on-time OR starts from 37% to 42%, $p < 0.001$. Notably, there was a statistically significant increase in OR turnover time from 38 minutes to 40 minutes. We also observed a decrease in the number of sentinel events. Conclusions: We found that implementing a pre-operative huddle at a large level 1 hospital improves patient safety, on-time OR starts, and communication amongst the healthcare team, without significantly disrupting OR workflow. Use of standardized communication processes may contribute to a decrease in medical errors and assist hospitals in becoming highly reliable organizations.

Implementation of SOAP-R Screening Tool to Assess Adult Opioid Misuse in Rural Clinics

Research Area: Community Medicine

Abstract ID: UNTHSC423

Presenter Name: Caleb Parry

Authors:

Caleb Parry ^{1 *}

Chad Weldon ²

Lesca Hadley ³

John Gibson ⁴

Submission Type: Non-Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Introduction: Opioid misuse is an epidemic in the United States with estimates of opioid overdose deaths increasing 156% between 2010 and 2015¹. Rural communities are disproportionately burdened. Barriers in the rural health systems include distance, cost, and lack of methadone treatment clinics. The aim of this project is to assess the effectiveness of an opioid screening questionnaire in a rural clinic. Methods: Implementation of the Revised Screener and Opioid Assessment for Patients with Pain (SOAPP-R) was assessed over a 4-week period. Patients who were prescribed opioids twice over a two-week period and who were age 19-80 were included. Cancer patients on opioid therapy were excluded. Results: Out of the 15 patients who were eligible to take the questionnaire, 11 chose to participate (70%). Three patients refused and one patient was not offered the questionnaire. None of the patients who took the questionnaire tested at risk for opioid abuse. Conclusion: Implementation of the SOAPP-R screening tool may alert physicians to potential misuse of opioids leading to earlier intervention and treatment for such patients. The present study showed an increase of screening from 0% to 73%. Future Plan Do Act (PDSA) cycles should include larger sample sizes. To assess the impact and influence of SOAPP-R, researchers should measure whether screening leads to early intervention.

Improving Fall Risk Assessment in a Rural Primary Care Clinic

Research Area: General Medicine

Abstract ID: UNTHSC420

Presenter Name: Joseph Fischer

Authors:

Joseph Fischer ^{1 *}

James Qualls ²

John Gibson ³

Lesca Hadley ⁴

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: The Athens Family Medicine clinic serves many elderly patients with a history of falls. The practice does not have any screening tools that assess a patient's risk for future falls. This project aims to see if increasing or diversifying screening services will lead to an increased screening for future fall risks in adults ages 65 and older. Methods: In this project two established fall assessment tools, the 4-Stage Balance Test and a modified Chair Stand test, were used to assess the fall risk of the patients. A "high risk" or "moderate risk" or "no increased risk" determination was assigned based on the assessment findings. Results: There was a total of 52 patients seen in the clinic during the assessment period that were greater than or equal to 65 years old. 40 patients out of the 52 patients had their fall risk assessed; an improvement of 77% compared to prior to the start of the survey. Of the patients surveyed 15 (38%) were found to have no increased fall risk, 9 (22%) had a moderate fall risk, and 16 (40%) had a high fall risk. Conclusions: The project showed that the fall risk screening method used allowed for the majority of eligible patients to be screened during the screening period, showing an increase in screening services in patients ages 65 and older. The next step is to then have a more personalized patient conversation about fall risk and preventing falls for those at increased risk.

Improving Fall Risk Assessments in Elderly Rural Populations

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC491

Presenter Name: Jordyn Johnson

Authors:

Jordyn Johnson ^{1 *}

Vanna Gold ²

John Gibson ³

Lesca Hadley ⁴

Submission Type: Non-Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose This QI project was implemented to improve the screening for fall risks in patients over 65 who were not already using a walking assistive device. The town of Lampasas has a population of 19.4% over the age of 65 and there is currently little being done to identify fall risks. Methods Fall risks were identified using the "Get Up and Go" test in which patients were asked to go from a seated position to standing, walk across the room, and return to their chair. The administrator of the test was to watch for any difficulty standing, unsteadiness, or difficulty walking. Ideally, if a fall risk was identified, the administrator should then discuss preventative measures. Results Data collection was done on two separate days. The first day recorded how many screenings were done without intentional implementation of the project. Zero fall risk assessments were done during that day. The second was running the project and including the Get Up and Go test as part of the physical exam. Of the nine possible patients who could have been screened, seven were for an overall increase of 75%. Conclusions A key lesson learned was planning screenings in a way that is practical and easy. The get up and go test is easy to include in physical exams and provides a sampling of a patients mobility. The next steps would be to include the screening as part of the physical exam template in order to que providers to do the assessment.

In-vitro Blood-Brain Barrier Models: An Emerging Platform for Central Nervous System Drug Discovery and Delivery

Research Area: Cell & Molecular Biology

Abstract ID: UNTHSC461

Presenter Name: Brjesh Shah

Authors:

Brjesh Shah ^{1 *}

Xiaowei Dong ²

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: Blood-brain barrier (BBB) and its components protects the brain, but drug delivery sufficient to induce clinical effects is hindered causing challenges for therapeutic translation. To study drugs and their delivery systems across the BBB, numerous in-vitro BBB models have been studied. However, the limitations among them are still unanswered causing poor in-vivo imitation. Therefore, we performed an exhaustive literature study on in-vitro BBB models/methods to summarize which model/method could be futuristic. Method: Literature search in PubMed showed that nearly 400 research and review reports were published in last two decades. Three major models including two-dimensional (2D), stem cell and three-dimensional (3D) models were discussed and compared. Each type of model was reviewed in depth to identify an ideal in-vitro model that could closely mimic the in-vivo BBB microvasculature. Results: In 2D models, while cocultures over monocultures showed improved barrier integrity none of them mimicked shear stress. Additionally, the results between double and triple cocultures were controversial. Irrespective of model types, human stem cells revealed an excellent barrier phenotype against other cellular sources. 3D models such as chip-based and microfluidic encompassing multiple compartments and shear stress imitated the BBB microenvironment more realistically than 2D models. However, cost, complex design and poor scalability are few setbacks of 3D models. Conclusion: Considering key limitations of current in-vitro BBB models, the microfluidic technology in combination with stem cells would be the next generation in-vitro models that could best mimic the BBB phenotype.

Incorporating Medical Students into the Development of Age Friendly Healthcare Systems through Quality Improvement Projects

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC566

Presenter Name: Joshua Murphy

Authors:

Joshua Murphy ^{1 *}

Timothy Philip ²

Jennifer Severance ³

John Gibson ⁴

Lesca Hadley ⁵

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: The world is aging. Health systems are often not prepared for the number or complexity of geriatric patients. Caring for this vulnerable population through age-friendly health systems is imperative for our future. With the universal lack of geriatricians, family physicians primarily care for the elderly population and are therefore ideally placed to lead changes to improve the lives of geriatric patients. The Rural Osteopathic Medical Education (ROME) Program partnered with UNTHSC's Center for Geriatrics to create geriatric-focused quality improvement projects (QIPs) for medical students to complete in their family medicine clerkships. Methods: ROME students surveyed rural family physicians regarding geriatric needs in their patient population. The results were analyzed to determine patient clinical needs as well as physician educational needs. Geriatric QIPs were developed from the survey results and implemented into the clinics. Results: 100% of the students stated that they are better able to analyze, collect, and communicate data about quality improvements in practice. 100% of the students stated that they would integrate QIPs into their practices. 67% of the family physicians strongly agreed that QIPs were useful to their practice. Conclusions: Students identified best practices to address the health needs and concerns of older adults and their caregivers. The QIPs improved care for the elderly in addition to providing experience in implementing quality improvement methods that can be used in the students' future medical practices. Incorporating medical students into QIPs in family medicine clinics is valuable for the patients, students, and physicians.

Intermuscular Lipoma: A Case Report

Research Area: Structural Anatomy

Abstract ID: UNTHSC428

Presenter Name: Jorge Alejandro Bi bao

Authors:

Jorge Bi bao ^{1 *}

Cara Fisher ²

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Lipomas are the most common type of soft-tissue tumors. Superficial lipomas account for about 50% of all soft-tissue tumors and are usually found in the upper back, neck, proximal extremities, and abdomen. Deep-seated lipomas are far less common and usually found in the lower extremity, trunk, shoulder, and upper extremity. Case Presentation: In our study we report a case of a deep-seated, intermuscular lipoma with a rare location in the erector spinae musculature of the lower back. This mass was found during a routine dissection of a 68-year-old male cadaver and it serves to expand knowledge on the anatomical aspects of rare intermuscular lipoma locations. On gross examination, the lipomatous mass was seemingly circumscribed with a uniform, yellowish adipose color, lobulated surface, and soft consistency. Histological examination exhibited a discrete mass of uniform, mature adipocytes, which are clearly delineated from the surrounding musculature. Conclusions: These findings are diagnostic of a well-circumscribed intermuscular lipoma. It is important to note that these lesions are benign and have no metastatic potential. Knowledge of rare intermuscular lipoma locations is necessary for clinicians and surgeons during diagnostic and therapeutic procedures. It is necessary that current clinical guidelines take rare variants into consideration.

INVESTIGATING ECOGEOGRAPHIC VARIATION IN SUPERIOR AND FUNCTIONAL ETHMOIDAL BREADTH IN INTERNAL AIRWAY DIMENSIONS

Research Area: Structural Anatomy

Abstract ID: UNTHSC707

Presenter Name: Caroline Grace

Authors:

Caroline Grace ^{1 *}

Scott Maddux ²

Cecelia Schaefer ³

Submission Type: Non-Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: Community Partner (Not for Competition)

Abstract: Superior Ethmoidal Breadth (SEB = maximum breadth between the left and right frontoethmoidal sutures) is widely employed as a proxy for internal nasal airway dimensions. SEB is also commonly argued to evince climatic adaption in modern humans, as populations living in cold-dry environments predictably exhibit narrower SEB dimensions than those inhabiting tropical environments. However, as SEB anatomically spans the upper nasal airways (common and superior meatuses) and the ethmoid air cells, the accuracy of SEB as a proxy for airway dimensions remains questionable. Here, we evaluate the correlation between SEB and internal airway dimensions using linear measurements collected on CT scans from a mixed-sex sample of human crania (n=217) ancestrally derived from sub-Saharan Africa, Europe, East Asia, and the Arctic Circle. Our results demonstrate SEB is highly correlated ($r=0.807$, $p<0.0001$) with functional airway breadth (FEB), suggesting SEB is a reliable proxy. ANOVA results indicate, in addition to significant differences in SEB ($F=36.5$, $p<0.0001$), regional differences exist for common ($F=3.95$, $p=0.009$) and superior ($F=3.19$, $p=0.024$) meatus breadths and ethmoid air cell breadth ($F=9.01$, $p<0.0001$). Specifically, the African-derived sample consistently exhibit the widest nasal dimensions and the Arctic-derived sample the narrowest dimensions. Our results indicate a positive scaling relationship between SEB and internal airway breadths, with the wider SEB values of the African-derived sample actually underestimating their disproportionately wider common and superior meatuses. Cumulatively, these results empirically support use of SEB as proxy for upper nasal airway breadth.

Investigating the Use of Resistance Breathing for the Detection of Acute Hypovolemia

Research Area: Cardiovascular

Abstract ID: UNTHSC648

Presenter Name: Ryan Rusy

Authors:

Ryan Rusy ^{1 *}

Garen Anderson ²

Victoria Kay ³

Caroline Rickards ⁴

Submission Type: Oral Presentation

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Introduction: Standard vital signs (e.g., heart rate and blood pressure) lack sensitivity and specificity to detect blood volume status following hemorrhage. Inspiratory resistance breathing has therapeutic potential to increase blood pressure and cardiac output following blood loss. We hypothesize that resistance breathing will elicit greater increases in absolute and breath-to-breath amplitude of stroke volume and arterial pressure under hypovolemic vs. normovolemic conditions. Methods: Data were retrospectively analyzed from 23 healthy human subjects aged 18-45 years. Subjects underwent lower body negative pressure (LBNP) protocols to simulate hemorrhage with and without resistance breathing. Continuous mean arterial pressure (MAP) and stroke volume were measured via finger photoplethysmography. Comparisons of absolute and changes in the breath-to-breath amplitude of MAP and stroke volume were made under 4 conditions: 1) normovolemia; 2) normovolemia + resistance breathing; 3) hypovolemia, and; 4) hypovolemia + resistance breathing. Results: Preliminary findings show an average change in MAP of -3.1% in response to resistance breathing during normovolemia, and +8.2% during hypovolemia. MAP amplitude during normovolemia decreased by -1.5% and increased by 22.4% during hypovolemia. Stroke volume maximum increased by 3.8% during normovolemia and 20.0% during hypovolemia, while stroke volume amplitude during normovolemia increased by 52.4% % and 19.0% during hypovolemia. Conclusions: These data indicate that there may be differences in the hemodynamic response to resistance breathing that could aid in the diagnosis of acute hypovolemia.

Involvement of the c-Jun N-terminus kinase (JNK) pathway in Endothelin (ET-1) mediated neurodegeneration of retinal ganglion cells

Research Area: Eye / Vision

Abstract ID: UNTHSC627

Presenter Name: Bindu Kodati

Authors:

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Dorota Stankowska ²

Vignesh Krishnamoorthy ³

Raghu Krishnamoorthy ⁴

Submission Type: Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: Postdoctoral Fellow

Abstract: PURPOSE: Endothelins contribute to neurodegeneration in glaucoma, however, the mechanisms are not completely understood. The goal of this study was to determine if JNK2 plays a causative role in endothelin-1 (ET-1)-mediated loss of RGCs in mice. METHODS: JNK2^{-/-} and wild type (C57BL6) mice (n=4) were intravitreally injected in one eye with 2 nmoles of ET-1, while the contralateral eye was injected with 2 µl of vehicle. The mice were euthanized at 2 h and 24 h post-injection. Retinal sections from the JNK2^{-/-} and wild type (C57BL6) mice were used for immunohistochemical analysis of the phosphorylation of JNK substrate, c-Jun. In a separate set of experiments, JNK2^{-/-} and wild type mice (n=6) were intravitreally injected with either 2 nmoles of ET-1 or vehicle, and euthanized 7 days post-injection. RGC counts and axonal degeneration were assessed. RESULTS: Intravitreal ET-1 administration produced a significant increase in immunostaining for phospho c-Jun in wild type mice which was appreciably lower in the JNK2^{-/-} mice. Following ET-1 administration, a significant (p< 0.05) 26% loss of RGCs was found in wild type mice, while JNK2^{-/-} mice showed no significant (p=0.36) loss of RGCs. A significant decrease in the axonal counts and an increase in the collapsed axons was found in ET-1 injected eyes in wild type mice. CONCLUSION: JNK2 appears to play a major role in ET-1 mediated loss of RGCs in mice.

Is the pill count or polyactive substance count a better estimate of polypharmacy in people living with HIV/AIDS?

Research Area: General Public Health

Abstract ID: UNTHSC484

Presenter Name: Helen Orimoloye

Authors:

Helen Tolulope Orimoloye ^{1 *}

Submission Type: Non-Competition Poster

Department: School of Public Health: Biostatistics & Epidemiology

Classification / Affiliation: Alumni (Not for Competition)

Abstract: Introduction: People with HIV/AIDS (PLWHA) now live longer due to the advent of antiretroviral therapy, but consequently are at an increased risk of age-related comorbidities. Increasing comorbidities have resulted in polypharmacy in PLWHA. Most studies define polypharmacy as the use of five or more medications simultaneously, but researchers have suggested that a definition based on the number of pharmacologically active ingredients (polyactive substances) may be a better indicator of polypharmacy. Typically, drugs for HIV/AIDS and other chronic diseases are combined into single doses to maximize adherence. Therefore, most pills used by PLWHA are a combination of two or more polyactive substances. However, due to limited literature, it is not clear by how much polypharmacy (defined by pill count) differs from that defined by polyactive substances. Objective: To compare polypharmacy in PLWHA by determining the difference between the pill count and the number of polyactive substances. Method: Medication records of 765 HIV patients from a study were obtained. Polypharmacy was defined as the use of five or more medications. Polyactive substance use was defined as the use of five or more pharmacologically active ingredients in medications. Result: The prevalence of polypharmacy using pill count at baseline was 78.3% at baseline, while the prevalence of polyactive substances was 92.16%. A paired T-test showed a mean difference of 2.15 with a standard deviation of 1.32 (p-value < 0.001) between polyactive substances and pill count. Conclusion: Among HIV patients, pill count underestimates the prevalence of polypharmacy compared to polyactive substance count.

Likelihood of clinics to refer pediatric hypertension patients to nephrology

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC394

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Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose Physician adherence to diagnostic criteria for pediatric hypertension (HTN) remains an area of active research. We investigated which specialty clinics were more likely to appropriately refer hypertensive patients to a nephrology clinic. Methods A retrospective study was conducted on patients, aged 3-18 years, who were referred to the Cook Children's Medical Center (CCMC) nephrology clinic for elevated blood pressure (EBP) over a 3-year period. Patients were excluded if they were referred previously, were referred for other conditions, or did not have ≥ 1 prior visit at CCMC with blood pressure recorded. Up to 10 prior visits with EBP were recorded for each patient. Analyses were performed to determine which clinics were more or less likely to refer to CCMC nephrology for hypertension. Results There were 120 patients referred with a total of 626 prior visits recorded with EBP; thus, in 16% of recorded visits with EBP, patients were referred to nephrology. Visits to outside clinics (35%) were more likely to give referrals than were visits to CCMC clinics (13%). Primary care (20%), emergency and urgent care (18%), and especially cardiology (29%) clinics were prone to refer. However, endocrinology (13%), neurology (2%), and other specialty clinics (9%) were less likely to refer. Conclusion Cardiology clinics were especially likely to refer, whereas neurology clinics were unlikely to refer for hypertension. This disparity could be attributed to unfamiliarity with the diagnostic criteria apparently linked to specialty-related exposure to this patient population. These results have implications for provider education at CCMC.

Localizing the Course of the Radial Nerve Based on Anatomical Landmarks: A Cadaveric Study

Research Area: Structural Anatomy

Abstract ID: UNTHSC676

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Submission Type: Competition Poster

Department: Center for Anatomical Sciences

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Abstract: Purpose: Iatrogenic radial nerve injury during the posterior approach to the humerus is a well-documented complication. The aim of this study is to define the course and variability of the radial nerve along the posterior humerus in relationship to the medial and lateral epicondyles. Methods: With the cadaver in a lateral position, the shoulder and elbow were flexed to 90 degrees and supported as done intraoperatively. The epicondyles of the humerus were aligned and tensioned to be held parallel to the operating table. The forearm was clamped in neutral to the supporting pipe. A posterior incision was made over the humerus to expose the triceps muscle. Dissection was continued to the bone and exposure of the radial nerve was completed with care. The location where the radial nerve intersected the medial and lateral edges of the humerus was marked. Images, with a ruler placed on the humerus, were taken of the posterior arm from a standard camera setup. ImageJ was utilized to measure the distance from the epicondyles to where the radial nerve crossed the humerus. Results: Measurements are currently being performed and analyzed in arms of 25 cadavers. Conclusion: Identification of the radial nerve allows for protection of the nerve during a posterior surgical approach to the humerus. This study allows for simple guidelines for orthopedic surgeons to identify the radial nerve and limit iatrogenic injury.

Long-term cognitive and neurodegenerative effects of repetitive mild traumatic brain injury

Research Area: Neuroscience

Abstract ID: UNTHSC625

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Submission Type: Non-Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: 1.6 – 3.8 million sports-related traumatic brain injuries (TBI) occur every year in the U.S. Recent retrospective studies suggest that repetitive mild TBI (rmTBI) is associated with the earlier onset of neurodegenerative diseases. Mild TBI can be hard to detect, and there are currently no widely accepted biomarkers that could aid in its diagnosis. Further, there is currently no standard pharmacological treatment for TBI. Our previous work demonstrated neurological deficits 1 week following 20-25 rmTBI in young male mice. We hypothesized that these deficits would persist up to 5 weeks following injury and that pretreatment with an agonist of the Sigma-1 receptor (PRE-084) could reduce these deficits, as has been demonstrated in other neurodegenerative models. Eight-week-old male C57BK6 mice were divided into sham injury, rmTBI, and rmTBI+PRE084 groups (n=14/gp). Mice were anesthetized and administered either PRE084 (1mg/kg sc) or vehicle immediately before experiencing closed head-injury with rotational acceleration via a 65g weight drop 5 days a week for 5 weeks. Five weeks after the final injury mice were assessed for neurological deficits. Injured mice demonstrated significant ($P < 0.05$) deficits in motor and vestibular-motor performance (Rotarod, balance beam) and cognitive performance in the Morris water maze. Treatment with PRE-084 did not ameliorate deficits. These data suggest there are chronic deficits for at least 5 weeks after rmTBI and that sigma-1 activation does not inhibit rmTBI deficits.

Long-term effects of late gestational maternal hypoxic stress on mood disorders: Sex and age differences

Research Area: Neuroscience

Abstract ID: UNTHSC456

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Rebecca Cunningham ⁹

Submission Type: Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: PURPOSE: In utero insults have been linked with increased fear and anxiety in progeny. In utero hypoxic stress is also associated with multiple gestational complications. We hypothesized that exposure to maternal hypoxia during late gestation will have a long-term impact on anxiety in progeny. METHODS: Pregnant female Long-Evans rats were exposed to five days (gestational days: 15-20) of chronic intermittent hypoxia (CIH) or room air (normoxia: 21% O₂) for 8 hours during their sleep phase. Each CIH cycle was 6 min of 3 min hypoxia (10% O₂) and 3 min normoxia for a total of 10 CIH cycles/hour. At weaning (PND 28), progeny was pair-housed with a conspecific of same sex and similar weight. To examine anxiety disorders, we quantified anxiety-related behaviors (time spent in center of open field arena, marble burying test, social and anti-social behaviors with conspecifics) along with quantifying food intake and circulating sex hormone levels during puberty (postnatal day, PND 40-45) and young adulthood (PND 60-65) in male and female progeny. RESULTS: Maternal CIH did not impact circulating sex hormones or food intake, regardless of sex or age of progeny. However, maternal CIH increased anxiety related behaviors in pubertal females but were not observed in young adulthood. Maternal CIH did not impact male progeny, regardless of age. CONCLUSIONS: Maternal CIH during gestation resulted in increased anxiety related behaviors in pubertal female progeny. Maternal hypoxia during late gestation may temporarily increase the risk for anxiety disorders in pubertal females.

Long-term effects of late gestational maternal hypoxic stress on neurodegeneration: Sex and age differences

Research Area: Neuroscience

Abstract ID: UNTHSC462

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Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: GSBS Student

Abstract: Introduction: In utero insults can lead to onset of neurodegenerative diseases, such as Parkinson's disease (PD). In utero hypoxic insults are associated with maternal sleep apnea or preeclampsia. It is unknown whether late gestational maternal hypoxic insults have long-term effects on brain regions associated with PD, such as the nigrostriatal pathway. We hypothesized that late gestational maternal hypoxia will result in sustained nigrostriatal impairment in male and female progeny. Methods: Timed pregnant Long-Evans rats were exposed to five days (gestational days: 15-20) of chronic intermittent hypoxia (CIH) or room air (normoxia 21% O₂) for 8 hours during their sleep phase. Each CIH cycle was 6 min of alternating 3 min hypoxia (10% O₂) and normoxia (21% O₂) totaling 10 CIH cycles/hour. Gestational age and biometrics were recorded 12-16 hours after birth. At postnatal day, PND 28, progeny were pair-housed with a conspecific of the same sex and similar weight. We focused on PD associated oxidative stress and behavioral impairments in the nigrostriatal pathway. Gross motor (open field), fine motor (ultrasonic vocalizations), and cognition (spatial memory) were examined during puberty and young adulthood. Results: Maternal CIH had no effect on gestational age, progeny biometrics, or progeny circulating oxidative stress. Gross motor and cognitive functions were unaffected by maternal CIH. However, a sustained fine motor impairment was observed in both male and female progeny. Conclusion: Maternal hypoxia during late gestation induced sustained nigrostriatal pathway impairment, which may increase the risk for neurodegeneration.

Long-term effects of prenatal chronic intermittent hypoxia insult on the substantia nigra

Research Area: Neuroscience

Abstract ID: UNTHSC671

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Submission Type: Non-Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: Purpose: Prenatal chronic intermittent hypoxia (CIH) was employed to evaluate the effects of hypoxic insults on the substantia nigra (SN), which is impacted by Parkinson's disease (PD). SN loss during PD is linked with oxidative stress (OS) and apoptosis. We hypothesized that exposure to late gestational maternal hypoxia would result in an increase in increased OS, but not apoptosis, in the SN of adult male and female progeny. Methods: During gestational days 15-20, pregnant Long-Evans rats were exposed to CIH or room air (normoxia) for 8 hours. CIH consisted of 3 min hypoxia (10% O₂) and 3 min normoxia (21% O₂). Animals were sacrificed at puberty (PND 44) or adulthood (PND 66). SN micropunches were obtained. OS was quantified by measuring calpain cleavage of spectrin. Results: OS (calpain cleavage of spectrin) was increased in the SN of adult male and female rats exposed to prenatal CIH compared to control ($F_{1,17} = 3.606$; $p = 0.075$). No effects on OS were observed in pubertal rats. Apoptosis (caspase-3 cleavage of spectrin) was not observed in any of the groups. Conclusions: These data suggest that prenatal CIH programming has a long-lasting impact on the SN of adult progeny, which may increase the susceptibility of SN to damage and PD risk. Although no sex differences were observed in this pilot study, we may see a sex effect upon increasing animal number, especially in male rats. This is consistent with the higher incidence of PD in men than in women.

Major Mental Illness and Resources Available Tarrant County

Research Area: General Public Health

Abstract ID: UNTHSC439

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Submission Type: Non-Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Major Mental Illness and Resources Available Tarrant County Introduction: High prevalence of mental illness leads to higher rates of death, disability, medical illness, incarceration, homelessness, unemployment, poverty, and violation of human rights. Significant barriers to those facing mental illness are the lack of access to care and the stigma of treatment. The three major mental illnesses that physicians encounter are schizophrenia, major depressive disorder, and bipolar disorder. All of these illnesses require life-long treatment. However, there are resources available in the Tarrant County area and at the national, state, and local levels to alleviate the mental illness care disparity. Available Resources: Although getting access to mental health care is still challenging, there are resources available at the national, state and local level. At the national level, there is the National Alliance on Mental Illness. Texas Health and Human Services is a resource available at the state level. Finally, at the local level in Tarrant County there is JPS Behavioral Health Clinic - Northeast, My Health My Resources (MHMR), and Crisis Respite and Residential Unit. Barriers: The goal of these organizations is to help those with serious mental health illnesses, however the eligibility and process required to access these resources may create barriers for some individuals. Conclusion: While several resources in Tarrant County are striving to close these significant gaps in access to behavioral health help, it is important to realize that more work needs to be done until mental illness is viewed as equivalent to physical illness.

Mapping Out Maternal Mortality

Research Area: General Public Health

Abstract ID: UNTHSC712

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Submission Type: Competition Poster

Department: School of Public Health: Health Behavior & Health Systems

Classification / Affiliation: School of Public Health Student

Abstract: Purpose: The rising maternal mortality (MM) rate in the United States is a pressing concern that mandates immediate action. One of the highest state-level MM rates belongs to Texas, where almost 80% of deaths are deemed to be preventable. Biomedical approaches have previously been prioritized, but the issue is unfolding to be much more complex. To better understand MM in Texas, it is necessary to identify the multidisciplinary teams involved in prevention efforts and how they are linked. Methods: A web-based search of the terms “maternal mortality” and “maternal mortality in Texas” was conducted via Google, Google Scholar, and PubMed to identify organizations involved in pregnancy care and MM prevention efforts. The systems thinking approach was used to map out organizational connections. Results: Ten prominent organizations were identified at the international (2), national (4), and state (4) level that conducted a range of functions such as surveillance, research, recommendations, funding, and advocacy. Higher rates of collaborative work were observed among state level organizations, where a partnership was identified. Inconsistencies across all organizational levels, in regard to the MM definition and tracking, resulted in duplicate analyses and misclassification errors. Dismissal of national level recommendations at the state level led to deficits in protective services. Conclusion: While all of the organizations provided vital services to combat MM, a lack of standardization suggested that the full scope of MM is unknown. Additionally, further expansion of interrelations, and a reduction of counterintuitive practices is needed to make a greater impact on MM.

Massage application to increase spread of local anesthesia in sciatic nerve blocks: a cadaveric study

Research Area: Structural Anatomy

Abstract ID: UNTHSC458

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Daniel Nash ⁴

Submission Type: Competition Poster

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Classification / Affiliation: GSBS Student

Abstract: Introduction: Sciatic nerve blockades are essential for treatment of a variety of lower limb pathologies. Due to the complexity and variation of anatomical landmarks, ultrasound (US) is used to guide injection of local anesthesia. In patients with thicker thigh girth (i.e., obese patients) excess tissue can distort US penetration, diminishing efficacy of the nerve block and/or post-operative pain. Dye tracing techniques have been used to test the effectiveness of nerve blocks, but there is little research on using massage to increase anesthetic spread. Therefore, this study will assess whether local massage can spread anesthetic proximal to the injection site. Methods: Fresh cadaveric legs were injected with 15cc's of 25:75 mixture of methylene blue dye and 0.5% bupivacaine. The specimens were divided into control (non-massage) and experimental (massage) groups. Nerve blockades with dye were performed by an anesthetist using US guidance at the popliteal fossa traveling proximally until the formation of the sciatic nerve, where the location was tagged. Immediately following, experimental specimens received repeated, proximally directed massages with the US transducer head. Specimens from both groups were dissected to expose the sciatic nerve. Measurements of the distance traveled from marked site of injection to proximal end of dyed area were measured and compared using statistical analysis. Results: Researchers expect significant difference in distance of injected materials proximal to injection site in the massage group compared to the experimental group. Conclusion: Post-injection massage can be used in clinical settings to increase efficacy of higher risk local anesthetic injections.

Metabolic changes in optic nerve head astrocytes following glaucoma-associated deformation

Research Area: Eye / Vision

Abstract ID: UNTHSC544

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Submission Type: Non-Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: Faculty / Staff (Not for Competition)

Abstract: Purpose: The astrocytes of the optic nerve head (ONHAs) are the predominant glial cell in the unmyelinated portion of the optic nerve. We tested the metabolic changes these cells undergo in glaucoma by exposing them in vitro to degrees of deformation similarly experienced as a result of increased intraocular pressure in primary open angle glaucoma. Methods: Primary astrocytes were cultured from the cortices of P1 mouse pups or P7 optic nerve head explants then seeded on collagen-coated FlexCell plates. The astrocytes were then biaxially stretched by 12% for 24 hours using the FX-6000T FlexCell. ONHA extracellular acidification rate (ECAR) and oxygen consumption rate (OCR) were measured using the Seahorse XFe24 Analyzer, while changes in the proteome were measured using mass spectrometry. Results: Stretched cortical astrocytes showed at least twofold increases in metabolic proteins such as glutamate dehydrogenase 1, isocitrate dehydrogenase 1, and aldolase fructose-bisphosphate c. There was also at least a twofold decrease in citrate synthase, isocitrate dehydrogenase 2, glycogen phosphorylase B, and adenylate kinase 1. In the Seahorse Analyzer, stretched ONHAs showed increased glycolytic ECAR, maximal ECAR, and maximal OCR. Stretched astrocytes showed no difference in their dependence on pyruvate compared to controls, but a significant decrease in their capacity for mitochondrial respiration from pyruvate. Conclusions: Exposing astrocytes to glaucoma-associated deformation altered their metabolism in ways that indicated stronger commitment to glycolysis compared to control astrocytes, such as increases in glycolytic proteins, decreases in mitochondrial proteins, and increases in glycolytic ECAR.

Metformin Nanoparticles for Liver Delivery

Research Area: Diabetes

Abstract ID: UNTHSC454

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Submission Type: Non-Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: UNT System College of Pharmacy Student

Abstract: Metformin Nanoparticles for Liver Delivery Purpose: Metformin hydrochloride is a biguanide, an antidiabetic medicine, taken orally to lower blood sugar in diabetic patients, especially with Type 2 diabetes. Metformin is hydrophilic in nature and it has been observed that overtime, higher doses are usually required for effectiveness. This might result from low bioavailability due to its formulation. The purpose of this study was to develop a HPLC- method for Metformin Hydrochloride that will be used for further formulation development. Method: Metformin hydrochloride solution was analyzed quantitatively using Waters HPLC separation module 2695 equipped with auto injector and detector (PDA 2996) and UV detector (2487), Embedded with Empower software. Method was developed by utilizing a reverse phase chromatographic with Column Ultimate XB-SCX Dim 4.6 x250mm, with an ambient temperature, 5µm particle size, Flow rate 1ml/min, Wavelength 232nm, Ammonium dihydrogen phosphate as the mobile phase and injection volume of 10µl. Forced degradation studies were conducted by employing stress conditions with various concentrations of HCl, NaOH, H₂O₂ for acid hydrolysis, base hydrolysis and oxidation. Results:The detection of the eluent was consistently observed at around 11 minutes for all concentrations. SD value was low, RSD was around 1% indicating accuracy and reproducibility with regression coefficient $R \geq 0.997$ with six different concentrations from 1mg/ml-100mg/ml. Conclusion:The quantitative analysis result for the HPLC method was close to 100% and it did not appear there was any interference from the excipients. The method was simple, rapid and reproducible and useful for further drug formulation development.

Microbial Natural Product Drug Discovery Through Systematic Sampling of Diverse Texas Soils

Research Area: Pharmaceutical Sciences

Abstract ID: UNTHSC443

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Submission Type: Oral Presentation

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: GSBS Student

Abstract: Purpose: To proof a concept of discovering microbial natural products through systemic sampling of diverse Texas soils by constructing and screening a pilot library of secondary metabolites produced by Texas soil-derived microbes for cytotoxicity. Methods: Secondary metabolites were extracted from soil-derived microbial isolates using methanol and ethyl acetate. These metabolites ("crude extract") were preliminarily fractionated through reversed-phase flash chromatography and screened for cytotoxicity against MIA PaCa-2, SH-SY5Y, and COLO 829 using an ATP-luciferase assay. Following further activity-guided HPLC purification, isolated active compounds were identified through methods including TOF-MS, MS/MS, NMR, and X-ray crystallography. Results: Malformin, a bicyclic pentapeptide which has been shown to elicit potent anti-cancer effects was purified and helped to validate our methodology. Subsequently, two related compounds, aspergillin PZ and trichoderone B, exhibiting anti-cancer effects were purified from *Aspergillus flavipes* sp.. These two compounds were enrolled in the National Cancer Institute 60 human tumor cell line anticancer drug screen (NCI60) which showed similar cytotoxic profiles and low potency at 10 μ M. Though a >25% reduction in growth was seen in UACC-257, HOP-92, A498, and SNB-75. Conclusions: While a previously unidentified compound has not yet been discovered through this pilot study, bioactive secondary metabolites have been re-discovered which not only validates our methodology but also provides opportunity to address gaps in scientific understanding of previously reported compounds. Theoretically, enlarging our library size should afford new and active natural products.

miRNA Profiling of Human Optic Nerve Head Astrocytes Exposed to Cyclic Stretch

Research Area: Eye / Vision

Abstract ID: UNTHSC646

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Submission Type: Non-Competition Poster

Department: North Texas Eye Research Institute

Classification / Affiliation: GSBS Student

Abstract: Purpose: Elevated intraocular pressure (IOP) is the primary risk factor for glaucoma, a leading cause of irreversible blindness involving the progressive loss of retinal ganglion cells (RGCs) and their axons. Elevated IOP induces biomechanical aberrations within ocular tissues – including the transmission of biomechanical stretch through the lamina cribrosa (LC) region of the optic nerve head (ONH), the site where RGC axon damage first occurs. LC cells and ONH astrocytes (ONHA), the primary cells of the LC, respond to stretch in a manner that promotes pathological extracellular matrix (ECM) remodeling and mechanical damage of RGCs within the ONH. A complex set of molecular mechanisms regulate ECM remodeling. Part of this regulation may involve microRNAs (miRNAs), small RNA molecules that can indirectly inhibit gene expression by binding messenger RNA. miRNA dysregulation may contribute to ECM remodeling during glaucoma progression. In this study, we examined miRNA expression profiles of ONHA exposed to cyclic stretch. Methods: Primary human normal ONHA cell strains (n=3) were exposed to 0-12% cyclic stretch for 24 hours. miRNA PCR arrays were used to determine expression changes in profibrotic and anti-fibrotic miRNAs. Results: We found that specific miRNAs were consistently dysregulated across three independent strains of ONHA. Statistical significance could not be detected, but these patterns may represent biologically meaningful changes. Conclusion: Stretch modulates miRNA expression in cultured human ONHA and may be responsible for ECM alterations at the LC. Dysregulated miRNAs may serve as novel targets or models for future therapeutics.

MitoHooker: A PCR-free enrichment strategy using RNA baits for targeted detection of mitochondrial base modifications on nanopore sequencing devices

Research Area: Molecular Genetics

Abstract ID: UNTHSC677

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Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose: Aberrant methylation and increased oxidative damage throughout the mitochondrial genome (mtDNA) have been implicated in numerous diseases ranging from cancer to neurodegeneration. Current understanding, however, is obscured by the inherent limitations of traditional detection techniques. Nanopore sequencing offers the ability to simultaneously ascertain genetic variation and base modifications without chemical treatment. While numerous copies of mtDNA are present within a sample, these sequences represent a small fraction of total genetic material competing for pore access. Therefore, this project aimed to evaluate RNA baits hybridization capture for enrichment of mtDNA prior to nanopore sequencing. Methods: Heavy and light mtDNA strands in cell-free plasma extracts were individually captured using the Arbor Biosciences myBaits Expert Mito kit. Elutant from the first capture served as input for rebaiting with the opposite probe set. Following complement synthesis by Klenow fragment, double-stranded products were multiplexed and sequenced on the MinION device. Resultant basecalled reads were mapped to the human reference genome to assess on- and off-target coverage. Base modifications in the raw data were detected using a combination of available bioinformatics tools and in-house algorithms. Results: Although overall input and throughput were significantly lower than a typical whole genome sequencing run, read count and coverage data indicate that this technique allowed mtDNA to outcompete background DNA while maintaining modified bases within the native strands. Conclusion: The workflow developed herein could provide novel insights into the complete collection of mtDNA base modifications and enable identification of disease-relevant alterations in this landscape.

Molecular characterization of adipose-tissue derived stem cells (ASCs) from the breast

Research Area: Cell & Molecular Biology

Abstract ID: UNTHSC531

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Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose: It has been reported that both the health of the donor, as well as the site of collection can alter the proliferation and differentiation properties of adipose tissue-derived stem cells (ASCs) . Obesity alters ASCs and induces them to enhance the tumorigenic properties of breast cancer cell lines both in vitro and in vivo. Abdominal ASCs (aASCs) from obese donors show increased expression of leptin and estrogen. Leptin signaling cascades and estrogen-mediated pathways can increase breast cancer proliferation, tumorigenesis and metastasis. The aim of this study is to characterize ASCs derived from breast tissue (bASCs) of human donors and compare their proliferation and differentiation properties to those of aASCs, and to understand if bASCs are affected in the same way. Methods: bASCs will be characterized and compared to aASCs. Adipogenic and osteogenic differentiation will be induced and assessed with Oil Red O and Alizarin Red S staining, respectively. Colony forming capabilities will be assessed with crystal violet staining. Surface markers will be evaluated with flow cytometry. Expression of adipogenic genes will be assessed by real-time PCR. Results: bASCs are expected to display CD90, CD105 and CD73 surface markers. They are also expected to successfully undergo adipogenic and osteogenic differentiation and to be capable to form colonies. Finally, it is expected to observe differences in proliferation rates between aASCs and bASCs. Conclusion: Characterizing bASCs, and comparing them to aASCs, will provide us an understanding of the unique properties of this subpopulation and their potential applications.

Movement Patterns in Dancers: analysis of pelvis and hip movement in elite ballerinas

Research Area: Physical Medicine / OMM

Abstract ID: UNTHSC709

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Submission Type: Non-Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Ballet dancers place extreme demands on their bodies throughout their careers. To reduce injury risk and prolong a ballet dancer's career, attention must be paid to correct positioning and joint biomechanics. The specific aim of the Movement Patterns in Dancers study was to observe changes in posture and movement throughout the ballet performance season. Methods: The study sample consisted of five male and five female professional ballet dancers. Using motion capture technology, each dancer was filmed completing barre exercises at three different times during the performance season. Movement of the pelvis was analyzed in three planes of motion: medial/lateral, flexion/extension, and torsion about a longitudinal axis. Additionally, the hip angle, defined as the angle between the femurs, was calculated. Results: Dancers demonstrated consistency in pelvis movement in all planes throughout the performance season. The degrees of motion observed in each plane varied with the direction in which the movement was performed (side, front, and back). No significant changes were observed between visits. Hip angle varied between the left and right side in both male and female dancers, with female dancers demonstrating larger differences between legs. Conclusions: The pelvic stability demonstrated in this study was reflective of dancers' level of proficiency and training. The difference in hip angle between the left and right legs could be explained by dancers having a dominant leg. Further analyses of the collected data can contribute towards creating a model to assess dancers at different levels of training and assist dancers recovering from injury.

Multiple Lateral Cervical Musculature Variation: A Case Report

Research Area: Structural Anatomy

Abstract ID: UNTHSC658

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Joy Mong ²

Cara Fisher ³

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: The paired anterior, middle, and posterior scalene muscles are found in the lateral neck. The anterior scalene originates from the transverse processes (TPs) of C3-C6 and inserts on the first rib. The middle scalene originates from the TPs of C2-C7 and also inserts on the first rib. The posterior scalene originates from the TPs of C5-C7 and inserts on the second rib. The levator scapulae also attaches to the cervical TPs, typically originating from C1-C4 and inserting on the angle of the scapula. This case report documents multiple anatomical variations of the scalenes and levator scapulae in the lateral neck. While there have been case studies on other scalene variations, there are no documented cases matching the morphologies noted here. Case Information: Detailed dissection revealed multiple muscle variations. The first, an accessory middle scalene muscle with two bellies. The superior belly originates at C1-C5 TPs, running in an inferomedial fashion, anterior to the middle scalene. The inferior belly runs in an inferior fashion, anterior to the middle scalene, with some fibers inserting on the middle scalene and the remainder merging with the first intercostal fibers. The second, an accessory levator scapulae muscle, with two bellies coming off the 3rd belly of levator scapulae and attaching to C5. The final variation, the posterior scalene muscle attaching to the first rib instead of the second. Conclusion: Some possible clinical implications of this variant include cervicogenic headaches, thoracic outlet syndrome, and compression of the brachial plexus.

Muscular Asymmetries in Anatomical Donors with Lower-Limb Amputations

Research Area: Structural Anatomy

Abstract ID: UNTHSC675

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Submission Type: Oral Presentation

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Purpose: Muscle atrophy from amputation has been associated with increased gait asymmetry, fall risk, and overuse injuries. This study investigated between-limb muscular differences in donors with lower-limb amputations to determine if findings reflect living individuals. We hypothesized each donor's most compromised limb would show less muscle mass, lower pennation angle and PCSA, and fewer and smaller type 1 fibers compared to their most intact limb. Methods: Two male unembalmed donors 61-67 years of age with diabetic lower-limb amputations were obtained through the UNTHSC Willied Body Program. Four muscles were dissected from each limb: gluteus maximus, sartorius, rectus femoris, and biceps femoris long head. PCSA was calculated using the following formula: $[(\text{muscle mass} \times \cos(\text{pennation angle})) / (\text{fiber length} \times \text{muscle density} (1.067 \text{ g/cm}^3))]$. Histological (H&E) staining of muscle tissue determined fiber density and cross-sectional area. Immunohistochemical (IHC) staining identified the percentage of fibers containing the fast isoform of myosin heavy chain (MHC), or type 2 "fast-twitch" fibers. Results: Biceps femoris PCSA was 18.1-68.6% larger on each donor's most compromised limb compared to their most intact limb. Histological staining also showed smaller cross-sectional biceps femoris muscle fibers on the most compromised side compared to the most intact side. IHC analyses of fiber phenotype in these muscles are ongoing. Conclusion: Knowledge of muscle adaptations following amputation in donors can confirm accurate biomechanical modeling and inform rehabilitation techniques to reduce muscle atrophy.

Nasal morphology and health disparities in asthma: A study assessing semi-automated tools for processing computed tomography scans in 3D morphometric research

Research Area: Structural Anatomy

Abstract ID: UNTHSC680

Presenter Name: Siddharth Das

Authors:

Siddharth Das ^{1 *}

Suhhyun Kim ²

Scott Maddux ³

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: As the nasal complex is predominantly responsible for respiratory heat and moisture exchange, it has been suggested that abnormal nasal anatomy may predisposes certain individuals to asthma. Recent research into anatomical etiologies of asthma have increasingly turned to medical imaging modalities(e.g., CT/MRI scans) to quantify 3D nasal anatomy across large samples(n > 10,000) of asthmatic patients. However, lack of automated and semi-automated procedures for scan processing has represented a significant obstacle for such anatomical studies. Accordingly, the purpose of this project was to evaluate the applicability of a newly developed subroutine for the NIH-funded 3D Slicer software program designed to semi-automate the alignment of cranial CT-scans into the Frankfort Horizontal plane for subsequent morphometric assessment. Methods: Our study sample consisted of 10 high-resolution cranial CT scans of dried skulls. These CT scans were first processed using traditional methods for aligning the cranium into the Frankfort Horizontal plane, followed by a second trial employing a new python-based script alignment subroutine for the "SlicerMorph" extension module of 3D Slicer. Results: Overall, the automated subroutine showed a significant improvement in image processing times, reducing alignment time for a single scan by approximately 60% from 50-60 minutes down to 15-20 minutes. Furthermore, the accuracy of alignment was found to be substantially improved. Conclusion: This novel subroutine will allow future researchers to efficiently process segmented scans of human crania while decreasing observer error yet increasing the morphometric accuracy.

Nasopleural Drainage of Empyema via Esophago-Pleural Fistula: A Novel Endoscopic Rescue Technique

Research Area: General Medicine

Abstract ID: UNTHSC512

Presenter Name: Hamza Salim

Authors:

Hamza Salim ^{1 *}

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Ali Raza ³

Submission Type: Competition Poster

Department: Non-UNTHSC

Classification / Affiliation: TCOM DO Student (4th Year)

Abstract: Background: Esophago-pleural fistulas (EPF) are rare entities. These can occur spontaneously or following surgical manipulation and can result in empyema formation. Treatment of empyema in this patient population is difficult, and a variety of techniques have been described. Here, we present a novel rescue technique for empyema management via endoscopy, when percutaneous and surgical techniques were not feasible. Case Information: A 90-year-old female presented with acute gastric volvulus requiring emergent partial gastrectomy and gastrostomy tube placement. Her clinical course was complicated by necrosis of the gastric cardia resulting in perforation and contamination of the mediastinum, requiring distal esophageal stump creation and multiple washouts. She was started on long term antimicrobial agents, with plans of maintaining esophageal discontinuity for six months prior to considering re-anastomosis. She was unstable for surgical drainage. An urgent transnasal endoscopy was performed using an ultra-slim scope. A small fistulous connection was noted between the distal esophageal stump and the left pleural cavity. She had a remarkable clinical improvement within 24 hours. A week after conservative management, a percutaneous drain placement was successfully performed. Conclusion: Empyema management ranges from conservative chest tube placement to aggressive surgical management. Endoscopic drainage is another option when percutaneous and surgical options are not possible. Our case demonstrates a novel rescue technique for the management of empyema in patients who already have an EPF and are not good candidates for conventional treatment. This technique can only be used short-term, as a bridge to definitive treatment.

Natural Killers: Targeting NK Cells in Cancer Immunotherapies

Research Area: Immunology

Abstract ID: UNTHSC633

Presenter Name: Casey Buller

Authors:

Casey Buller ^{1 *}

Stephen Mathew ²

Submission Type: Oral Presentation

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Natural Killer (NK) cells are innate lymphoid immune cells that have garnered attention for their pivotal role in tumor surveillance and their ability to recognize and clear cancerous cells. NK cells' delicate balance of activating and inhibitory receptors and those receptors' engagement with target cancer cells determines their effector function. NK cells show promise in the treatment of solid and hematologic tumors. Additionally, targeting NK cells to clear cancerous cells offers advantages over CD8+ T cells, such as not relying on major histocompatibility complex (MHC) I. Successful use of NK cell therapies does have challenges that must be overcome. Several strategies include the use of monoclonal antibodies, chimeric antigen receptor (CAR) NK cell therapy, bi- and tri-specific killer engagers (BiKES and TriKES), and immune checkpoint molecules.

Near Peer Ultrasound Education Evaluation

Research Area: Education

Abstract ID: UNTHSC407

Presenter Name: Cassidy Weeks

Authors:

Louisa Weindruch ^{1 *}

Cassidy Weeks ²

John Gibson ³

Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Ultrasound training is incorporated throughout the medical curriculum at TCOM beginning in Year 1 Physical Exam where they are introduced to the fundamental of Ultrasound as it pertains to each system being taught. In year 2 the training is included in the Simulation Lab curriculum. The purpose of this study is to look at the effectiveness of near peer teaching in the setting of ultrasound. We hypothesize that near peer teaching will be the preferred learning technique among students and student teaching assistants and will facilitate a better learning environment. Near peer teaching is where material is taught to students by their peers. This has been proven to be an effective teaching technique in other settings. Point of care ultrasound is becoming a necessary part of medical education, as its importance in clinical medicine grows. Near peer teaching can be one way to implement medical school ultrasound training.

NEJM Case 13-2013: A 6-Year-Old Girl with Bone and Joint Pain and Abdominal Distension

Research Area: Cancer

Abstract ID: UNTHSC592

Presenter Name: Christine Chin

Authors:

Christine Chin ^{1 *}

Melson Mesmin ²

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: B-Cell Acute Lymphoblastic Leukemia/Lymphoma (B-ALL) is the most common childhood malignancy. B-ALL has good prognostic outcomes when diagnosed in its early stages, with a 5 year overall survival rate > 85%. Case: A 6-year-old female initially presented to her pediatrician's office with bone pain following a fall and was repeatedly evaluated by her orthopedist and rheumatologist for recurrent limb pain over a year. She eventually developed a high intermittent fever of 39.8C, abdominal distention/discoloration, and periorbital erythema/edema. On admission at Massachusetts General Hospital, her physical exam findings were consistent with the pre-admission evaluation and labs were notable for normal WBC and platelet counts. CT and PET studies showed lymphadenopathy, multiple lytic lesions, and a large abdominal mass with increased uptake. Examination of a biopsy specimen from the abdominal-pelvic mass showed a monotonous population of primitive cells. Immunohistochemical studies of these cells showed coexpression of terminal deoxynucleotidyl transferase (TdT) and CD10, as well as positivity for the B-cell marker PAX5, consistent with B lymphoblasts. The patient was diagnosed with B-ALL one year after her first bone pain episode. After treatment with a 3-drug induction and two bone marrow transplants, she died 20 months after her diagnosis. Conclusion: This case demonstrates the varied presentation of B-ALL that requires physicians to maintain a high index of suspicion. Despite its good prognosis, the presentation with intra- and extramedullary involvement and normal hematologic values can be a challenge to physicians evaluating young patients.

Neuroprotective Effects of Exercise on Parkinson's: The Role of BDNF in 6-OHDA Lesioned Rats

Research Area: Neuroscience

Abstract ID: UNTHSC681

Presenter Name: Caleb Parry

Authors:

Caleb Parry ^{1 *}

Michael Salvatore ²

Ella Kasanga ³

Submission Type: Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Parkinson's disease (PD) is a neurodegenerative disorder of the nigrostriatal pathway that largely affects elderly individuals and leads to steady motor decline. Exercise may slow motor decline in PD patients if it is tolerable and consistent. Thus, it is important to define physiologic mechanisms by which exercise affects PD to develop similar therapies. Mechanisms may include growth factors like brain derived neurotrophic factor (BDNF). This project aims to evaluate BDNF in a tolerable exercise regimen after 6-hydroxydopamine (6-OHDA) lesion. Methods: Sprague Dawley rats were conditioned to exercise. Nigrostriatal pathways were lesioned with 6-OHDA to model PD in one group. After motor impairment was measured, exercise was initiated and occurred 3 days a week for 3 weeks with 1 day of rest between each day of exercise. Exercise consisted of a warm-up phase (8m/min for 5 min) and training phase (10 m/min for 35 min). Striatal tissue was analyzed for BDNF expression using anti-BDNF antibody and western blot. Results: Exercised 6-OHDA lesioned rats showed motor recovery compared to non-exercised rats. Anti-BDNF antibody showed bands indicating mature and pro forms of BDNF. Bands were analyzed to compare BDNF expression between exercise and non-exercise groups. Conclusion: Understanding the CNS mechanisms of exercise and its impact on PD could reveal novel therapeutic strategies that target specific proteins. This study demonstrates a tolerable training regimen that improves motor deficit and a means to study the possible role of BDNF expression in motor improvement.

Novel combinatorial treatment effects on SP1 and Survivin in Ewing Sarcoma

Research Area: Cancer

Abstract ID: UNTHSC594

Presenter Name: Christoffer Briggs Lambring

Authors:

Christoffer Lambring ^{1 *}

Submission Type: Competition Poster

Department: Other

Classification / Affiliation: GSBS Student

Abstract: Purpose: Ewing Sarcoma (ES) is a bone and soft tissue cancer affecting young adults and children. ES most occurs in the bones or soft tissue of the arms, legs, and pelvis. Localized ES presents with 5-year survival rate of 70%, but metastatic 5-year survival rate is between 15% and 30%. Our laboratory is interested in combination treatments using less toxic agents to induce sensitization to chemotherapy in ES. The anti-cancer activity of a Non-Steroidal Anti-Inflammatory Drug, tolafenamic acid (TA), against ES cells has been shown. TA inhibits Specificity protein 1 (Sp1) and survivin, these markers are associated with aggressive cancer cell growth and resistance to chemo/radiation therapies. This studies purpose is to evaluate the effectiveness of TA and Copper-TA (Cu-TA) to inhibit ES cell growth alongside Vincristine (VCR). Methods: Anti-proliferative activity of TA or Cu-TA and/or (VCR) against ES cell lines, TC32 and CHLA258, was evaluated using CellTiterGlo kit. Dose curves were plotted and IC50 values were determined by Sigma-Plot software. The expression of Sp1 and survivin was determined by Western bot analysis. Results: When compared to TA, Cu-TA's IC50 values were significantly less. Cu-TA inh bited the expression of Sp1 and survivin in ES cells. The combination of Cu-TA and VCR showed higher efficiency for inhibiting ES cells. Conclusions: Cu-TA may effectively sensitize certain ES cells and induce the response of chemotherapy. Studies to understand the mechanism of action of Cu-TA are underway.

Novel Compound SA-21 with Antioxidant Capability - The Prospect for Neuroprotection in Glaucoma.

Research Area: Eye / Vision

Abstract ID: UNTHSC597

Presenter Name: Jonathan Ferguson

Authors:

Jonathan Ferguson ^{1 *}

Gretchen Johnson ²

Charles Amankwa ³

Wei Zhang ⁴

Linya Li ⁵

Sudershan Gondi ⁶

Arlene Funk ⁷

Dorette Ellis ⁸

Suchismita Acharya ⁹

Dorota Stankowska ¹⁰

Submission Type: Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: Purpose: Current treatments for glaucoma do not fully address neurodegeneration of retinal ganglion cells (RGCs). Our objective was to determine if compound SA-21, a hybrid superoxide dismutase and glutathione mimetic, could inhibit death of trabecular meshwork cells (NTM5), RGCs and rescue the functional decline of RGCs in an optic nerve crush (ONC) model. Methods: The structure of SA-21 was confirmed by magnetic resonance (NMR) spectroscopy and mass spectrometry. Reactive oxygen species (ROS) release was performed using pyrogallol assay. NTM5 cells were oxidatively stressed with TBHP (5.5mM) or vehicle in the presence of SA-21 (1mM, 100µM, 10µM, 1µM) for 24h. Cell survival was assessed by MTT assay. C57BL6 male mice (12-weeks old, n=4-5) were anesthetized, underwent ONC surgery, and at day 0 and 3 were intravitreally injected with 1% SA-21 (2µl) or vehicle. On day 7, pattern electroretinogram (PERG) was performed, animals were euthanized, and the number of surviving RBPMs-positive RGCs were counted. Results: SA-21 (1mM) treatment significantly decreased ROS production (~50%) measured by pyrogallol assay and increased NTM5 cell viability (~20%, p< 0.0094) following TBHP treatment compared to cells treated with the vehicle. ONC produced a 48% loss of RGCs, which was decreased in SA-21 treated mice (by ~10%) and demonstrated a trend in increase in PERG amplitude. Conclusions: SA-21 compound has antioxidant capability and protects NTM5 cells from oxidative stress. Intravitreally injected SA-21 at the selected dose in mice demonstrated trend in neuroprotection but further investigation is required.

OCIMUM TENUIFLORUM DECREASES THE RATE OF GROWTH AND METASTATIC POTENTIAL OF MURINE 4T1 MAMMARY CARCINOMA CELLS

Research Area: Cancer

Abstract ID: UNTHSC563

Presenter Name: Michael Ahenkora Donkor

Authors:

Michael Donkor ^{1 *}

Harlan Jones ²

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Combination therapies involving chemotherapy and radiation, aimed at reducing metastasis and mortality have faced challenges, including limiting the effectiveness of immunotherapy. *Ocimum tenuiflorum* (*O. tenuiflorum*) has been used traditionally in Indian culture for the treatment of disease and proven scientifically to have immunomodulatory effects. The purpose of this study was to determine the anti-tumor effect of the natural plant *O. tenuiflorum* on 4T1 murine mammary carcinoma cells (4T1). Hypothesis: *O. tenuiflorum* decreases the rate of growth and metastatic potential of 4T1 tumor cells. 4T1 cells were grown in culture medium and exposed to increasing concentrations of *O. tenuiflorum*. The metastatic potential was determined using the scratch assay technique. We were also interested in the mechanism by which *O. tenuiflorum* decreased the rate of growth and metastatic potential of 4T1 cells. We determined the changes in the mRNA expression of IL-4R, previously reported to drive breast cancer metastasis following exposure of 4T1 tumor cells *O. tenuiflorum*. Results: Exposing 4T1 cells to various concentrations of *O. tenuiflorum* decreased the rate of growth and metastatic potential of 4T1 tumor cells. Also, *O. tenuiflorum* downregulated the expression of IL-4R by 4T1 tumor cells with increasing concentration. We conclude that *O. tenuiflorum* has the potential to be used as adjunct treatment in management of breast cancer. Further studies will investigate in-depth the mechanism of *O. tenuiflorum*'s on 4T1 including apoptosis, migration and other molecular mechanism on tumor evasiveness.

Online learning modules improve musculoskeletal medicine exam scores

Research Area: Education

Abstract ID: UNTHSC495

Presenter Name: Alissa Mirochnitchenko

Authors:

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Laura Garcia ²

Brian Webb ³

Kim Meyer ⁴

Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Effective teaching methods are fundamental in ensuring medical student success. In the spring of 2020, the pandemic forced most medical school courses to go online. As a result, online interactive learning modules were introduced into the second exam portion of the TCOM Musculoskeletal Systems 2 (MSS2) course. This study aims to retrospectively review the effects of this online, interactive, module-based format. Methods: Student demographics, course grades and student course feedback from the MSS2 course in spring of 2019 and 2020 were collected and analyzed using a mixed-methods approach. A quantitative analysis was conducted using SPSS to determine if there was a difference in course outcomes between the 2019 cohort and 2020 cohort. Additionally, a qualitative analysis was conducted to compare student feedback between the cohorts. Results: Although the final grade for the MSS2 course was statistically significantly higher in the 2019 cohort (88.4% vs. 87.2%), the 2020 group achieved a significantly higher average grade for the second exam of the course in which online modules were added (88.1% vs. 86.3%). A significantly smaller proportion of the 2020 cohort scored below 80% on the second exam (11.66% vs. 18.34%). Most comments regarding the modules were positive. Conclusions: The addition of interactive modules to the MSS2 curriculum was beneficial as students were able perform significantly better on the relevant exam material despite entering the course with significantly lower GPAs. Furthermore, student feedback about their learning was positive.

Optimization and characterization of mannose-decorated lipoprotein nanoparticles for the targeting of tumor-associated macrophages

Research Area: Cancer

Abstract ID: UNTHSC541

Presenter Name: Akpedje Serena Dossou

Authors:

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Nirupama Sabnis ³

Rafal Fudala ⁴

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Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose: Reconstituted high-density lipoprotein nanoparticles (rHDL NPs) have been shown to accumulate into tumors. This effect is achievable because of their small size and their affinity toward the scavenger receptor SR-B1 which is overexpressed in most tumors. Thus, rHDL NPs appear suitable to target tumor-associated macrophages (TAMs) which express SR-B1 as well as the mannose receptor CD206. While cancer cells promote an immunosuppressive (M2) phenotype in TAMs, it has been shown that a re-orientation of TAMs toward an immunostimulating (M1) phenotype results in rapid tumor regression. Because a generalized immunostimulating effect is not desirable, the targeted approach via rHDL NPs offers a safer alternative via selective delivery of an M2-to-M1 reversal agent to TAMs. Vadimezan (also called DMXAA) is such an agent. Consequently, the goal of this study is to develop and characterize a formulation of DMXAA encapsulated in mannose-decorated rHDL NPs. Methods: Six formulations of DMXAA with mannose-decorated rHDL NPs with increasing concentration of the mannose moiety were prepared via microfluidics and characterized via dynamic light scattering, fast protein liquid chromatography, and colorimetric assays for their contents. Results: The formulations decorated with the mannose moiety, displayed larger particle diameters compared to the control rHDL NPs and achieved a drug incorporation efficiency of about 60%. Conclusion: The characteristics of these particles show that the mannose moiety was stably incorporated into the rHDL NPs. Consequently, this formulation is anticipated to selectively target TAMs and, thus, achieve an enhanced therapeutic effect.

Optimization and Evaluation of qPCR Duplex Assay for mtDNA Copy Number Quantification

Research Area: Forensic and Investigative Genetics

Abstract ID: UNTHSC469

Presenter Name: Gretchen Johnson

Authors:

Gretchen Johnson ^{1*}

Nicole Phillips ²

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose: The mitochondrial genome (mtDNA) encodes thirteen essential proteins in oxidative phosphorylation. Depending on the cell type and stage of development, each cell contains an average of 10^3 to 10^4 copies of mtDNA. Current methods of mtDNA copy number quantification can be imprecise due to low efficiencies of assays and inherent imbalance of mtDNA copy number with nuclear DNA (nDNA) copy number. Accurate quantification of both components is important when calculating the ratio of mtDNA to nDNA. The goal of this project is to optimize a duplex assay that will give precise and accurate ratio estimates. Methods: We employ synthetic oligomer standards for an absolute real-time qPCR assay. The significance of using absolute qPCR is that the standard curve allows for the direct comparison of unknowns to obtain a copy number. The mitochondrial target is a site in the minor arc (MinArc), and the nuclear target is a single copy locus ($\beta 2M$). The accuracy of this assay was evaluated using a standard reference material (SRM2372a) and the precision was evaluated via replications. Results: This assay was optimized so both targets amplify with similar efficiency to give precise and accurate ratio estimates. The precision was demonstrated over repeated runs and shown to be accurate based on SRM quantification. Conclusion: This protocol demonstrates reproducible quantification in both mitochondrial and nuclear targets while reducing time and resources. The data generated can be used to indicate overall mitochondrial health and can be utilized in research areas such as aging, cancer, forensics and neurodevelopment.

Optimization of CRISPR-Cas9 via the synergy of MD simulation and machine learning

Research Area: Molecular Genetics

Abstract ID: UNTHSC521

Presenter Name: Duen-Shian Wang

Authors:

Duen-Shian Wang ¹

Ivy Liang ²

Jin Liu ^{3 *}

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: GSBS Student

Abstract: CRISPR-Cas9, a promising gene-editing tool, sheds light on gene therapy. The normal DNA cleavage of CRISPR-Cas9 is programmed by a guide RNA (gRNA) template. However, recent studies showed that Cas9 cleavage occurs even without guidance from the gRNA in the presence of Mn²⁺ ions, implying the issue of off-target effect of Cas9. Here, we report a mechanism of this RNA-independent off-target cleavage (RI-cleavage) elucidated by molecular dynamic (MD) simulations. We further used machine learning algorithms developed by our lab to facilitate the design of novel Cas9 variants to reduce such RI-cleavage. In this study, we revealed the possible mechanism of RI-cleavage and further engineered Cas9 to reduce RI-cleavage via the power of machine learning. Our research serves as an excellent example showing the potential in the synergy of MD simulation and machine learning to optimize CRISPR-Cas9.

Optimization of machine perfusion to preserve structure and function of porcine kidney

Research Area: Integrative Physiology

Abstract ID: UNTHSC522

Presenter Name: Michael Wade

Authors:

Michael Wade ^{1 *}

Robert Mallet ²

Albert Yurvati ³

Arthur Williams ⁴

Richard Hare ⁵

Ashraf Rayad ⁶

Sarika Chaudhari ⁷

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Improved preservation of explanted kidneys is essential to narrow the supply vs. demand disparity for transplantable human kidneys. This study evaluated whether the use of buffer containing mannitol, a non-toxic osmolyte that minimizes cellular edema, improves kidney preservation during prolonged hypothermic perfusion. Methods: Left kidneys were harvested from anesthetized Yorkshire pigs via laparotomy, followed by cold (2-4°C) machine perfusion for 72 h. Flow rate and resistance were recorded throughout perfusion to assess renal vascular function, then biopsy for histological analysis of hematoxylin and eosin-stained renal cortex and medulla. Results: Kidneys with comparable initial flows and resistances received standard (A) or mannitol-enriched (B) perfusion buffer. Flows (ml/min)/resistances (mm Hg/ml/min) were 65/0.40 (A) vs. 65/0.38 (B) at 5 h, 27/1.03 (A) vs. 54/0.46 (B) at 24 h, and 13/1.99 (A) vs. 49/0.50 (B) at 48 h perfusion. The mass of Kidney A increased by 47%, and that of kidney B by 39%, over 72 h. Histology revealed improved preservation of tubular and glomerular architecture in B vs. A. Conclusion: The addition of mannitol afforded appreciable improvement in renal vascular function during machine perfusion and reduced tubular necrosis when compared to mannitol-free perfusion. Preservation of renal structure using mannitol-enhanced perfusion buffer was superior to the current standard of cold machine perfusion buffer for preserving human kidneys for transplant. By reducing cellular damage and maintaining renal perfusion, the optimization of cold machine perfusion with mannitol holds the potential to increase the availability of kidneys suitable for transplantation.

Outcomes of Weight Loss during Induction Therapy for Childhood ALL

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC604

Presenter Name: Pavithra Wickramage

Authors:

Pavithra Wickramage ^{1 *}

Ifrah Farooq ²

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Pediatric patients with acute lymphoblastic leukemia (ALL) and lymphoblastic lymphoma (LLy) often experience significant weight gain during remission induction therapy. However, some experience significant weight loss instead. This population is not widely recognized. This study aims to determine whether significant weight loss during induction therapy decreased likelihood of reaching end of therapy (EOT) or increased risk of death or relapse. This was a retrospective study of 187 patients, aged 2-20 years, diagnosed with ALL and LLy at Cook Children's Medical Center from 1/1/11 to 3/31/17. Percent weight change from diagnosis to end of induction was grouped: loss ($\geq 5\%$ loss), gain ($\geq 5\%$ gain), and steady ($< 5\%$ loss/gain). To examine outcomes of weight loss, logistic regression was used for reaching EOT and Cox regression for death and relapse. Weight-change categories were 17% loss, 39% steady, and 45% gain. Eighteen (10%) patients did not reach EOT; 10 (5%) patients died; and 22 (12%) patients relapsed. Compared to the steady category, patients who lost weight were significantly less likely to reach EOT (OR=0.31, 95% CI=0.16-0.63, $p < 0.01$). Though nonsignificant, the hazard ratios demonstrated increased risk of death (HR=3.67, 95% CI=0.81-16.52, $p=0.09$) and relapse (HR=1.83, 95% CI=0.60-5.60, $p=0.29$). Patients in the steady and gain groups did not significantly differ in any outcomes ($p > 0.05$). Patients who experience malnutrition during induction therapy may be at greater risk for not completing therapy. Those in the loss group had higher mortality rates (13%) than those in the steady or gain (4%) groups.

Patient Safety in the Hospital Pharmacy Setting: Overcoming Barriers and Identifying Solutions

Research Area: Patient Safety

Abstract ID: UNTHSC654

Presenter Name: Hannah Bond

Authors:

Hannah Bond ¹ *

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmacotherapy

Classification / Affiliation: UNT System College of Pharmacy Student

Abstract: Objective: The World Health Organization states that as many as 1 in 10 patients in high income countries are harmed while receiving hospital care. The purpose of this study is to understand the types of structural barriers that exist in the inpatient hospital pharmacy setting, highlight common themes, and identify solutions to overcome the barriers. Methods: A systematic review of the literature was conducted from 2001 to 2020 using PubMed with keywords such as "hospital pharmacy," "patient safety," "hierarchical structures," "organizational barriers," "information technology barriers," "environmental barriers," and "collaboration barriers". A PRISMA flow diagram was used to evaluate the process. Articles were summarized in a table organized by author(s), year published, title, study design, type of barrier, method of studying safety, findings, and solutions. The quality of articles was graded using the Oxford for Evidence-based Medicine scale. Results: One-hundred and four articles were eligible to review. The majority of studies conducted semi-structured interviews to gather pharmacist feedback on medication safety. Some common themes include lack of organizational support, environmental constraints, limited collaboration between healthcare professionals, and lack of information technology infrastructure. Proposed solutions include supporting effective multidisciplinary teams, greater involvement of pharmacists in medication reconciliation, linked prescribing databases and decision support systems, and providing advanced training and certification programs. Conclusions: Fostering organizational support and good communication between healthcare professionals will ultimately lead to improved patient safety and better health outcomes.

Patient-Physician Trust

Research Area: Patient Safety

Abstract ID: UNTHSC683

Presenter Name: R ja Khan

Authors:

R ja Khan ^{1 *}

Submission Type: Competition Poster

Department: Non-UNTHSC

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: This literature review explores factors contributing to the patient-physician relationship from the perspective of both patient and physician. Methods: A literature review was created from initial PubMed search of "patient-physician trust." Papers were: 2 qualitative essays, one about patient-physician trust from a surgeon's perspective and another about shared decision-making; a qualitative study with physician interviews and focus groups describing low and high trust relationships; and two studies analyzing data from patient surveys focusing on associations with patient-provider trust and communication scores. Results: 1- Physician trust factors: a) Patient transparency in providing necessary medical information b) Letting physician know about major changes in condition c) Telling physician about all medications/treatments d) Understanding the physician, being actively involved in managing the condition e) Respecting physician's time and boundaries f) Not making unreasonable demands or manipulating office visits for secondary gain g) Keeping appointments 2-Patient trust factors: a) Social trust refers to trust a patient has of the institution itself. b) Patients self-reporting negative attitudes toward the healthcare system demonstrated significantly lower trust scores ($p < 0.001$). c) Socioeconomic factors: lower income and education ($p = 0.01$) d) Public health insurance or no coverage compared to private health insurance reported significantly lower provider-patient communication scores ($p < 0.001$). Conclusions: This review showed that patient-physician trust is complex and multifactorial. Awareness of these factors are critical for developing a successful healthcare delivery model.

Peaks and Valleys - Oscillatory cerebral blood flow at high altitude

Research Area: Integrative Physiology

Abstract ID: UNTHSC655

Presenter Name: Garen K. Anderson

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Alexander Rosenberg ²

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Jordan Bird ⁴

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Britta Byman ⁶

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Trevor Day ⁹

Caroline Rickards ¹⁰

Submission Type: Oral Presentation

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: An oscillatory pattern in cerebral blood flow (at ~0.1 Hz) protects cerebral tissue oxygen saturation (ScO₂) under conditions of cerebral hypoperfusion. In this study, we hypothesized that inducing oscillations in cerebral blood flow at 0.1 Hz would protect cerebral blood flow and ScO₂ during exposure to combined simulated hemorrhage and sustained hypobaric hypoxia. Eight healthy human subjects (4 M:4 F, 30.1 ± 7.6 y) participated in two lower body negative pressure (LBNP) experiments (simulating hemorrhage) at high altitude (3800 m): 1) 0 Hz control condition (CTRL) and 2) 0.1 Hz oscillatory LBNP (OLBNP) condition. Measurements included internal carotid artery (ICA) blood flow via duplex Doppler ultrasound, middle cerebral artery velocity (MCAv) via transcranial Doppler ultrasound, and ScO₂ via near-infrared spectroscopy. Mean MCAv waveforms were fast Fourier transformed to verify oscillations were generated at ~0.1 Hz. Low frequency power (0.07-0.15 Hz) in mean MCAv increased during OLBNP vs. CTRL (P = 0.05). OLBNP did not protect ICA flow (OLBNP: -32.5±12.2 Δ%; CTRL: -20.2±24.3 Δ%; P = 0.18) or mean MCAv (OLBNP: -26.5±13.8 Δ%; CTRL: -17.7±15.7 Δ%; P = 0.58), but ScO₂ was protected (OLBNP: -0.89±0.61 Δ%; CTRL: -3.99±2.2 Δ%; P = 0.007). These results support our hypothesis that inducing oscillatory blood flow leads to protection of cerebral tissue oxygenation, despite no differences in ICA blood flow or mean MCAv. Overall, these data suggest that therapies using oscillatory perfusion may help preserve cerebral tissue oxygen saturation under conditions of reduced oxygen delivery.

Pediatric asthma: social, environmental, and potential genetic disparities across racial/ethnic groups

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC667

Presenter Name: Shilpa Raju

Authors:

Shilpa Raju ^{1 *}

Katelyn Moss ²

Deanna Cross ³

Submission Type: Non-Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Asthma affects nearly 300 million people worldwide and is the most common chronic condition in children. The purpose of our study was to identify potential disparities between racial and ethnic groups in children with asthma. We analyzed the social and environmental factors contributing to asthma as well as the potential genetic factors. Methods: A literature review was conducted using key words (asthma, children, race, etc.) on PubMed and Center for Children's Health to determine what factors affected asthma diagnosis. To identify genetic contributions to asthma, we used resources such as ClinVar and dbSNP to identify genes associated with asthma. Results: Housing quality, pollution, discrimination, and place of residence all contributed to disparities in asthma prevalence among the pediatric population. Black patients have 1.25 times the asthma prevalence and twice the mortality rates of the U.S general population. Compared with non-Hispanic white children, Asian Indian, Native American and multiple-race children had higher odds for current asthma. Hispanic patients were similar in prevalence patterns to black patients. Genetic loci on 17q21, near IL1RL1, TSLP and IL33 are associated with asthma risk in three ethnic groups while the PYHIN1 and PTCHD3 genes are associated with asthma in the African American population. We identified 19 known asthma-related genes that are still not well characterized for racial/ethnic allelic differences. Conclusions: Environmental factors leading to the disparities in asthma diagnosis have been studied extensively. Further research is needed to analyze gene associations with asthma in ethnic groups and gene- environment interactions.

Pediatric Response to Psychosocial Stressors During the COVID-19 Pandemic

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC558

Presenter Name: Jazmin Fernandez

Authors:

Priya Bui ^{1 *}

Jazmin Fernandez ²

Juhi Singhal ³

Joanna Garcia ⁴

Holy Chor ⁵

Marcus Villarreal ⁶

Michael Petrus-Jones ⁷

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Due to the coronavirus (SARS-CoV-2) pandemic, the University of North Texas Health Science Center (UNTHSC) Pediatrics Clinic reduced the number of in-person visits starting in March of 2020. In response to a rise in child abuse-related fatalities in Tarrant County, the Pediatric Mental Health Calls (PMHC) Program was created with the goal of checking-in and providing support for patients at the UNTHSC Pediatrics Clinic and their caregivers. Methods: A list of patients from the UNTHSC Pediatrics Clinic is uploaded onto a database called REDCap. Call scripts are designed to standardize telephone conversations and evaluate mental and physical well-being during isolation. Medical and physician assistant (PA) students from UNTHSC are recruited and trained as volunteers. A UNTHSC Pediatric Clinic manager/licensed vocational nurse contacts patients that desire to speak with a provider in order to schedule an in-person appointment or virtual visit. Results: There have been 110 medical student and physician assistant volunteers that have participated in calling patients in this program. During the timeframe of April to November of 2020, there were a total of 2,338 patients called. Out of these patients, 262 of them requested to speak to a provider. Conclusion: Goals for the program include continuing to collect data, adding new patients to the database, and editing the call script to reflect changes. Future research plans are to identify rates of anxiety and depression among teenagers and postpartum mothers in social isolation.

Perception of pregnant medical students' ability

Research Area: Education

Abstract ID: UNTHSC636

Presenter Name: Andi Toufexis

Authors:

Andi Toufexis ^{1*}

Emma Tierny ²

Kimberly Fulda ³

Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Medical school curriculum is very rigorous and many students face challenges in life while struggling to keep up with their studies. Pregnancy is one challenge that some students experience and there is a lack of research on the correlation of pregnancy and medical school performance. We asked about the perceived change in ability in medical school due to pregnancy and the differences in perception between those who have and have not been pregnant in medical school. Methods: A survey was e-mailed to medical students in the fall semester of 2019 with a reminder in the spring semester of 2020. Descriptive statistics are provided to look at responses for all students and those who have been pregnant in medical school. Results: Sixty-eight percent (n=102) of 150 respondents were female, and 8 (5.3%) had been pregnant while in medical school. Students that have never been pregnant in medical school are likely to rate change in academic ability as 'decreased' (n=63, 51.6%) or 'greatly decreased' (n=33, 27.0%) while students who have been pregnant experienced 'decreased' (n=4, 50.0%) or 'no change' (n=4, 50.0%) in ability. Additionally, students who have been pregnant in medical school (n=4, 50%) rate support services higher than their counterparts (n=27, 22.1%). Conclusion: This study suggests that students who have never been pregnant in medical school believe there is a greater decrease in ability than those that have experienced pregnancy while in medical school.

Phosphorylation of Annexin A2 at Tyrosine 23 is Essential for its Association with Exosomes and for Imparting Invasive Phenotype to Breast Cancer Cells

Research Area: Cancer

Abstract ID: UNTHSC691

Presenter Name: Priyanka Prakash Desai

Authors:

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Preteesh Mylabathula ³

Timothy Van Treuren ⁴

Amit Kumar Tripathi ⁵

Jamboor Vishwanatha ⁶

Submission Type: Oral Presentation

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Introduction: Studying triple negative breast cancer (TNBC) is important as treatment lacks targeted-based therapies. High expression of exosomal Annexin A2 (AnxA2), a Ca²⁺-dependent phospholipid binding protein, plays an important role in pre-metastatic niche formation and promoting cancer metastasis in TNBC. N-terminal phosphorylation of AnxA2 at Tyrosine(Y)23 has been implicated in several cancer progression. However, the mechanism through which AnxA2 associates with the exosomes and helps impart invasiveness to TNBC cells has been least elucidated. Methods: Plasmids expressing constitutive phosphomimetic (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 and invasion. 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 were analyzed on invasiveness of cancer cells. Results: Our results showed that MDA-MB-231 TNBC cells expressing AnxA2-Y23E showed increased migratory and invasive capacity compared to cells expressing AnxA2-Y23F. Exosomes derived from AnxA2-Y23E cells had increased surface AnxA2 expression compared to exosomes derived from AnxA2-Y23F cells. High surface expression of AnxA2 in exosomes derived from AnxA2-Y23E cells induced invasive characteristics in CAL-148 breast adenocarcinoma cells compared to exosomes derived from AnxA2-Y23F cells. Conclusion: Phosphorylation of AnxA2 at Y23 plays an important role in associating AnxA2 with the exosomes which promotes invasiveness in cancer cells.

Phyllodes Tumor in Adolescent Female

Research Area: Other

Abstract ID: UNTHSC645

Presenter Name: Sera Jacob

Authors:

Sera Jacob ¹ *

Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Introduction: Phyllodes tumors are rare occurrences in the general population, accounting for only 0.3-1% of all breast tumors. It is even more uncommon to see it in a pediatric patient. Phyllodes tumors are commonly seen in middle aged women between the ages of 40 to 55. Case Presentation: A 17-year-old Asian American female presented with an incidental finding of a mass on her left breast that she found during a self-breast exam. She has no personal and family history of breast tumors or cancer. She began menarche at the age of 9. An ultrasound was ordered, and the patient was started on ant biotics. Ultrasound findings showed a mass measured to be 4.4 cm x 2.4 cm x 4 cm and a guided core fine needle biopsy was arranged. Biopsy results showed a benign fibroepithelial mass. Patient had the mass excised and the measurements were reported to be 5.2 cm x 4.5 cm x 3 cm. Pathology from the excision showed with that the mass had appearance consistent with benign phyllodes tumor. Patient will follow up every 6 months for the next 3 years to monitor recurrence. Conclusion: This case exh bits a unique presentation of phyllodes tumor in an extremely uncommon age group.

Physical Inactivity Among High School Students: A Public Health Concern of the 21st Century

Research Area: General Public Health

Abstract ID: UNTHSC715

Presenter Name: Amber Deckard

Authors:

Amber Deckard ¹ *

Submission Type: Competition Poster

Department: School of Public Health: Biostatistics & Epidemiology

Classification / Affiliation: School of Public Health Student

Abstract: Purpose: Physical activity among school aged children is a leading public health concern with physical, mental, social, and financial implications. According to the Centers for Disease Control and Prevention (CDC), only 1 in 5 high school students meet the CDC's recommended 60 minutes of daily physical activity. The purpose of this report was two-fold to determine the prevalence of Texas high school students not meeting the CDC's physical activity recommendations and determine the relationship between the student's physical education class attendance. Methods: A web-based analysis was conducted utilizing the Youth Risk Behavior Surveillance System (YRBSS). Responses from individuals in 9th through 12th grade were included. YRBSS Analysis tools were utilized for performing a cross-tabulation and determining statistical significance within the variables of sex, race/ethnicity, grade level, and sexual identity with a ($p < 0.05$) significance level. Results: The majority of high school students do not meet the recommended minutes of physical activity. Females are more likely than males to not meet guidelines, and Black students and Hispanic students are more likely than White students to not meet guidelines. The relationship between the two measures were statistically significant in which students who did not attend physical education class were not meeting the CDC's recommendations either. Conclusion: Health disparities among students who do not meet physical activity recommendations were identified and need to be addressed. Adopting policies and allocating resources for longer physical education classes, more recreational activities, as well as ensuring safe environments for recreation are recommended next steps.

Plantaris Tendon Insertion Variant

Research Area: Structural Anatomy

Abstract ID: UNTHSC600

Presenter Name: Paul Spore

Authors:

Paul Spore ^{1 *}

Cara Fisher ²

Submission Type: Non-Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: The plantaris muscle is thought to be a vestigial muscle and its tendon lies between the gastrocnemius and soleus muscles. It is most common for the plantaris tendon to insert onto the medial calcaneal tuberosity or onto the calcaneal tendon. The plantaris muscle and tendon insertion are thought to possibly play a role in calcaneal tendinopathy. Although it does not play a significant role in foot plantarflexion, it could possibly play a role in proprioception for the muscles that surround it. Case Information: Dissection of the posterior compartment of the left leg of a - year old embalmed female revealed a rare variation in muscular anatomy. The plantaris tendon inserted into the transverse inter-muscular septum between the tibia and the calcaneal tendon. The literature review revealed that this insertion point occurs approximately 3% of the time. Conclusion: While this variation in insertion is documented, it is the least common of the 5 types of plantaris tendon insertions. This case report attempts to further the understanding of the variance of plantaris tendon insertion points and how they can impact diagnosis and treatment of calcaneal tendinopathy.

Point of Care Ultrasound Abdominal Aortic Aneurysm Screening: A Quality Improvement Project

Research Area: Cardiovascular

Abstract ID: UNTHSC435

Presenter Name: Timothy Philip

Authors:

Jonathan Hughes ¹

Timothy Philip ^{2 *}

Ana Adams ³

Victoria Pierce ⁴

Madeline Carson ⁵

Elijah McClellan ⁶

Jordyn Johnson ⁷

Emerald Walsh ⁸

Dallas Miller ⁹

Jennifer Archer ¹⁰

John Gibson ¹¹

Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: The USPSTF recommends 1-time screening for abdominal aortic aneurysm (AAA) with ultrasonography (US) in men above 65 who have ever smoked. AAA screening has reduced rupture rates; however, the rates of screening are lower in rural areas. The Rural Osteopathic Medical Education program at Texas College of Osteopathic Medicine (TCOM) initiated a quality improvement project to increase rates of AAA screenings by means of medical students equipped with hand-held US devices. Methods: Consenting men above 65 who have ever smoked received an outpatient, point of care ultrasound (POCUS) AAA screening via Butterfly iQ. Screenings of the proximal, middle, and distal portions of the abdominal aorta in both longitudinal and transverse views were conducted. Patients were then referred to radiological services to receive a one-time ultrasound screening for AAA. The outcomes compared the variability between the students' and radiologists' measurements and radiology referral compliance. Results: 35 patients were screened in the clinic using the handheld ultrasound device. 3 patients screened positive for AAA at the radiology department, while 2 screened positive in the clinic. The average difference between the measurements by the students and the radiologists was -0.30 cm (95% CI, -0.45 to -0.15; P=0.0002). Results suggested that there was not a clinically significant difference between measurements obtained by the medical students and the radiology department. The patient follow-up compliance rate was only 51%. Based on these data, medical student performed POCUS AAA screening may provide better compliance with similar accuracy compared to traditional AAA screening.

Postural stability as a predictor for reactive response to perturbations

Research Area: Rehabilitative Sciences

Abstract ID: UNTHSC540

Presenter Name: Tai Yasuda

Authors:

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Sarah Moudy ²

Rita Patterson ³

Kendi Hensel ⁴

Submission Type: Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: The major cause of accidental death for people above 65 is fall-related injuries. Fall risk can be assessed through postural stability or gait analysis following a trip-like perturbation. Easy clinical assessment is a major advantage of using postural stability, but it is unclear if it represents the ability to recover from a trip. The purpose of this study is to investigate if postural stability can be used to predict reactive response to perturbations. Methods: Postural stability was examined by participants standing still for 30 seconds. Corresponding measures were extracted from center of pressure (COP) including: mean velocity of COP (mvN), distances from COP (net_area), base of support (net_bos), and ratio of change in net_area to net_bos support (net_ratio). Reactive recovery was assessed by COP-Center of Mass (COM) distance and step length after perturbations were elicited by accelerating the treadmill at 5 meters/sec² while walking. To determine if postural stability is associated with reactive recovery, linear regressions and correlations were performed. Waveform analysis was applied for COP-COM distances. Results: Weak correlations ($r = 0.01-0.31$, $p = 0.002-0.05$) were found between step length and postural stability measures. COP-COM distance found one significant relationship with mvN after perturbation ($p = 0.022$, $r = 0.29$). No other significant relationships were found. Conclusions: Data points selected for quiet standing, or inherent differences between postural and dynamic components of gait, may explain these results. Additional research in understanding if postural stability can predict reactive response is recommended for future assessment of fall risk.

Preoperative factors for early mortality in patients with HLHS undergoing the Norwood procedure

Research Area: Cardiovascular

Abstract ID: UNTHSC474

Presenter Name: Barbara Karnkowska

Authors:

Barbara Karnkowska ^{1 *}

James Kuo ²

Tyler Hamby ³

Submission Type: Competition Poster

Department: Non-UNTHSC

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Hypoplastic left heart syndrome (HLHS) is characterized by hypoplasia of the left heart and outflow tract. The three-stage surgical reconstruction of heart consists of circumventing the underdeveloped left ventricle by connecting right ventricle to systemic circulation and grafting a passive flow conduit which shunts venous blood into pulmonary artery. First stage surgery (Norwood) has the highest mortality among common congenital surgeries (7-19%) followed by a high risk interstage (IS) phase where additional 4-15% of infants die. A retrospective chart review of HLHS patients was conducted at Cook Children's hospital between January 2007 through January 2017. The objective of the study was to identify preoperative risk factors that may lead to premature death during IS. Univariate logistic regression analyses were used to determine whether feeding, intubation, and ECMO predicted mortality. IS was defined as time following Norwood procedure until Glenn, the second stage of reconstruction. Analysis revealed that receiving preoperative Norwood feeding intubated prior to surgery was associated with lower mortality (OR=0.42, CI=0.20-0.90, p= 0.025). Furthermore, intubation prior to surgery (OR=1.73, CI=1.05-2.85, p= 0.03) and pre-operative extracorporeal membrane oxygenation (ECMO) procedures (OR=2.83, CI=1.12-7.19, p=0.028) were associated with a higher IS mortality. Findings suggest a positive relationship between pre-operative respiratory interventions and increased rate of mortality during IS. Elucidation of this relationship suggests that pre-operative pulmonary status of the patient may be a leading prognostic factor on infant death between Norwood and Glenn. Consequently, a closer look at HLHS palliative protocol is warranted.

Prevalence of Early Puberty in Children on the Outcomes of Type 2 Diabetes Risk

Research Area: Diabetes

Abstract ID: UNTHSC612

Presenter Name: Shanon Quach

Authors:

Shanon Quach ^{1*}

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Type 2 diabetes (T2DM) is no longer considered an adult-onset disease as the prevalence and incidence have increased in children. T2DM can cause devastating effects to major organs of the body and lifetime management. This study aims to examine pubertal factors as risk indicators for T2DM. Methods: This is a cross sectional analysis of data collected in a parent – children survey that evaluated the risks and predictors of T2DM. The participants were aged 10 to 14 years old and did not have diagnosed T2DM (N=153). Pubertal age was measured via the Tanner stages. Early puberty was indicated at ≤ 11 years. Independent two sample t-tests were conducted with each pubertal variable against risk of T2DM. Results: The study population consisted of 74 boys and 79 girls. Age for boys was evenly distributed among 9-14, while in girls it was right skewed in the 8-13 range. Growth of hair among both boys and girls had a mild association ($p=0.28$), as did first menstruation for girls (earlier menstruation, $p=0.21$). If a boy had increased development compared to their peers, they had an increased risk of T2DM as well ($p=0.05$). Conclusion: There seems to be some association of pubertal characteristics to increase risk of T2DM in children. Early puberty can be affected by various factors such as low socioeconomic status, unhealthy diets, and childhood obesity. T2DM can be prevented via behavioral modifications. Understanding pubertal risk factors could allow clinicians to work with parents to avoid T2DM in children.

QI project to reduce prescription of high risk medications for type 2 diabetes in patients over 65 years old

Research Area: Patient Safety

Abstract ID: UNTHSC405

Presenter Name: Timothy Philip

Authors:

Timothy Philip ^{1 *}

Ramon Cantu ²

Lesca Hadley ³

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Submission Type: Non-Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose Patients over the age of 65 are at risk of hypoglycemia, which can increase risk of death. The objective of this project is to change high-risk medication (HRM) prescription, in diabetic patients over 65 years old, of long-term sulfonylureas or sliding-scale insulin to medication with less risk of hypoglycemia. Methods Patients over 65 years with non-HRM and HRM diabetes medications prescribed to them were identified. Post-exam, a recommendation was made to change medication from HRM to non-HRM. Results of the encounter will be recorded in data tables. Results After the implementation, only 1 out of 3 possible patients on Glimepiride was changed to an anti-diabetic medication that was not an HRM. This particular patient was prescribed basal-bolus insulin to replace the glimepiride. Conclusions One obstacle in preventing a change from Glimepiride to a non-HRM was cost. Therefore, due to cost of medication, socioeconomic status of the patient, and number of other medications, most patients declined a change. One patient denied the change because he was well-controlled on glimepiride for years. Although the data suggests lower rates of prescribing HRMs, this however is due to natural variability within the patient population and not a significant change caused by the enhancement.

Quality Improvement: Examining Reduction of High Risk Medication Use in an Elderly Population

Research Area: Patient Safety

Abstract ID: UNTHSC697

Presenter Name: Sarah E. Hutton

Authors:

Sarah Hutton ^{1 *}

Jennifer McGaughy ²

John Gibson ³

Lesca Hadley ⁴

Submission Type: Non-Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: The purpose of this project was to decrease the use of high-risk medications in adults age 65 and older. Polypharmacy is a potentially dangerous problem facing older patients in the United States; addressing high risk medication use is important to reduce risk. Methods: A questionnaire and educational handout regarding polypharmacy and high-risk medication were used to address the issue of high-risk medication use. Medication lists were reviewed for every patient meeting the criterion of being over the age of 65. Results: There was no significant reduction in high-risk medication use post-intervention. Those who were prescribed 1 high-risk medication (determined by the Beer's criteria) in the "prior to the enhancement implementation period" was 10.5% compared to the 10.0% of the same category in the "enhancement implementation" period. There was no change in either period for those prescribed 2 or more high-risk medications; these were both 0%. Conclusions: One of the reasons to explain the lack of significant reduction is there is not a large elderly patient population seen at the clinic. Also, a medication review function exists in the EMR that may have already led to a reduction in prescription of high-risk medications. While implementing use of the questionnaire and handout were appropriate, it was difficult to fully address the Beer's criteria extensive list of medications. The next step would be to have the EMR flag high-risk medications and identify those who are at higher risk of drug-drug interactions.

Racial Differences in Treatment and Outcomes of Chronic Low Back Pain

Research Area: Health Disparities

Abstract ID: UNTHSC507

Presenter Name: Benjamin Timmer

Authors:

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John Licciardone ²

Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Chronic low back pain (CLBP) is the leading cause of patient visits to primary care physicians in the United States. Black patients with chronic pain are at higher risk of progressing to disability due to lack of access to healthcare, yet limited studies have addressed the epidemiology of CLBP treatment and outcomes in the Black population. Methods: This cross-sectional study utilized the Pain Registry for Epidemiologic, Clinical, and Interventional Studies and Innovation (PRECISION) to study racial differences in selected patient-reported treatment and clinical outcomes, including a numerical rating scale (NRS) for pain, Roland-Morris Disability Questionnaire, Pain Sensitivity Questionnaire, and Pain Catastrophizing Scale. Results: A total of 848 patients with CLBP participated, including 184 (22%) who were Black. The percentage (95% CI) of Black patients who used non-pharmacological treatments was 70%(63%-77%) vs. 87%(84%-89%) of White patients ($p < 0.001$). Black patients were also less likely to use nonsteroidal anti-inflammatory drugs for pain, 72%(65%-78%) vs 86%(83%-89%) ($p < 0.001$). However, opioid use was not different between races. Black patients experienced greater pain than White patients based on reported mean (95% CI) NRS values of 7.2(6.9-7.4) vs. 5.8(5.7-5.9) ($p < 0.001$). Additionally, Black patients experienced greater disability, pain sensitivity, and pain catastrophizing than White patients ($p < 0.001$ for each contrast). Conclusions: These findings suggest that racial health disparities exist among patients with CLBP. Greater efforts to increase awareness of and access to non-pharmacological treatments for Black patients with CLBP may improve their outcomes.

Rate of Change with Respect to Time Trends of Net 5-Year Survival in the Absence of Other Causes of Death: Male and Female Adolescent and Young-Adult Cancer Patients

Research Area: Cancer

Abstract ID: UNTHSC708

Presenter Name: Mackenzie Ewart

Authors:

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William Bowman ²

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Laura Rutledge ⁵

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Rate of Change with Respect to Time Trends of Net 5-Year Survival in the Absence of Other Causes of Death: Male and Female Adolescent and Young-Adult Cancer Patients Cancer is a devastating disease process that affects the lives of millions around the world. Of particular interest, within the field of cancer research, is the measurement of therapeutic progress made throughout time, which is commonly measured through analyses of 5-year survival statistics. While cancer therapies have come a long way, the adolescent and young adult (AYA) cancer patient population faces many unique obstacles such as cancer identification, proper diagnosis, adequate treatment, and continuity of care. These obstacles have led to a lack of improvement in the outcomes for AYA cancer patients when compared with patient populations both younger and older. The derivation of 5-year survival statistics from the Surveillance, Epidemiology, and End Results Program (SEER) 17 registries yields a measurable disparity in the therapeutic improvement of the AYA cancer patient population when analyzed against the derivation of 5-year survival statistics for children and adults in the United States. More initiatives and research are needed to correct the lagging disparities and to improve the overall survival in the AYA population.

Rats with placental ischemia and preeclampsia-like symptoms have increased circulating cell-free mtDNA

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC418

Presenter Name: Jennifer Gardner

Authors:

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Nicole Phillips ⁷

Styliani Gouloupoulou ⁸

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Preeclampsia (PE) is a hypertensive disorder of pregnancy, which is characterized by placental mitochondrial dysfunction. Increased circulating cell-free mitochondrial DNA (mtDNA) has been also reported in PE. Animal models are commonly used to study the role of placental dysfunction in the maternal syndrome of PE. The objective of this study was to determine the concentrations of circulating mtDNA in rat models of placental ischemia. Placental ischemia was induced in rats on gestational day (GD) 14 by placing clips on a) the abdominal aorta and ovarian arteries (reduced uterine perfusion pressure (RUPP)) and b) ovarian arteries and uterine arteries (selective RUPP (sRUPP)). Sham rats had clips placed on intraabdominal fat. Different groups of rats were exposed to hypoxia (11% O₂) or maintained at atmospheric conditions (21% O₂) from GD6 to GD21. Blood samples were collected on GD21. Real time PCR quantification of mtDNA was performed on DNA extracts from serum using TaqMan™ probes and chemistry. mtDNA copy number (CN) was greater in RUPP and sRUPP rats compared to their respective controls (Sham (11) vs. RUPP (11): 0.18 ± 0.04 CN/ μ l vs. 0.30 ± 0.04 CN/ μ l, p-value: 0.04; Sham (8) vs. sRUPP (10): 24.84 ± 3.29 CN/ μ l vs. 54.38 ± 3.29 CN/ μ l, p-value: 0.016)). Hypoxia did not affect mtDNA CN (Control (7) vs. Hypoxia (9): 0.28 ± 0.05 CN/ μ l vs. 0.36 ± 0.04 CN/ μ l, p-value: 0.28). Rats with placental ischemia have increased circulating cell-free mtDNA similar to what is seen in pregnant women with PE.

Real-time monitoring of membrane composition for liposomal drug formulations in continuous manufacturing.

Research Area: Pharmaceutical Sciences

Abstract ID: UNTHSC630

Presenter Name: Julio Rincon

Authors:

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Meredith Garrett ²

Michail Kastellorizios ³

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: Liposomes are lipid-based vesicles with the ability to entrap drugs. Their applications continue to benefit from advances in technology and manufacturing. When it comes to liposomes, or any nanomedicines, attributes such as membrane composition, size, and drug encapsulation are important to consistently deliver the intended performance of drug products. Newly adopted continuous manufacturing processes present challenges for real-time critical attribute analysis, as most characterization techniques employ a batch-based process. Here, we present a methodology to verify liposome membrane composition in a manner that can be implemented in continuous manufacturing process by detecting changes in surface tension. Methods: 8 capillary tubes (25 μ l) were simultaneously submerged in 96 well plates. Wells were loaded with 250 μ l of a Doxil-like liposome formulation at a concentration of 16 mg/ml. DSPEPEG ratios varied from 2.6%, 3.9%, 4.5%, 5.3%, 6%, 8%, 9%. Cholesterol molar ratio was kept at 38%, HSPC content varied dependent on DSPEPEG ratio. Three different protocols were evaluated: single 10-second submersion, 45 continuous submersions (500 milliseconds each), and 25 μ l prefill followed by 15 submersions. Results: Rise measurements demonstrated significant surface tension differences between 5.3% and all other ratios using the prefill method. In addition, both single and multiple immersion protocols showed capillary rise hysteresis. Conclusions: Preliminary studies verify surface tension can be used to distinguish PEG variations in liposome membrane composition. Additional protocol and method development is required to reduce capillary rise hysteresis and further enable real-time monitoring of membrane composition in continuous manufacturing.

Reducing Utilization of Hospital Resources through Implementing Outpatient Follow-up in a Rural Setting

Research Area: Community Medicine

Abstract ID: UNTHSC411

Presenter Name: Alexa Calcagno

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Jeremy Johnson ²

John Gibson ³

Lesca Hadley ⁴

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Will increased outpatient follow-up with patients having multiple chronic conditions lead to decreased utilization of hospital resources? About 15% of the U.S. population qualifies for Medicare, the majority of which have chronic conditions requiring regular management. One Medicare component, the Chronic Care Management (CCM) Program, allows for establishment of a comprehensive care plan in patients with two or more chronic conditions at risk of death or functional decline. Initiated at Graham Healthcare and Urgent Care in Graham, Texas in January 2020, the goal of CCM is to encourage outpatient management of chronic conditions and reduce utilization of emergency room (ER) or inpatient services. Methods: The target population was 24 clinic patients enrolled in CCM in January or February of 2020. The number of ER visits, hospital admissions, and clinic visits of each patient in the 7 months before enrollment were compared to the number in the 7 months after enrollment. Results: The number of ER visits and hospital admissions before enrollment compared to the number after enrollment decreased by 11.8%. However, the number of clinic visits did not change before and after enrollment. Conclusion: If a larger sample size of patients were tracked over a longer time frame, it is likely the number of clinic visits would increase, and the number of ER visits and hospitalizations would continue to decrease. Therefore, the goal is to continue growth of enrollment in CCM and to implement a follow-up protocol to enhance efficacy of CCM services and advanced-care planning.

Restoration of HIV infected astrocytes functions by utilizing CRIPSR-Cas9

Research Area: Neuroscience

Abstract ID: UNTHSC596

Presenter Name: Boyan Leng

Authors:

Boyan Leng ^{1 *}

Kathleen Borgmann ²

Submission Type: Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: Purpose: HIV enters the brain, resides in neuroglia and invades immune cells. Antiretroviral therapy has been unsuccessful at reducing the proportion of HIV+ patients developing neurocognitive disorders, highlighting the necessity of eradicating HIV from the brain. As one of the most abundant neural cells, astrocytes provide physical and metabolic support to neurons and remain a significant HIV reservoir capable of reconstituting peripheral HIV infection in humanized mouse models. Current strategies aiming to eradicate the HIV genome from the brain have proved to be detrimental to astrocyte function. We hypothesize that successful HIV excision will improve astrocyte function and restore a neuro-supportive phenotype. Methods: Primary human astrocytes were infected with a dual red/green reporter HIV construct (R/G-HIV) to investigate the function of HIV+ astrocytes. CRISPR/Cas9/gRNAs were designed based on previous studies and evaluated for off target effects. The constructs will be cloned into a glial-targeting adenoviral vector to improve transfection efficiency and permit in vivo studies. Results: Pseudotyped HIV successfully integrated into the astrocyte genome and led to expression of construct reporters and HIV proteins. HIV+ astrocytes showed increased expression of proinflammatory mediators, reduced glutamate clearance and proliferation as compared to controls. The CRISPR/Cas9/gRNA construct will induce cuts in the 5' and 3' long terminal repeats to excise HIV. Conclusion: Successful completion of this study will identify HIV excision as an important tool capable of restoring the neuro-supportive phenotype of HIV(-) astrocytes, which could provide a worthy therapeutic strategy against HIV-associated neurocognitive disorders.

Review of a Case With Vague Presenting Symptoms in Preparation for Clinical Rotations

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC432

Presenter Name: Cara Lammers

Authors:

Cara Lammers ^{1 *}

William Bowman ²

Riyaz Basha ³

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Conducting scholarly reviews of case studies as a preclinical medical student is a crucial supplement to classroom didactics and provides students with a clinical framework that can be applied throughout future clinical rotations. Case Information: In review of An 18.5-Month-Old Girl with Watery Diarrhea and Poor Weight Gain from New England Journal of Medicine (2010; 362:1619-1626), an otherwise healthy female infant presents with a reported 6 month history of watery diarrhea up to 15x per day. The child's weight decreased from 56th percentile at 7 months to < 10th percentile. Physical exam was normal without any organomegaly, tenderness, or masses. An extensive diagnostic workup was completed ruling out common food allergies, gluten-sensitive enteropathy, cystic fibrosis, and an invasive organism. Finally, the possibility of a tumor and associated paraneoplastic syndrome was considered, and a measurement of urinary catecholamines revealed elevated levels. A CT scan showed a calcified retroperitoneal mass without evidence of invasion. The mass was fully resected consistent with ganglioneuroma. At follow-up, the child was thriving without evidence of recurrent disease and normal catecholamine levels. Conclusions: Without prompt diagnosis, the outcome of this case could have been catastrophic leading to continued failure to thrive and developmental abnormalities. Using the case presented as a framework, I have developed my own systematic approach for patients presenting with vague symptoms. Furthermore, I keep tumors and cancerous etiologies at the forefront of my mind when developing differentials for patients with non-specific symptoms ensuring earlier diagnoses and interventions.

Review: A 15-Year-Old Boy with Abdominal Pain, Hematochezia, and Anemia

Research Area: General Medicine

Abstract ID: UNTHSC564

Presenter Name: Saman Modi

Authors:

Ly Nguyen ^{1 *}

Saman Modi ²

Clifton Huang ³

Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: Intussusception is the telescoping of part of the intestine into a more distal segment. It can cause abdominal pain and hematochezia. Intussusception typically presents between 6 and 36 months of age, however, 3-4% of cases can occur in children over 10 years of age and are usually associated with a pathologic lead point. Case information: A 15-year-old male presented to the emergency department with recurrent abdominal pain, diarrhea, and hematochezia. The painless rectal bleeding was first noted when the patient was 9 years old. At that time, abdominal and colonoscopy exams and stool cultures were normal. Laboratory studies were consistent with iron deficiency and β -thalassemia (low Hb, Hct, MCV, elevated TIBC, low ferritin, low serum iron, elevated HbA2), but were otherwise unremarkable. The abdominal pain began 8 weeks prior to admission. The patient has a history significant for iron-deficiency anemia, β -thalassemia minor, and allergic rhinitis with nasal polyps, and a family history of Peutz-Jeghers syndrome with nasal polyposis in two siblings. Prior to admission, an abdominal and pelvic CT scan revealed an ileocolonic intussusception without a distinct mass. A diagnostic procedure and surgical resection revealed a resolved intussusception with a dysplastic polyp as the lead point. No evidence of carcinoma was noted. Conclusions: This case highlights a unique presentation of intussusception with a pathologic lead point in an atypical age group.

ROAD MAPS TO GLAUCOMATOUS NEURODEGENERATION BY LABEL-FREE QUANTITATIVE PROTEOMICS

Research Area: Proteomics

Abstract ID: UNTHSC639

Presenter Name: Khadiza Zaman

Authors:

Khadiza Zaman ^{1 *}

Vien Nguyen ²

Katalin Prokai ³

Laszlo Prokai ⁴

Submission Type: Non-Competition Poster

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: There is a scarcity in reports on the molecular cross-talks occurring between the retina and optic nerve in glaucoma. Menopausal hormone deficiency also has been considered a risk factor of glaucomatous neurodegeneration hitherto without plausible mechanistic origins. To address these gaps of knowledge, we designed a global proteomics-based analysis of rat retina and optic nerve to gain a detailed understanding of IOP-associated alterations occurring at the protein level upon estrogen deprivation. Methods: Tissues were obtained through collaboration from rats in which one eye was subjected to routine IOP elevation by sclerosing the episcleral vein with hypertonic saline. Proteins from target tissues were extracted and analyzed separately for mass spectrometry-based proteomics using label-free quantification. Differentially expressed proteins were mapped to protein interaction networks and biological processes through Ingenuity Pathway Analysis (IPA[®]). Results: Our mass discovery-driven proteomic analysis covered nearly 1900 proteins in the rat retina and optic nerves. Regulated proteins triggered by increased IOP showed both distinct and similar functions between the retina and the optic nerve. The most interesting regulation we observed was the inhibition of signaling mechanisms involved in growth and proliferation, such as semaphorin signaling in neurons, and clathrin-mediated endocytosis responsible for maintaining cell morphology, regulating uptake of nutrients and synaptogenesis. Conclusion: Our study has provided the first global insight into alterations occurring at the molecular level and involving protein networks with associated biological processes upon glaucomatous neurodegeneration of the retina and optic nerve in response to elevated IOP.

Role of A1/A2 Neurons in the Dysregulation of Vasopressin Release and Dilutional Hyponatremia in Liver Disease

Research Area: Integrative Physiology

Abstract ID: UNTHSC468

Presenter Name: Ato Oppong Aikins

Authors:

Ato Aikins ^{1 *}

Joel Little ²

Joseph Cunningham ³

Submission Type: Oral Presentation

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Abstract Purpose: Inappropriate release of arginine vasopressin (AVP) has been linked to dilutional hyponatremia in patients with cirrhosis. Elevated Plasma AVP causes water retention, hyposmolality, ascites formation, and a perceived decrease in plasma volume. The perceived decrease in plasma volume is sensed by the A1/A2 norepinephrine neurons in the caudal ventrolateral medulla (CVLM) and the nucleus tractus solitarius (NTS) respectively. We propose that these neurons provide the initial stimuli that activates AVP-secreting neurons in the supraoptic nucleus (SON) leading to inappropriate AVP release and dilutional hyponatremia. Method: Adult male rats were bile duct ligated (BDL) to model cirrhosis. Selective lesioning of the SON-projecting A1/A2 norepinephrine neurons was achieved using anti-D β H-Saporin [IT-03] (Advanced Targeting Systems). Plasma copeptin concentration was measured as a surrogate marker for AVP using ELISA. Plasma osmolality and hematocrit measurements were also taken. Immunohistochemistry for delta FosB and dopamine beta-hydroxylase (D β H) was performed on brain slices. Results: Lesions of the A1/A2 neurons projecting to SON (Saporin/BDL n=9) was associated with decreased copeptin as compared to BDL controls (Vehicle/BDL, n=6, p< 0.05). However, the number of delta FosB immunoreactive A1/A2 cells was not significantly different. While A1/A2 lesions seemed to normalize osmolality and hematocrit in the BDL rats, the trends were not statistically significant. Conclusion: The result suggests that A1/A2 neurons could contribute to increased plasma AVP seen in male BDL rats, but there could be other contributing factors preventing a recovery of plasma osmolality.

Role of DNA Methylation in Risk for Alzheimer's Disease and Type 2 Diabetes in a Mexican American Cohort

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC669

Presenter Name: Ann Abraham Daniel

Authors:

Ann Abraham Daniel ¹

Talisa Silzer ²

Courtney Hall ³

Jie Sun ⁴

Nicole Phillips ⁵

Robert Barber ⁶ *

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: PURPOSE: Age related diseases such as Alzheimer's disease (AD) and type 2 diabetes (T2D) are respectively the 6th and 7th leading cause of mortality in the US. Mexican Americans, the largest ethnic minority group in the US, have an increased likelihood of developing T2D compared to their Caucasian counterparts. With the elderly Mexican American population (≥ 65 years old) likely to multiply 7-fold by 2050, prevalence of AD alongside T2D is predicted to increase too. Mexican Americans have an earlier onset of AD and a metabolic heavy predisposition for AD compared to Caucasians who develop inflammation-based AD. The risk for T2D and AD is multifactorial involving epigenetic factors such as methylation, which is the addition of a methyl group to the cytosine base of DNA. We aim to establish an epigenetic association between AD and T2D unique to the Mexican American population. METHODS: Participants from the Texas Alzheimer's Research and Care Consortium (TARCC), which consists of Mexican American individuals diagnosed with either AD only, T2D only or AD and T2D matched with a Caucasian counterpart were selected. Peripheral blood was drawn from participants and individual methylation profiles collected using the Illumina Infinium MethylationEPIC chip array. Differential methylation will be assessed using the Chip Analysis Methylation Pipeline (ChAMP) package in R. RESULTS: Results obtained will be analyzed using pathway and gene set enrichment analysis tools. CONCLUSIONS: Identifying possible methylation sites associated with T2D and AD unique to the Mexican American population could contribute towards developing ethnicity-specific biomarkers and treatments.

Role of Screening Questionnaires in Reducing the Risk of Opioid Abuse

Research Area: Other

Abstract ID: UNTHSC595

Presenter Name: Sera Jacob

Authors:

Sera Jacob ^{1 *}

David Hill ²

John Gibson ³

Lesca Hadley ⁴

Submission Type: Non-Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose An epidemic that is a growing concern, especially to health care providers, is the opioid epidemic in America. Opioid abuse is an issue that is affecting medical care all over the country, in urban and rural areas. It has been starting right in family medicine clinics, where it is daily goes by unnoticed. Will the increased use of screening questionnaires reduce the risk of opioid misuse in adults ages 18 and older? Methods Patients were asked to anonymously complete an Opioid Assessment for Patients with Pain-Revised (SOAPP-R) worksheet. Patients were first asked permission and then they were free to complete the worksheet anonymously. A data table was kept updated with the amount of responses received. Results The results showed that after four weeks of data collection, 11 patients were screened out of 40 patients who were seen for opioid medication refills. Enhancement results were calculated to be 27.5% people screened for opioid abuse compared to prior to enhancement results which was 0% of people screened. Out of the 11 screening questionnaires, 2 people showed an increased risk of opioid misuse. Conclusions This project showed how many patients could be adequately screened for opioid misuse in a family medicine clinic in a rural town. I learned the benefits of how to conduct a quality improvement project. Next steps for the project would be that the clinic would conduct screenings periodically for patients to minimize opioid risk.

Roles of aging-associated Treg cell accumulation in experimental autoimmune encephalomyelitis (EAE) — a model of late-onset multiple sclerosis (MS)

Research Area: Immunology

Abstract ID: UNTHSC422

Presenter Name: Weikan Wang

Authors:

Weikan Wang ^{1 *}

Rachel Thomas ²

Jiyoung Oh ³

Dongming Su ⁴

Submission Type: Oral Presentation

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose: MS, a T cell-mediated autoimmune demyelinating disease of the central nervous system (CNS), has not been sufficiently studied in the elderly, despite instances of late-onset MS. Regulatory T (Treg) cells play an ameliorative role in MS. Given that the aged immune system exhibits accumulated peripheral Treg (pTreg) cells, the role of Treg cell in aged MS patients remains to be elucidated. Methods: We immunized young and aged mice to induce EAE and investigated the disease courses and Treg cell associated mechanisms. Results: We found that the aged mice have two types of late-onset EAE. In Type I, EAE onset was delayed in the age mice, but the disease became more severe once after onset; Alternatively, in type II, some aged mice never developed into as severe symptoms as the young mice until a second antigen challenge was given, which led to more progressive disease courses than their young counterparts. This phenotype was potentially associated with a lower proportion of CNS-specific Treg cells in the aged CNS, even though the aged mice had a high proportion of polyclonal pTreg cells. Transient inhibition of polyclonal pTreg cells partially ameliorated the disease severity in the aged mice, accompanied with increased CNS-specific Treg cells in the CNS. Conclusions: Therefore, we suggest that accumulated polyclonal pTreg cells in the aged periphery are detrimental for CNS repair processes during neuronal inflammation in aged MS mice, potentially due to hampering trafficking of CNS-specific Treg cells into the CNS.

Scholarly Review of Case Studies: Disparities in the Clinical Presentation of Skin Lesions and the Severity of the Etiology in Pediatric Patients

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC622

Presenter Name: Evelyn Gartstein

Authors:

Evelyn Gartstein ^{1*}

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: Skin lesions in the pediatric population derive from a variety of etiologies, such as infection, atopic diseases, and oncological disorders. Many conditions can present with cutaneous manifestations with similar features, although some underlying causes have malignant origins and warrant rapid confirmation of the diagnosis. Acute leukemia is the most common cancer in childhood. Infants can frequently present with leukemia cutis, prior to bone marrow invasion; however, genetic analysis of the presenting skin lesions can confirm features that aid in identifying the diagnosis and initiating proper treatment. Case Presentation: A 5-month-old girl presents with a diffuse cutaneous eruption and a solitary plaque and physical exam revealed no concerning abnormalities, such as hepatosplenomegaly or lymphadenopathy, and the complete blood count was normal. The conclusion that the presenting lesions were related was made and the initial diagnosis was urticaria pigmentosa, based on the unremarkable exam and lab features. However, a pathological exam and genetic analysis of the skin lesions revealed a diagnosis of AML with a translocation of the MLL gene at chromosome 11q23. The bone marrow aspirate did not meet the full criteria for an AML diagnosis. Although the patient initially presented healthily and her bone marrow showed rare blast cells, the patient suffered from progressive cutaneous and CNS involvement and passed away. Conclusions: The features of this case, through scholarly review, illustrate the importance of thorough diagnostic testing for cutaneous conditions in young patients, as well as retaining malignant causes within one's differential.

Scholarly Review of Case Study: “Recovery of a 16-Year-Old Girl from Trauma and Burns after a Car Accident”

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC576

Presenter Name: Louisa Weindruch

Authors:

Nicole Huettnner ¹

Louisa Weindruch ^{2 *}

Samuel Selby ³

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Scholarly Review of Case Study: “Recovery of a 16-Year-Old Girl from Trauma and Burns after a Car Accident” Louisa Weindruch M.S. 2, Nicole Huettnner M.S. 2, Dr. Sam Se by, D.O. In this project, we conducted a review of a case study from the New England Journal of Medicine as part of the 2020 Virtual Pediatric Research Program. The case details the medical management of a 16-year-old female who suffered both severe, full-thickness burns and a traumatic brain injury resulting from a motor vehicle accident. Our presentation aims to highlight important aspects of her care, which ultimately resulted in a positive outcome. We also discuss some of the nuances and challenges involved in caring for a patient with multi-system injuries. Lastly, we hope that our project can be an example of how students can engage in scholarly activities virtually and benefit from the analysis of case studies.

Scholarly Review of NEJM Case Study of Amniotic Fluid Embolism

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC593

Presenter Name: Jessica Aird

Authors:

Jessica Aird ^{1 *}

Anjali Patel ²

Matthew Mitts ³

Melanie Lagomichos ⁴

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: Amniotic Fluid Embolism (AFE) is an unpredictable and rapidly-progressing obstetric emergency producing acute cardiovascular, hemodynamic and hematologic abnormalities. The annual incidence of AFE is difficult to determine but is estimated to be anywhere from 1 in 8,000 to 1 in 80,000 deliveries. Case Presentation: A 35-year-old African American G4P1021 female presented to labor and delivery at 36.4 weeks gestation for planned cesarean section. During the course of the pregnancy, she was diagnosed with an anteriorly placed placenta and complete placenta previa, and was evaluated twice for vaginal bleeding. Shortly after delivery of a healthy infant, the uterus became blanched with minimal bleeding. The patient became unresponsive and was noted to be in pulseless electrical activity with normal sinus rhythm on the monitor; resuscitation measures were initiated. Hysterectomy was required to control uterine hemorrhage. Transesophageal echocardiogram showed acute right ventricular failure and labs were consistent with disseminated intravascular coagulopathy. To increase preload and cardiac contractility and decrease afterload, inotropic agents and inhaled nitric oxide were administered. She received pRBCs (15 units), FFP (15 units), platelets (18 units) and cryoprecipitate (500 mL) to address her blood loss and coagulopathy. Tranexamic acid was also administered to prevent fibrin degradation. The patient stabilized in the cardiac surgical ICU and continued to show improvement, culminating in her discharge on postoperative day 5. Conclusions: This case illustrates a favorable outcome following a rare, commonly fatal, occurrence of AFE in a highly complicated pregnancy.

Self-Management Program for Brain Health

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC438

Presenter Name: Roslin Jose

Authors:

Roslin Jose ^{1*}

Sr jaa Kannan ²

Sarah Ross ³

Mary Quiceno ⁴

Jennifer Severance ⁵

Submission Type: Non-Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: Faculty / Staff (Not for Competition)

Abstract: Purpose: While developing dementia may be unavoidable, various factors contribute to its onset including lifestyle choices. The purpose of this study is to implement a program supporting lifestyle changes to improve brain health and cognitive functioning with hopes of preventing or delaying dementia. Methods: Health coaching, education and targeted assessments with feedback will be used to provide a personalized approach to addressing brain health. Inclusion criteria: ≥ 18 years old without dementia or uncontrolled psychiatric illness. Participants can choose to receive health coaching through a digital tool or in-person. They will complete assessments for each of the pillars of Brain Health: Diet, Exercise, Social Engagement, Cognitive Activity, Sleep, Mindfulness & Outlook, and General Health. Demographics, motivation to change and cognitive status will also be assessed. Health coaching will last 3 months with assessments for the pillars given 3 months before starting, at the start, at the end, and 3 months after completion. We will evaluate scores for each assessment at various points in time for improvement or other trends. Results: This program is in the beginning stages of implementation. Conclusion: This self-management program intends to promote lifestyle changes that will reduce the risk of developing dementia. If individuals make improvements in the seven pillars, they can expect optimization of cognitive functioning and risk reduction for developing dementia. Clinical implications include the development of an evidence-based program for addressing risk factors for dementia with potential for preventing or delaying its onset.

Severe Hyponatremia Secondary to Escitalopram Therapy: A Case Study

Research Area: Pharmacology

Abstract ID: UNTHSC498

Presenter Name: Hadia Aziz

Authors:

Hadia Aziz ^{1 *}

JD Escobedo ²

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Hyponatremia secondary to syndrome of inappropriate antidiuretic hormone (SIADH) secretion is a well-known complication of selective serotonin reuptake inhibitors (SSRI), however it is rarely seen with the new generation SSRIs. There have only been fifteen reported cases of hyponatremia with the newest SSRI, escitalopram. Case Presentation: A 77-year-old female was admitted to the hospital for altered mental status and hyponatremia. Her past medical history was significant for anxiety treated by escitalopram oxalate 10 mg daily. Patient reported increased weakness and use of walker due to recent history of falls. On exam, she was communicating slower than her baseline but otherwise speech, memory, and orientation seemed unchanged. Mucous membranes were dry and skin tenting was present. A diagnosis of SIADH was made based on clinical findings, laboratory findings of severe hyponatremia, hypotonicity, elevated urine osmolality, and after ruling out other causes of hyponatremia due to normal renal, adrenal, and thyroid function. Patient's SIADH was attributed to the escitalopram she was started on for anxiety fourteen days before admission. After treatment, patient was asymptomatic and discharged with a sodium level of 121 mEq/L. Repeat sodium levels were 130 mmol/L eleven days after discharge and patient was started on mirtazapine for anxiety. She has had no episodes of hyponatremia since discontinuing escitalopram. Conclusion: Physicians should be aware of SIADH development secondary to SSRIs in the elderly even with new generation SSRIs such as escitalopram. Electrolytes should be monitored regularly, especially in the first two weeks after starting the medication.

Severe Salt Wasting in a 16-day-old Male

Research Area: Other

Abstract ID: UNTHSC673

Presenter Name: Mi Sun Bae

Authors:

Mi Sun Bae ¹

Luke Cienlonko ²

Luke Hamilton ^{3*}

Tyler Hamby ⁴

Don Wilson ⁵

Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Severe salt-wasting X-linked Adrenal Hypoplasia Congenita (X-AHC) is a rare cause of severe salt-wasting in affected males. We present a 16-day-old non-Hispanic male who experience marked hyponatremia and hyperkalemia, initially thought to have 11-hydroxylase congenital adrenal hyperplasia (CAH). A 16-day-old male was born at term following an uncomplicated pregnancy, labor and delivery. Because of poor feeding, electrolytes were ordered which revealed severe electrolyte imbalance. The child was assumed to have CAH due to elevation of cortisol precursors. He was treated with IV glucocorticoid and remained on IV fluids until his electrolyte balance and acidosis were corrected. These were replaced by oral glucocorticoid and mineralocorticoid, and salt supplementation was given orally. Once able to tolerate oral intake, IV fluids were tapered and discontinued. Based upon the family history, genetic testing was ordered, revealing a mutation in NROB1, consistent with a diagnosis of X-AHC. X-AHC may be misdiagnosed as CAH: a rare disorder caused by a genetic mutation on the NR0B1 gene, is estimated to occur in 1:140,000 to 1:1,200,000 live births. Initial treatment of CAH and X-AHC are similar. Both require mineralocorticoid and glucocorticoid replacement. However, misdiagnosis may lead to life threatening electrolyte abnormalities following withdrawal of mineralocorticoid therapy in infants thought to have 11-OH-lase deficiency. Although much less common than CAH, corrected identification of X-AHC allows proper management, appropriate genetic counseling, and anticipation of concomitant and future co-morbidities associated with X-AHC.

Sex Differences in the Oxidative Stress and Inflammation Response During and After Simulated Hemorrhage in Humans

Research Area: Cardiovascular

Abstract ID: UNTHSC610

Presenter Name: Haley J. Barnes

Authors:

Haley Barnes ^{1 *}

Alexander Rosenberg ²

Garen Anderson ³

My-Loan Luu ⁴

Caroline Rickards ⁵

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: UNT System College of Pharmacy Student

Abstract: Introduction: Hemorrhage (i.e., massive blood loss) induces an oxidative stress and inflammatory response that can persist even following hemostasis and resuscitation. In this study, we hypothesized that young males would elicit a greater oxidative stress and inflammatory response compared to young females, both during and after simulated hemorrhage. Methods: Healthy human subjects (10F; 10M) participated in a presyncopal lower body negative pressure (LBNP) protocol (simulating hemorrhage). Stroke volume was estimated as a marker of central hypovolemia (indexed to body surface area). Venous blood samples were collected at baseline, at the onset of presyncope, and 60-min into recovery ("resuscitation"). The oxidative stress and inflammation response were assessed via measurement of circulating F2-Isoprostanes (F2-IsoP) and interleukin (IL)-6 and IL-10. Results: LBNP tolerance time was similar between male and female subjects (Males, 1592±124 s vs. Females, 1437±113 s; P=0.37), and stroke volume index decreased by a similar magnitude at presyncope (Males, -50.2±6.3% vs. Females, -49.4±3.2%; P = 0.87). There was no effect of time or sex on the %Δ [F2-IsoP] during or after LBNP (P≥0.12). However, male subjects exhibited a greater increase in both the %Δ [IL-6] and %Δ [IL-10] compared to female subjects at the 60-min recovery time point (IL-6: Males, 101.4±138.9% vs. Females, 12.3±34.0%; P=0.06. IL-10: Males, 71.1±133.3% vs. Females, -2.2±11.8%; P=0.06). Conclusion: These data suggest there may be a sex difference in the inflammatory response to blood loss and subsequent fluid resuscitation.

Sexual Dimorphism Within Dental Microstructure

Research Area: Structural Anatomy

Abstract ID: UNTHSC427

Presenter Name: Sara Aldeeb

Authors:

Sara Aldeeb ^{1 *}

Emma Handler ²

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Purpose: A general pattern of sexual dimorphism is displayed across humans. Many males generally have a larger body than females. This dynamic has also been demonstrated within the oral cavity. For example, on average, many males have larger teeth than females. However, despite clear gross dental size differences, some studies have suggested that males and females also exhibit divergent quantities of enamel. This study aims to contribute to the growing body of evidence suggesting sexual dimorphism exists in the microstructure of human dentition. Moreover, this study will develop a protocol for sectioning human dentition in order to quantify enamel and dentin volumes using computerized tomography (CT) scans. Methods: Skeletal CT scans from adult subjects were loaded onto 3D slicer; a 3D visualization software. The CT scans were digitally segmented to measure volumetric areas of dental microstructure within each tooth bilaterally. Results: Measurable differences are present in gross dental size and quantities of dental microstructure between sexes. Preliminary data has demonstrated that males exhibit less relative enamel compared to females. A protocol for sectioning human dentition in order to quantify microstructure volumes utilizing CT scans was also generated. Conclusion: Sexual dimorphism exists not only in the size of human teeth but also within their enamel substrate. This protocol will aid future studies in a guided protocol to continue to grow evidence of sexual dimorphism within the oral cavity.

SLOW RECOVERY OF CEREBRAL PERFUSION DURING HYPOTENSION IN ELDERLY HUMANS

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC530

Presenter Name: Kulsum Abdali

Authors:

Kulsum Abdali ^{1 *}

Xiaoan Chen ²

Ming Cai ³

Sarah Ross ⁴

Sandra Davis ⁵

Zhengyang Zhou ⁶

Xiangrong Shi ⁷

Submission Type: Oral Presentation

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: Purpose: Aging affects the cardiovascular function. This study tested the hypothesis that aging diminishes cerebral perfusion during hypotension challenge. Methods: Healthy elderly (n=13) and young (n=13) adults signed a consent form that was approved by IRB at UNTHSC. Heart rate (HR), mean arterial pressure (MAP), and cerebral blood flow velocity of the middle cerebral artery (VMCA) were continuously measured during systemic hypotension, which was induced by rapid-deflation of bilateral thigh-cuffs after 3-min supra-systolic occlusion. This hypotension elicited a transient-decrease in VMCA (Δ VMCA) and a reflexive-increase in HR (Δ HR). Time duration reaching the nadir of MAP and VMCA (T0) and the rate of the recovery response (TR) were compared between the groups. Results: Cuff deflation after occlusion to the legs significantly decreased MAP (Δ MAP) which elicited significant hypoperfusion to the brain in both groups. Although Δ MAP and Δ VMCA were not statistically different between the groups, both T0 and TR for MAP and VMCA were significantly longer in the elderly group. T0 and TR were shorter for Δ VMCA than Δ MAP, suggesting the presence of cerebral autoregulation, which evoked an early recovery of Δ VMCA from its nadir, and also explained an early completion of VMCA recovery before MAP restoration. In addition, the rates of Δ MAP and Δ HR during recovery were diminished with aging, which explained a prolonged recovery of cerebral perfusion. Conclusion: We conclude that aging diminishes the function of maintaining cerebral perfusion during hypotension, which is associated with age-impaired cerebral intrinsic factor and systemic function.

Smooth Muscle Contraction Is Regulated by Chloride Channels: Functional Evidence for TMEM16A in Porcine Coronary Arteries

Research Area: Cardiovascular

Abstract ID: UNTHSC561

Presenter Name: Gregory M. Dick

Authors:

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Johnathan Tune ²

Submission Type: Non-Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: Faculty / Staff (Not for Competition)

Abstract: Purpose: Contraction of coronary smooth muscle is influenced by ion channels controlling membrane potential (E_m) and Ca^{2+} influx. A great deal of attention has been focused on K^+ channels, as their opening makes E_m more negative, reduces Ca^{2+} , and causes relaxation. We investigated ion channels whose opening would depolarize E_m , increase Ca^{2+} , and promote contraction. A candidate for study is TMEM16A, a Ca^{2+} -activated Cl^- channel expressed in a variety of smooth muscles. We tested the hypothesis that drugs which influence TMEM16A would alter contraction. We predicted that contraction would be enhanced by a TMEM16A activator (Eact), whereas it would be attenuated by a TMEM16A inhibitor (T16Ainh-A01). Methods: We used isometric tension recording methods on epicardial coronary artery segments from domestic swine. Contractions to K^+ were recorded before and after treatment with 5 μM Eact or 5 μM T16Ainh-01. Extracellular K^+ was varied by adding K-gluconate, rather than KCl, to keep Cl^- constant. Results: K^+ contracted rings with an EC_{50} of 19.1 ± 0.6 mM and a maximum of 11.8 ± 1.4 g. Drug vehicle had no effect on EC_{50} or maximum. Eact shifted contraction to the left (17.8 ± 0.9 mM; $P < 0.05$) but did not affect the maximum ($105 \pm 3\%$ of control). T16Ainh-A01 shifted contraction to the right (20.4 ± 0.6 mM; $P < 0.05$) but did not affect the maximum ($90 \pm 1\%$ of control). Conclusions: These data suggest that TMEM16A is expressed in porcine coronary arteries and influences electromechanical coupling.

Sorafenib loaded In-situ Self-Assembling Nanoparticle: A novel approach to increasing oral bioavailability

Research Area: Pharmaceutical Sciences

Abstract ID: UNTHSC618

Presenter Name: Jaylen Mans

Authors:

Jaylen Mans ^{1 *}

Xiaowei Dong ²

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: GSBS Student

Abstract: Purpose: Sorafenib (SFN), a multi-kinase inhibitor, has demonstrated potent anticancer activity. However, the efficacy of orally administered SFN is limited due to its poor water solubility, leading to low absorption and bioavailability. The novel nanotechnology, In-situ Self-assembling Nanoparticles (ISNP), has shown potential to overcome low solubility in complex drug candidates. The objective of this study was to investigate ISNP nanotechnology as an approach to overcome low solubility and bioavailability of orally administered SFN. Method: SFN-ISNP granules were prepared using D- α -tocopheryl polyethylene glycol 1000 succinate (TPGS), Miglycol-12, Aeroperl-300, and SFN powder. SFN-ISNPs were characterized by particle size, drug loading (DL), entrapment efficiency (EE%) and physical structure using DLS, HPLC, and DSC analytical methods. SFN-ISNP granules were orally administered to rats, and the SFN concentrations in blood plasma and tissues were measured using LC-MS. Results: In-vitro characterization of SFN-ISNPs resulted in particle size of 181 ± 24 nm, PDI < 0.28, DL of $8.825\% \pm 0.36\%$ and EE% of >99.9% (n=4). DSC analysis indicated SFN was present in an amorphous physical state within the granule. The pharmacokinetic study results demonstrate that the ISNP nanotechnology significantly increased bioavailability. Peak plasma concentration of SFN-ISNP granules resulted in 4.5-fold increase compared to SFN powder. Biodistribution results indicate that SFN-ISNP granules significantly increased SFN distribution to tissue. Conclusion: The novel ISNP drug delivery technology is a promising innovation that has demonstrated an ability to increase drug absorption and bioavailability of orally administered SFN.

Spatial Transcriptomics of Supraoptic Nucleus and Paraventricular Nucleus of the Hypothalamus in the Adult Rat

Research Area: Integrative Physiology

Abstract ID: UNTHSC452

Presenter Name: Dianna H. Nguyen

Authors:

Dianna Nguyen ^{1 *}

Nicole Hales ²

Joseph Cunningham ³

Submission Type: Oral Presentation

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: Dual Degree Student

Abstract: Purpose: Magnocellular neurosecretory cells (MNCs) in the supraoptic nucleus (SON) and paraventricular nucleus (PVN) of the hypothalamus release oxytocin (OXY) and arginine vasopressin (AVP) into the peripheral circulation, playing a key role in the regulation of body fluid homeostasis. Transcriptomics of MNCs have been studied; however, the data lack spatial context important for better understanding physiological functions of genes. Our study leverages spatially-resolved transcriptomics to address this limitation. Methods: 10x Genomics' Visium Spatial Gene Expression was used to obtain spatially-resolved gene expression data for SON and PVN of an adult male Sprague-Dawley rat. Briefly, the workflow includes: 1) sample preparation (section, mount, stain, and image tissue), 2) cDNA library preparation, 3) sequencing, and 4) analysis/data visualization. Results: Gene cluster analysis successfully differentiated myelinated fiber tracts from nuclei and identified several distinct neuronal populations. Clusters overlaying fiber tracts contain glia-specific markers (e.g., Mbp and Gfap), and those overlaying SON and PVN regions contain neuron-specific markers (e.g., Syn1 and Nrgn). SON clustered with magnocellular PVN, while parvocellular PVN was a different cluster. Differential expression analysis of these two clusters revealed relevant genes for the distinct regions and neuronal subpopulations in the top 20 globally distinguishing genes (e.g., Avp and Oxt for SON and magnocellular PVN cluster and Trh for parvocellular PVN cluster). Conclusions: This data allows us to obtain whole transcriptomic data without sacrificing morphological context. Future spatial transcriptomic studies will investigate transcriptomics of MNCs related to sex differences and disease models that can potentially inform pathophysiology.

Stiff Person Syndrome and Osteopathic Manipulative Medicine as a Treatment Modality: A Case Study

Research Area: Physical Medicine / OMM

Abstract ID: UNTHSC570

Presenter Name: Rupali Gautam

Authors:

Rupali Gautam ^{1*}

Sanober Khawaja ²

James Aston ³

Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Stiff-person syndrome (SPS) is a rare autoimmune and neurological condition characterized by progressive muscle stiffness, rigidity, and painful muscle spasms of the trunk and limbs, impairing mobility. The goal of treatment is to control symptoms and improve mobility and function. Patients often require a combination of therapies, including medications and physical therapy. However, the application of osteopathic manipulative treatment (OMT) has yet to be explored in such patients. Case Information: We present a case of a 41-year-old, White female who sought treatment at the Osteopathic Manipulative Medicine clinic for her worsening full-body and respiratory spasms and decreased mobility related to her SPS. The patient reported a medical history of SPS, Postural Orthostatic Tachycardia Syndrome (POTS), Polycystic Ovarian Syndrome (PCOS), Hypothyroidism, Chronic Interstitial Cystitis, Failed Back Syndrome, and an unspecified autoimmune disease. Her past surgical history includes a lumbar fusion, cervical fusion, dilation and curettage, cholecystectomy, appendectomy, and knee arthroscopy. The patient received the SPS diagnosis one-year prior by a neurologist who detected increased GAD-65 antibodies and has since been managed with Clonazepam as pharmaceutical therapy. During OMT sessions, she exhibited full-body spasms that lasted up to one minute. Following subsequent OMT appointments, fewer spasmodic events have been noted. After 6 months of OMT, she has noticed reduced spasm frequency. Conclusions: This case illustrates the potential benefits of OMT for patients with SPS. Further treatment and follow-up are necessary to understand the long-term prognostic impact of OMT on functionality.

Store-operated calcium entry mediated high glucose-induced podocyte injury and mitochondrial impairment

Research Area: Integrative Physiology

Abstract ID: UNTHSC613

Presenter Name: Yu Tao

Authors:

Yu Tao ^{1 *}

Sarika Chaudhari ²

Parisa Yazdizadeh Shotorbani ³

Rong Ma ⁴

Submission Type: Oral Presentation

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Purpose: Diabetic Nephropathy (DN) is a major complication of diabetes mellitus, a metabolic disease initiated by high glucose (HG). Podocyte injury is associated with progression of DN. However, the mechanisms underlying podocyte injury induced by HG is poorly understood. Store-operated calcium entry (SOCE) is a multifunctional signaling pathway in many cell types. However, its role in podocyte injury in DN is not known. The aim of the present study was to determine if SOCE mediated HG-induced podocyte injury by impairing mitochondria. Methods: Immortalized human podocytes were used for all experiments. Western blot was conducted to evaluate protein abundance of Orai1 (the channel protein mediating SOCE) and nephrin (a podocyte specific protein). Calcium imaging was used to analyze SOCE. TMRE fluorescence was used to probe the mitochondria membrane potential (MMP). Results: HG (25mM) treatment for time periods ranging from 2 to 12 hours significantly increased Orai1 protein abundance. This HG effect was dose dependent. Consistently, Ca²⁺ imaging showed that HG (25 mM for 12 hours) significantly enhanced SOCE. Furthermore, the protein abundance of nephrin decreased in podocytes exposure to HG (25 mM), indicating podocyte injury by ambient HG. BTP2 (4 μ M), a selective SOCE inhibitor blunted the HG-induced nephrin reduction. Moreover, HG (25 mM for 24 hours) decreased MMP, indicating mitochondria damage by HG. The MMP decrease was prevented by BTP2, suggesting the contribution of SOCE to the detrimental effect of HG. Conclusion: An upregulated SOCE contributes to HG-induced podocyte injury, possibly by impairing mitochondrial function.

Store-Operated Calcium Entry regulated IL6 expression and matrix proteins in glomerular mesangial cells

Research Area: Cell & Molecular Biology

Abstract ID: UNTHSC559

Presenter Name: Sarika Chaudhari

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Sarika Chaudhari ^{1 *}

Yu Tao ²

Parisa Yazdizadeh Shotorbani ³

Rong Ma ⁴

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: Postdoctoral Fellow

Abstract: Background: Glomerular mesangial cells (MCs) produce various cytokines in response to multiple stimuli. MCs also contribute to matrix expansion in kidney diseases. The aim of this study was to determine whether interleukin-6 (IL6) participated in matrix protein turnover and if Orai1-mediated store-operated calcium entry (SOCE) in MCs regulate IL6. Methods: In cultured human MCs, expression of target proteins was examined in culture media and whole cell lysates using ELISA and Western blot analysis, respectively. Overexpression of IL6 was achieved using the expression plasmid for IL6 while knockdown of Orai1 using Orai1 siRNA. Orai1 in MCs was knocked down using the targeted nanoparticle-siRNA delivery system in wild type C57BLKS/J mice at the age of 16 weeks. Glomerular IL6 expression was evaluated using immunohistochemistry of kidney sections. Results: In human MCs, overexpression of IL6 and its receptor decreased the abundance of fibronectin and collagen type IV in MCs. Thapsigargin (activator of SOCE, 1 μ M) significantly increased IL6 level in supernatant media and in whole cell lysates of MCs at 15 hrs, and this effect was attenuated by GSK 7975A (selective inhibitor of SOCE). Inhibition of NF κ B pathway significantly blunted the thapsigargin-induced increase in IL6 protein abundance. Moreover, thapsigargin stimulated the nuclear translocation of p65 in human MCs. IL6 expression was reduced in the glomeruli of the mice treated with nanoparticle/Orai1 siRNA for 2 weeks compared to control mice. Conclusion: SOCE positively regulates IL6 production by MCs through activation of NF κ B pathway and IL6 in turn inhibits matrix proteins.

STUDENT PHARMACIST PERCEPTIONS OF A TRANSITION TO A VIRTUAL CURRICULUM AND MENTAL HEALTH IMPLICATION

Research Area: Education

Abstract ID: UNTHSC690

Presenter Name: Katherine Muilenburg

Authors:

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Crystal Howell ²

Annesha White ³

Luis Garcia ⁴

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmacotherapy

Classification / Affiliation: UNT System College of Pharmacy Student

Abstract: Purpose The primary aim of this study was to assess student pharmacist satisfaction with the emergent transition to a remote pharmacy curriculum in the setting of a national pandemic. Methods This was a descriptive, cross sectional study conducted in Fall 2020. An email invitation was sent to an academic leader at each of the pharmacy schools in the United States to have students participate in a survey based on virtual learning changes, potential barriers to success, future solutions, mental health implications, and including a validated stress survey. Descriptive and inferential statistics were used to analyze data. Results A total of 488 students responded to the survey. Overall, the majority were from CDC regions 2, 5 and 6, female (78%), between the ages of 25 and 30 years (68%) and racially and ethnically diverse. The majority of students (68%) reported having to change their study habits and 68.5% reported their grades were affected by the transition. Feelings of isolation were reported by 62% and motivation to study decreased by 76.8%. There was a statistically significant decline in mental health for each question of the adapted Perceived Stress Scale. Conclusion As pharmacy educators and student pharmacists continue to evolve with the pandemic, the results of this study provide insight into barriers to success within a pharmacy curriculum and potential solutions post-pandemic. In addition, this study highlighted that mental health resources and advocacy will continue to be crucial to student pharmacist success.

Suppression of Adaptive Immunity by *Borrelia burgdorferi*: An Investigation of Bacterial Immune Avoidance Mechanisms

Research Area: Immunology

Abstract ID: UNTHSC575

Presenter Name: Megan Williams

Authors:

Megan Williams ^{1 *}

Yan Zhang ²

Michael Allen ³

Submission Type: Oral Presentation

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose: Infection with *Borrelia burgdorferi*, the causative agent of Lyme Disease, induces broad suppression of the host adaptive immune response. It has been shown that germinal centers form in the lymph nodes shortly after infection, but then collapse after one month. Additionally, when a group of *Borrelia*-infected mice were given an influenza vaccine, they mounted a significantly abrogated influenza-specific antibody response when compared to an uninfected group that received the same vaccine. A better understanding of how *B. burgdorferi* manipulates host immunity can help enhance serological testing for Lyme Disease. We aim to characterize how this suppression of host immunity changes over the course of infection with *B. burgdorferi*. Methods: We will randomly assign mice to 5 groups (n=4). One group will be inoculated with the Vanguard H3N2/H3N8 canine influenza virus (CIV) vaccine. The remaining 4 groups will be infected with *B. burgdorferi* and will receive the CIV vaccine at Day 0, 7, 28, and 45 post-infection. The CIV-specific antibody response will be measured using enzyme-linked immunosorbent assays (ELISA) at different stages of infection with *B. burgdorferi*. Results: This study has not yet been completed. The CIV bivalent vaccine was shown to be safe and with no adverse effects when tested in 15 BALB/cByJ mice. Conclusion: Although conclusions cannot yet be drawn, preliminary evidence demonstrates that the Vanguard CIV bivalent vaccine is safe for use in mice and may be used to address our question regarding the duration of *Borrelia*-induced immune suppression.

Surgical Treatment of Acromioclavicular Dislocations: A Scoping Review

Research Area: Other

Abstract ID: UNTHSC711

Presenter Name: Jennifer Beal

Authors:

Jennifer Beal ¹

Jake Powell ²

Apollo Tran ^{3*}

Submission Type: Competition Poster

Department: Other

Classification / Affiliation: TCOM DO Student (1st Year)

Abstract: Background. While AC joint dislocation accounts for 3.2% of all shoulder injuries, there is still debate on the optimal surgical approach. Over 150 surgical variations have been proposed for AC joint reconstruction. The literature for reconstruction varies widely by technique and focus of analysis, focusing on either clinical or biomechanical studies. Objective. This study aims to clarify research on the most commonly conducted AC joint reconstruction procedures by combining clinical and biomechanical studies into an organized review. In addition, we will identify new procedure designs and evaluate them for possible application in future reconstructive surgeries. Methods. We will complete a literature review to identify biomechanical studies on AC joint fixation using Medline, Scopus, and Excerpta Medica Database (EMBASE) following the 2009 PRISMA statement. Articles will be independently reviewed by at minimum two investigators and any disagreements will be reconciled by consensus in consultation with a third investigator. Results. Analysis of the most commonly performed procedures combines the biomechanical and clinical research associated with each technique. Results are categorized into ligament reconstruction and fixation. Ligament reconstruction pertains to the techniques of Modified Weaver-Dunn, autograft, and allograft. Fixation techniques will include Hook plate, Coracoclavicular Screw Fixation (Bosworth), Cortical Flip Button (endobutton), and K wire fixation. Conclusion. Past reviews focused solely on clinical or biomechanical aspects of AC joint reconstruction, rarely combining the two fields of study. Our review aims to join the different modes of study to provide a clearer picture of technique outcomes.

Sympathetic Response to Resistance Breathing During Simulated Hemorrhage in Humans

Research Area: Integrative Physiology

Abstract ID: UNTHSC641

Presenter Name: Kenneth Austin Davis

Authors:

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Justin Sprick ²

Victoria Kay ³

Caroline Rickards ⁴

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Background: Resistance breathing increases venous return and stroke volume by amplifying the respiratory pump during inspiration. Breathing with resistance devices augments reflex compensatory mechanisms to improve tolerance to hypovolemic stress, such as hemorrhage. We tested the hypothesis that protection of arterial pressure with resistance breathing during simulated hemorrhage is due to the mechanical effect of the respiratory pump, and not due to increases in sympathetic nervous system activity. Methods: Lower body negative pressure (LBNP) was used to simulate hemorrhage in eight human subjects (4M, 3F; 27.5±1.6 y). Two experiments were conducted (randomized order): 1) a control condition in which ramp LBNP was applied at 3 mmHg/min until the onset of presyncope, and 2) a resistance breathing condition in which the same LBNP protocol was used, but subjects breathed through a resistance device during the final stages of the protocol. Mean arterial pressure and stroke volume were monitored continuously, and blood samples were collected every 5-min for measurement of plasma norepinephrine and epinephrine. Results: There were no differences in the reduction in stroke volume (control, -36.9±13.8% vs. resistance breathing, -33.5±17.1%, P=0.31) or mean arterial pressure (control, -5.5±4.2% vs. resistance breathing, -6.3±7.4%, P=0.63) between conditions. LBNP induced increases in both norepinephrine (P=0.03) and epinephrine (P=0.003), but there was no main effect of resistance breathing on these responses (norepinephrine, P=0.8; epinephrine, P=0.48). Conclusion: These data support the hypothesis that, based on circulating catecholamine responses, resistance breathing has no direct effect on sympathetic drive to compensate for central hypovolemia.

Symptomatic Bradycardia in a KCNQ1 Patient

Research Area: Cardiovascular

Abstract ID: UNTHSC650

Presenter Name: James Warner

Authors:

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Rees Checketts ²

James Aston ³

Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: This case report is about a female that presented with severe weakness due to episodic bradycardia. The patient has a history of familial atrial fibrillation (FAF) from a KCNQ1 mutation treated with ablation in 2008. Is this presentation secondary to known FAF, a result of the ablation, or another unrelated disease process? Case Information: A 38-year-old Caucasian female presented to a standalone ED reporting sudden weakness and fatigue. She was at home when the symptoms caused her to sit on the kitchen floor. During the episode she had no syncope, chest pain, or shortness of breath. The patient's FAF has caused her no symptoms since 2008, when ablation through pulmonary vein isolation occurred. At the ED, ECG revealed sinus bradycardia. All other vitals were normal and chest x-ray was insignificant. CBC, CMP, and troponins were within normal limits, except for low Vitamin D. Cardiology placed a cardiac loop recorder which recorded symptomatic episodes of bradycardia and intermittent pauses. A pacemaker is scheduled for placement. Conclusions: Atrial fibrillation commonly presents with symptomatic tachycardia rather than bradycardia. The KCNQ1 mutation is not known to cause bradycardia. Additionally, bradycardia after a cardiac ablation is more likely to present acutely after the procedure. Evidence of post ablation bradycardia presenting years after the procedure is sparse. Perhaps this presentation is a separate undiagnosed disease entity that may or may not be related to prior treatment and/or as a result of this patient's cardiac history.

Synthesis and Bioactivity of Nitric Oxide Donor and Antioxidant Drug Hybrid

Research Area: Pharmacology

Abstract ID: UNTHSC487

Presenter Name: Sanober Khowaja

Authors:

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Maria Nguyen ²

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Suchismita Acharya ⁴

Submission Type: Competition Poster

Department: North Texas Eye Research Institute

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: In ischemic stroke or peripheral artery disease, there is a blockage of the arteries that results in increased free radicals and cell death. Our goal was to synthesize a hybrid compound SA-9-01 and assess its NO releasing and reactive oxygen species (ROS) scavenging ability using chemical assays. We hypothesize that the hybrid compound will prevent cell death by improving blood circulation and neutralizing ROS.

Methods: SA-9-01 was synthesized using a synthetic procedure similar to a previously designed analog SA-2 and structure was verified by ¹HNMR.

The NO releasing activity was determined using the Griess assay by measuring the total nitrite formation. The xanthine oxidase assay was used to measure the ROS scavenging activity. Results: Compound SA-9 (25 mM) released NO at concentrations between 1.35-1.40 μ M at t=90 mins

sufficient to provide therapeutic activity, while a known NO donor SIN-1 released between 2-15 μ M at same concentration and time point. From the xanthine oxidase assay, the scavenging ratio for SA-9-01 (250 μ M) was about 20-25% at t=100 mins and comparable to previously described

compound SA-2 and Baicalein (the positive control). Conclusion: Compound SA-9-01 was synthesized successfully with the correct chemical

structure and was found to be a tautomer of the first batch SA-9. The Griess assay demonstrated that SA-9 releases physiological level of NO. SA-9-01 also demonstrated ROS scavenging activity. The testing of SA-9-01 in cells is under progress.

Systems Thinking: A Path to Reduce Maternal Pre-Pregnancy Obesity

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC519

Presenter Name: Nihmath Nasiha Pattamanian Sultan Maliq

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Stacey Griner ²

Submission Type: Competition Poster

Department: School of Public Health: Biostatistics & Epidemiology

Classification / Affiliation: School of Public Health Student

Abstract: Background Maternal pre-pregnancy obesity rates have been steadily increasing in the U.S. This issue is of importance because of its linkage with adverse health outcomes for mother and fetus. The impact of pregnancy complications on the quality of life of mothers and children from a life course perspective emphasizes the need to discover organizations that help in reducing this problem. Objective To apply a systems approach to identify ten organizations that provide pre-pregnancy healthcare services, to study their inter-dependency, and their unified function to address maternal pre-pregnancy obesity. Methods Web-based research was used to identify ten organizations that were mapped using the mindomo application based on national-level, state-level, and local-level organizations. Results A few of the identified organizations include The American College of Obstetricians and Gynecologists (ACOG), Women, Infants, and Children nutrition program (WIC), and Acclaim Nurse-Midwives that are inter-related to one another. For example, ACOG's obesity tool kit helps healthcare providers to diagnose obesity and refer patients to the WIC program where they are provided nutrition care and further referred to Acclaim Nurse-Midwives to acquire social support. The identified resources are organized into national, state, and local levels. Conclusion The delivery of preconception care is influenced by a great range of factors on a systemic level. There is a lack of resources that exclusively provide pre-conception care which emphasizes further research and policy changes that may ensure a reduction in pregnancy complications due to pre-pregnancy obesity.

Tai Chi and Cardiovascular Conditions

Research Area: Cardiovascular

Abstract ID: UNTHSC399

Presenter Name: Mersida Kolenovic, SPT

Authors:

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Howe Liu ²

Yasser Salem ³

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Liana Logsdon ⁵

Submission Type: Competition Poster

Department: School of Health Professions: Physical Therapy

Classification / Affiliation: School of Health Professions Student

Abstract: Introduction: Tai Chi is a meditative and low intensity exercise that includes deep diaphragmatic breathing which promotes positive physiologic changes in the cardiovascular system. The purpose of this systematic review is to analyze evidence related to the benefits of Tai Chi pertaining to cardiovascular conditions and recognize the similarities of this intervention in research. Methods: This study includes twelve randomized control trial articles that encompass a variety of cardiovascular conditions. The electronic database utilized includes PubMed. Keywords used include Tai Chi intervention, hypertension, chronic heart failure, coronary artery disease, coronary heart disease, atherosclerosis, and myocardial infarction. Results: These articles discuss hypertension, myocardial infarction, atherosclerosis, coronary heart disease, coronary artery disease, heart failure, and cerebrovascular accidents related to a Tai Chi intervention. Significant improvements were observed in the following outcomes measured: TUG, VO₂peak, 6MWT, endurance tests, blood pressure, arterial stiffness, blood lipid levels, BMI, blood sugar, cognition, Cardiac Health Behavior scale, quality of life scales, and psychosocial self-reports. The most common intervention protocol used in these articles was a 1-hour session of 24-form Yang style Tai Chi for three times a week over a 12-week period. On the other hand, two articles used a similar protocol but implemented these exercises twice a week over a 12 week period and were still able to see significant improvements in cardiovascular function. Conclusion: Overall, this systematic review reveals the significance of Tai Chi as an exercise that will improve cardiovascular function in a population with cardiovascular disease.

Tai Chi and Diabetic Peripheral Neuropathies

Research Area: Rehabilitative Sciences

Abstract ID: UNTHSC396

Presenter Name: Allison Traina

Authors:

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Mersida Kolenovic ²

Liana Logsdon ³

Howe Liu ⁴

Yasser Salem ⁵

Submission Type: Competition Poster

Department: School of Health Professions: Physical Therapy

Classification / Affiliation: School of Health Professions Student

Abstract: Background: Every year about 1.5 million Americans are diagnosed with diabetes. A common and major complication these individuals face is the development of peripheral neuropathies, typically due to uncontrolled glucose levels. The purpose of this systematic review is to identify the benefits of Tai Chi as an exercise intervention to alter peripheral sensation and balance related to neuropathy in diabetic patients. Tai Chi is an ancient Chinese martial art that incorporates elements of balance, strength, postural control, and concentration. Methods: This systematic review examines the effects of a Tai Chi program based on studies from PubMed database within the past 20 years. Each intervention program had varying parameters like numbers of forms, session durations and session frequencies. Results: Six studies show improvement in ankle proprioception, quality of life, glucose control, nerve conduction velocities in legs and arms, vascular reactivity index, plantar sensation, and locomotor stability. Each study had less than 60 participants and a Tai Chi program of at least 8 weeks of Yang, Sun, or Cheng style with progressions at the instructor's discretion. Conclusion: Tai Chi is a beneficial intervention for people with peripheral neuropathy. The six studies showed improvement in glucose control, quality of life, sensation and standing balance components. After thorough analysis, this review exposes several deficits in the existing research. Further studies could control for more balance variables, include larger sample sizes, and investigate the efficacy of specific Tai Chi program parameters.

Tai Chi and Pulmonary Conditions

Research Area: Other

Abstract ID: UNTHSC560

Presenter Name: Liana Logsdon

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Yasser Salem ⁵

Submission Type: Competition Poster

Department: School of Health Professions: Physical Therapy

Classification / Affiliation: School of Health Professions Student

Abstract: Introduction: Tai Chi, a low-intensity exercise, has been found to have numerous health benefits throughout all systems of the body. Due to Tai Chi's focus on controlled breath and diaphragmatic breathing, Tai Chi has been shown to improve pulmonary functions in chronic and acute pulmonary disease such as chronic obstructive pulmonary disease (COPD), asthma, lung cancer, and cystic fibrosis. The purpose of this systematic review is to analyze studies related to Tai Chi intervention for subjects with pulmonary disease in order to compare Tai Chi program parameters. Methods: This systematic review examines how a Tai Chi program can improve lung function, forced expiratory volume of 1 second (FEV1), 6 minute walk distance (6MWD) test results, dyspnea scale measures, and overall sense of well-being. This review utilized random control trials from PubMed database within the past 15 years. Key words used were "Tai Chi," "intervention," "cystic fibrosis," "asthma," "COPD," "lung cancer". Results: Individuals with COPD benefitted most from a Tai Chi program with sessions twice per week for 12 weeks. Two studies showed sustained physiological and subject perceived improvements 12 weeks after completion of Tai Chi program for individuals with COPD. Conclusion: Tai Chi is a beneficial intervention for individuals with pulmonary disease in improving lung function, endurance, and overall sense of well-being. This systematic review revealed that further studies are needed to uncover sustained effects of Tai Chi programs and regarding pulmonary conditions such as adult and pediatric asthma, lung cancer, and cystic fibrosis.

Telehealth Education for Geriatric Populations

Research Area: General Medicine

Abstract ID: UNTHSC433

Presenter Name: Alyssa Wilder

Authors:

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Joseph Jenkins ²

John Gibson ³

Lesca Hadley ⁴

Submission Type: Non-Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Introduction The acceptance and use of telehealth by geriatric patients are a result of many factors, including perceived value, attitude, perceived behavior control, and resistance. Technology anxiety is often a large contributor to the negative reception of telehealth by geriatric patients. Will educational handouts lead to increased usage of telehealth services among geriatric patients? Methods Geriatrics patients were informed about the clinics telehealth services and offered two educational handouts about the telehealth service. The handouts were provided to patients over the course of a month as well as given to the medical assistant for reference when speaking to patients over the phone. The electronic health record was used to record the number of visits. Results The table shows that the number of geriatric patients utilizing the telehealth services decreased from 10.3% to 8.7% during the course of the project. Upon further investigation, the number of telehealth visits for the entire clinic had decreased in the month of August. This appears to be correlated with the declining number of COVID-19 cases in Port Lavaca during this time frame. Conclusions Though the number of telehealth visits decreased, patients felt more informed about what to expect. The medical assistant used the handouts to determine which patients could use the service. For this project the intent was to provide physical handouts could refer to after an in-person visit. Moving forward, it would be beneficial to add the flyers or other instructions to the patient portal, for easy access to all patients.

Telehealth Visit Satisfaction in Geriatric Patients

Research Area: Other

Abstract ID: UNTHSC453

Presenter Name: Mohammad Rashik

Authors:

Mohammad Rashik^{1*}

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Background: COVID-19 pandemic has led to a shutdown in access to healthcare and an increase in the use of telehealth. Surprisingly, the literature lacks the effectiveness, acceptability, and satisfaction of telehealth visits for geriatric patients (patients over 65). The purpose of this study was to explore the opinions of geriatric patients about telephone visits. Methods: This study investigates the satisfaction and acceptability of telehealth visits for 58 geriatric patients at UNTHSC geriatrics clinic. Patients were asked about call quality, sharing sensitive information over the phone, whether a telehealth visit was as good as an in person visit and if they would choose telehealth over in person visits. Questions were rated on a Likert-type scale from 0 to 10 with 0 being unlikely, 10 being very likely and 5 being neutral. Results: Participants were 70.7% females, mostly Caucasian. 62% were extremely satisfied with visit quality and extremely comfortable sharing sensitive information. 33.6% agreed telehealth visits were good as in person visits, while 28.1% disagreed. Patient opinions revealed that they did not want to miss out on the immersive experience of physical interactions with physicians. Lastly, 21.4% were very likely to choose telehealth visits in future whereas 12.5% were very unlikely. Conclusions: Most geriatric patients were satisfied with the quality of the telehealth visit and felt comfortable sharing sensitive information. Majority preferred virtual visits over in person visits. Future research needs to include a more diverse geriatric patient population and also incorporate options for virtual (video and audio) telehealth visits.

Ternary Pseudo-Triphasic Phase Diagram for Lipid Formulation

Research Area: Pharmaceutical Sciences

Abstract ID: UNTHSC500

Presenter Name: Jeanne Dulie Kom Nzia

Authors:

Jeanne Dulie Kom Nzia ^{1 *}

Xiaowei Dong ²

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: UNT System College of Pharmacy Student

Abstract: Purpose: Lipid-based formulations are frequently studied, they improve oral bioavailability of water-insoluble drugs and constitute 40% of new drugs. A ternary pseudo-phase diagram(TPPD) is a thesaurus tool used to define specific physical compositions of a thermodynamically stable solution. The aim of this study was to construct TPPD of lipid-based formulations and identify optimum composition for drug delivery. Method: The aqueous titration experimental method was used. A lipid and surfactant components were mixed in a fixed ratio. No cosurfactant was used. The mixture was heated at 45°C. Water was used as a titer and was added in increment of 5%-10% to up to 95% of the total mixture. After equilibrium, the mixture was observed for characterization. Data were gathered on a table, showing each increment of water, the amount of each component, and the percentage of each component in the mixture. Data collected were used to build TPPD through excel. Result: Comparing one set of 3 phase diagrams(PDs), the PD(Miglyol-812, TPGS, Water) presents a larger area of clear solution(CS), a very small area of microemulsion, and a small area of emulsion. The PD(Miglyol-812, Tween 80, Water) presents a smaller area of CS, a small area of microemulsion, and a larger area of emulsion. The PD(Miglyol-812, K El, Water) presents a small area of CS, a small area of microemulsion, and a large area of emulsion. Conclusion: All PD built present stable area of emulsion and microemulsion that can be reconstituted for optimum delivery.

Testosterone Replacement Therapy: Role in Modulating Oxidative Stress within the Entorhinal Cortex

Research Area: Pharmaceutical Sciences

Abstract ID: UNTHSC518

Presenter Name: Ammaar Tajani

Authors:

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Nataliya Rybalchenko ³

Elizabeth Wilson ⁴

Submission Type: Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: GSBS Student

Abstract: Purpose: Sleep apnea affects approximately a quarter of all Americans, with a higher incidence rate among men. Cognitive impairments are commonly observed. A rat model of sleep apnea, Chronic Intermittent Hypoxia (CIH), exhibits cognitive impairments associated with oxidative stress (OS). The entorhinal cortex (ETC) region of the brain is sensitive to OS and involved in cognition. Our studies show that Testosterone Replacement Therapy (TRT) can protect against CIH-induced circulating OS. However, it is unknown what the impact of TRT is on OS in the ETC. Methods: To address if TRT mitigates OS in the ETC, banked tissue from young adult male F344BN rats were exposed to normoxia (room air) or CIH (8-minute cycles of 5 minutes of 10% O₂ and 3 minutes of 21% O₂). Rats were gonadally intact, gonadectomized, or gonadectomized with TRT. OS was quantified by protein analysis of calpain cleavage of Spectrin and COX2. Since astrocytes can buffer OS, we quantified a marker of astrocytes (GFAP). Kruskal-Wallis non-parametric statistics were used. Results: Our prior results showed increased circulating OS in CIH exposed rats that were mitigated by TRT. Similarly, CIH increased OS in the ETC. However, astrocytes were increased only in TRT by CIH. Conclusion: This study suggests that TRT decreased OS by increasing astrocytes in the ETC. Astrocytes can play neuroprotective roles in the brain by buffering and neutralizing free radicals that lead to OS. TRT may be useful in preventing cognitive impairment associated with sleep apnea.

TGFβ2 induces Chronic Endoplasmic Reticulum Stress in Trabecular Meshwork cells

Research Area: Eye / Vision

Abstract ID: UNTHSC409

Presenter Name: Shruti Patil

Authors:

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Ramesh Kasetti ²

Prabhavathi Maddineni ³

Gulab Zode ⁴

Submission Type: Oral Presentation

Department: North Texas Eye Research Institute

Classification / Affiliation: GSBS Student

Abstract: Purpose:TGFβ2 induced extracellular matrix(ECM)accumulation is known to be associated with glaucomatous trabecular meshwork(TM)damage and IOP elevation. Previously, we have demonstrated that abnormal ECM accumulation leads to endoplasmic reticulum(ER)stress in TM. Here, we investigated whether TGFβ2 induces ER stress in TM cells and whether chronic ER stress plays a pathological role in dysfunction of TM cells. Methods:Primary human TM cells were treated with vehicle or recombinant TGFβ2(5ng/mL) to determine its effect on chronic ER stress markers(GRP78,ATF4 and CHOP)and ECM proteins(Fibronectin and Collagen-I/IV). Chronic ER stress-induced ATF4/CHOP were genetically knocked-down using targeted CRISPR/Cas9 expression plasmids, or by transducing with ad5-ATF4deltaRK that inhibits endogenous ATF4 activity. The effect on IOP of intravitreal gene delivery of active-TGFβ2 viral-vector in Chop-/- and C57BL/6J mice was evaluated. Pharmacological inhibition of ER stress using ATF4/CHOP inhibitor ISRIB and chemical chaperon sodium4phenylbutyrate(PBA) was also determined on TGFβ2-treated TM cells. Results:Westernblot and immunostaining demonstrated that TGFβ2 induced chronic ER stress markers along with increased levels of ECM proteins, suggesting TGFβ2-induced ECM deposition is associated with ER stress. Knockdown of key transcriptional factors, ATF4/CHOP, and ISRIB treatment prevented TGFβ2-induced ECM expression and reduced ER stress in TM cells. Moreover, activeTGFβ2 viral delivery caused no IOP elevation in Chop-/-mice compared to control C57BL/6J mice. Treatment of TM cells with PBA also inhibited TGFβ2-induced fibronectin deposition via induced expression and activation of MMP2/9. Conclusion:This study indicates that TGFβ2 induces chronic ER stress, which is associated with increased ECM accumulation.

The Association of Pain and Sleep in Relation to Depressive Symptoms among Older Adults with Arthritis

Research Area: General Public Health

Abstract ID: UNTHSC634

Presenter Name: Cameron Zie ke

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Noah Peerl ²

Uyen-Sa Nguyen ³

Submission Type: Competition Poster

Department: School of Public Health: Biostatistics & Epidemiology

Classification / Affiliation: School of Public Health Student

Abstract: Purpose: Data from 2013-2015 showed that arthritis affects 54.4 million adults in the US annually, most (59%) are 65 years or older. Chronic pain is a primary symptom of arthritis and may have widespread consequences on an individual's sleep and mental health. Research suggests that sleep and chronic pain may synergistically impact depression. However, to date no study has examined the joint effect that sleep and chronic pain may have on the development of depressive symptoms. Methods: We used data from the 2010-2016 waves of the Health and Retirement Study (HRS). The study included data from 7,310 individuals with arthritis and free of depressive symptoms at baseline (2010). We performed a multivariable-adjusted Cox proportional hazards regression to estimate the hazard ratio for the joint effect of pain and sleep disorder relative to having neither conditions on the development of depressive symptoms (CESD-R \geq 3). We calculated the relative excess risk due to interaction, comparing the joint effect with that of pain alone and sleep disorder alone. Analysis was further stratified by sex. Results: There is evidence of a synergistic effect of pain and sleep on risk of depressive symptoms adjusted-HR(95% CI):2.87(2.80,4.99) When stratified by sex a similar synergistic effect as observed in males. Conclusions: Findings from this study suggest that sleep and pain are synergistically linked to the development of depressive symptoms. Understanding the joint effect of pain and sleep on individuals' increased risk of depressive symptoms can help target treatment options for arthritis patients.

The Effect of COVID19 on the Caregivers of Dementia Patients

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC505

Presenter Name: Eric Whittaker

Authors:

Eric Whittaker ^{1 *}

Jane Oderberg ²

Submission Type: Competition Poster

Department: Institute for Healthy Aging

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose Investigating the effects of COVID19 on caregivers of dementia patients is paramount because of challenges such as limited resources, separation from patient, and neglect of personal health. By evaluating these effects on caregivers we can improve pandemic response to improve healthcare outcomes. This inquiry focused on describing the impact of COVID on caregivers of patients with dementia using survey data. Methods Inclusion criteria selected for caregivers of dementia patients from the UNTHSC Dementia CARES Program in 2019 (Quality Improvement Project). 17 caregivers responded to a survey during summer 2020. Participants rated how often they experienced situations due to COVID changes on a scale of "never" to "nearly always." Responses were analyzed using Qualtrics. Results Results indicate 18% of caregivers felt overwhelmed during COVID. Nearly 25% reported mental health concerns and an equal proportion felt their life would be less challenging without restrictions. Most participants never faced unique financial challenges and reported the availability of services was adequate. 35% reported difficulty attending to personal health needs because of COVID related changes to their caregiving role. Conclusions The results suggest a need to address mental health, personal health, and unique challenges from the pandemic. Financial burden was less of a challenge, however conclusions are limited due to sample size. This investigation is relevant because to treat dementia patients holistically, physicians must address the health of those who influence outcomes. By increasing data and awareness we can improve outcomes for caregiver and patient during future pandemics through quality patient care and policy.

The effect of MIEN1 in promoting invasion and migration in cancer stem cells.

Research Area: Cancer

Abstract ID: UNTHSC538

Presenter Name: Payal Ranade

Authors:

Payal Ranade ^{1 *}

Jamboor Vishwanatha ²

Submission Type: Competition Poster

Department: GSBS: Microbiology, Immunology & Genetics

Classification / Affiliation: GSBS Student

Abstract: Purpose MIEN1 (Migration and Invasion Enhancer 1 – MIEN1), located on chromosome 17q12, encodes a membrane-anchored protein that functions as an oncoprotein in several types of cancers (breast, prostate, oral and colorectal cancer), enhancing the biological processes of migration and invasion. The aim of this project is to evaluate the effect of MIEN1 on migration and invasion in Breast Cancer Stem Cells (BCSCs). Methods BCSCs were isolated from breast cancer cell line MDA MB 231, MDA MB 231 derivatives with varying levels of MIEN1 (A2, A10 and B7), MCF7 and a breast epithelial cell line MCF10A as control. Breast cancer cells were used for spheroid cultures for 21 days, which were used to isolate stem cells. ALDH (Aldehyde dehydrogenase) kit was used to isolate stem cells from spheroid cultures using FACS. Levels of MIEN1 protein will be evaluated by western blot. Results Spheroids with a dense core and loosely attached cells at the periphery were observed in ultra-low attachment 96 well plate after 21 days of seeding. BCSCs were isolated from spheroid cultures of MDA MB 231 and its derivatives A2, A10 and B7 using FACS and the data was analyzed using FlowJo software. MIEN1 protein levels will be checked in the isolated stem cell population using western blot. Conclusions Isolation of BCSCs from spheroid cultures yielded ~1% ALDH positive cells when 4.7×10^5 cells were used for sorting. Cells from 2-D cultures with more than 106 cells, grown in enhanced media, will be used for BCSC isolation.

The Effect of Osteopathic Manipulation Techniques on the Lymphatic System

Research Area: Physical Medicine / OMM

Abstract ID: UNTHSC473

Presenter Name: Madison Parker

Authors:

Madison Parker ^{1 *}

Arthur Williams ²

Robert Mallet ³

Johnathan Tune ⁴

Lisa Hodge ⁵

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: GSBS Student

Abstract: Purpose: Osteopathic manipulation techniques (OMT) have been utilized by osteopathic physicians to treat a variety of conditions. However, the mechanisms by which OMT aides the body in healing are not well understood. The long-term goal of our research is to advance our understanding of the impact of OMT during disease, such as sepsis. The purpose of this study is to develop a large animal model and to establish surgical techniques that will be used in these future studies. We hypothesized that the abdominal lymphatic pump technique (LPT) will enhance thoracic duct lymph (TDL) flow. Methods: The thoracic duct was exposed via thoracotomy then cannulated using an angio-catheter. TDL was collected from 2 swine (1 male, 1 female) during 10-minutes of baseline, 4-minutes of LPT, and 10-minutes post-LPT. TDL flow was measured by timed collection during each condition. TDL was centrifuged to remove the cellular components, and the supernatant was stored for biomarker analysis. Results: TDL flow increased from an average of 1.68 mL/min to 3.25 mL/min during LPT administration. Immunological assays will be performed to identify changes in lymph composition during OMT. Conclusion: In our pilot study, LPT increased TDL flow in both our swine subjects and demonstrated surgical feasibility. In future studies we will study the physiological effects of OMT during sepsis. This knowledge would provide an evidence-based foundation for the use, or contraindication, of OMT during sepsis and aid osteopathic physicians during their therapeutic decision making.

The Effect of Polysubstance Use on Menstrual Cycle Length among Women in a Substance Abuse Recovery Program

Research Area: Health Disparities

Abstract ID: UNTHSC623

Presenter Name: Shweta Sahu

Authors:

Shweta Sahu ^{1 *}

Martha Felini ²

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Previous studies have found chronic conditions such as anemia are prevalent among marginalized women with co-occurring substance use disorders. We hypothesized that illegal drugs (including opioids) alter physiologic processes that impact menstrual cycles and tested whether polydrug use has a significant effect on menstrual cycle length among women in substance abuse treatment. Methods: A cross-sectional analysis was performed on data abstracted from data collected through the cancer prevention project Sound Mind, Sound Body project (2012-2016). The dependent variable was polydrug use which was assessed as both a continuous (number of drugs used) and categorical measure (yes/no). The main independent variable was self-reported average menstrual cycle length (days). Potential confounding variables assessed included age, race/ethnicity, trauma history, and BMI. Chi-square p values and odds ratios (95% CI) were calculated using stratified analysis and logistic regression. Results: A total of 856 women of reproductive age reported a history of polydrug use (66%) and complex trauma (58%). The average cycle length was 5.15 days for polydrug users, and 5.10 days for single drug users. The association between polydrug use and abnormal cycle length was not statistically significant (OR = 1.30, 95% CI: 0.91-1.87, chi-square p value = 0.15). Conclusion: Our study found that while polydrug use is common, it did not significantly alter cycle length compared to single drug users. Patterns of substance use and more robust study design may better shed light on whether abnormal menstrual cycle length stems from polysubstance use.

The Effect of Sex on GABAA Receptor Activation in Vasopressin Neurons from the Supraoptic Nucleus

Research Area: Integrative Physiology

Abstract ID: UNTHSC580

Presenter Name: Courtney Brock

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Martha Bachelor ²

Joel Little ³

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Joseph Cunningham ⁶

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: Postdoctoral Fellow

Abstract: Purpose: Arginine Vasopressin (AVP) is important in maintaining proper fluid balance and plasma osmolality. Disruption in its regulation occurs in patients with chronic heart failure (CHF) and liver failure, which leads to poorer patient outcomes. AVP neurons from the supraoptic nucleus (SON) receive input from GABA, yet it is unknown what effects GABAA receptor activation has on these neurons under pathophysiological conditions or whether the effects are sex-specific. What is known is that under pathophysiological conditions, AVP neurons are unaffected by negative feedback which leads to excessive AVP release. Understanding the role of the GABAA receptor in these conditions is important. Here, we investigate whether activation of the GABAA receptor leads to sex dependent effects. Methods: Adult, intact, Sprague Dawley rats were anesthetized and bilaterally injected with the AAV2-0VP1-ClophensorN virus directly into the SON. After a two-week recovery, the animals were sacrificed and the brains were rapidly removed. Cells from the SON were dissociated and incubated for two hours. After incubation, recordings were taken using ratiometric live cell imaging. Selected neurons were sequentially excited at 445nm and 556nm and then emission data was collected between 500-550nm and 580-653nm respectively. After 40 cycles of 3-second recordings, muscimol (100nM), a GABAA receptor agonist was transiently applied to the cells. Results: In both males and females, application of muscimol resulted in chloride influx, which implies neuronal inhibition. Conclusion: Under normal physiological conditions, GABAA receptor activation does not show sex specific effects in neurons from the SON.

The Effect of Tai Chi on Sleep Quality and Sleep Disorders: A Systematic Review

Research Area: Rehabilitative Sciences

Abstract ID: UNTHSC408

Presenter Name: Joshua Baker

Authors:

Joshua Baker ^{1 *}

Howe Liu ²

Yasser Salem ³

Submission Type: Non-Competition Poster

Department: School of Health Professions: Physical Therapy

Classification / Affiliation: TCOM DO Student (1st Year)

Abstract: Purpose: To identify the effects of Tai Chi (TC) on sleep quality in older adults with or without a medical condition. Methods: Tai Chi, Tai Ji, insomnia, sleep disorder, and sleep problem were used to search for articles in peer-reviewed, English journals from the last 15 within the following databases: PubMed, Medline, and Scopus. Studies that met the initial criteria included subjects older than 18 with a sleeping disorder and included Tai Chi as one of the interventions. Two hundred and ten articles met the initial selection criteria and were further scanned and discussed as needed by 3 reviewers. Following review, 16 studies were qualified. Results: Sleep quality was improved as measured by the Pittsburgh Sleep Quality Index (PSQI) in 14 studies and by the Spiegel Sleep Questionnaire (SSQ) in 1 study in adults without medical conditions, or for those with cancer, sleep apnea, depression, or insomnia. Also, fatigue and quality of life were found to be improved in 4 studies as evaluated by the Brief Fatigue Inventory (BFI) and SF-12 or SF-26. Further, one study investigated the effect of Tai Chi on inflammatory biomarkers in patients with insomnia due to breast cancer and revealed significant inhibition of pro-inflammatory cytokines. The most commonly used TC parameters were 60 minutes per session, 2-7 times per week, with a duration between 3-6 months. Conclusions: TC is an effective program for improving sleep quality in individuals with or without a medical condition.

The Effect of Tooth Loss on Craniofacial Morphology

Research Area: Structural Anatomy

Abstract ID: UNTHSC549

Presenter Name: Andrew Su

Authors:

Andrew Su ^{1 *}

Rex Mitchell ²

Rachel Menegaz ³

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: GSBS Student

Abstract: Tooth loss (edentulism) is known to reduce biomechanical loading of the face, resulting in changes in craniofacial morphology and bone material properties. However, the effect of tooth loss on masticatory muscles and their bony attachments is less clear. We hypothesize that the craniofacial shape changes following tooth loss are related to alveolar resorption in both the mandible and maxilla. We also anticipate a recession of bone at the insertion sites of the masticatory muscles, namely the zygomatic arch and mandibular ramus. CT scans (>50 years) were obtained from the New Mexico Decedent Imaging Database. Edentulous individuals (0 teeth, n=10/sex) were compared to functionally dentate individuals (>22 teeth, n=10/sex). 3D Slicer software was used to collect 3D fixed and sliding landmarks along the mandible and facial skeleton. A general Procrustes analyses (GPA) was run in R Studio, and principal components analyses (PCA) were used to compare the morphology of the two populations. Results show significant differences in facial and mandibular shape between the two groups, driven by resorption along the alveolus. Variation within edentulous individuals suggests that the time since tooth loss and behavioral factors (e.g. denture wearing) may impact the degree of alveolar resorption. Smaller coronoid processes and posteriorly extended mandibular angles were observed in edentulous individuals, suggesting greater relative atrophy of the temporalis muscle relative to the masseter following tooth loss. Future studies will investigate the impact of tooth loss on chewing muscle morphology and force production.

The Effects of Medicaid Expansion on Women's Health

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC492

Presenter Name: Raina Saxena

Authors:

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Sr jaa Kannan ²

Jacqueline Huang ³

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: The purpose of this review is to identify how Medicaid expansion has impacted women's health. Before the expansion, patients from all states could qualify for coverage based on factors such as income, household size, disability, and family status. When certain states expanded Medicaid, this allowed for coverage based solely on income, improving enrollment rates. Methods: A literature search through various journals was utilized using terms such as Medicaid expansion, women's health, and maternal health. The goal was to find resources regarding the intersection between Medicaid, Medicaid expansion, and women's health. Results: In addition to allowing more reproductive-aged women to enroll, Medicaid expansion is associated with an overall increase in coverage, quality of care, and services for women. Specifically, it increased coverage of preconception, perinatal, and postpartum care, while lowering maternal mortality rates. However, the effects of expansion on breast and cervical cancer screening rates is uncertain. Some studies showed an increase in cancer screening rates; however, those that showed no significant change related it to barriers to access and supply of primary care providers available. Conclusions: Medicaid expansion has brought about favorable outcomes in women's health. Overall the number of women eligible for Medicaid coverage in participating states has expanded. It has improved maternal health and mortality and may show positive trends towards increasing cervical and breast cancer screening rates. Further research on variables such as ethnic and racial disparities, access to care, and physician availability may provide further insight into the differences between expansion and nonexpansion states.

The Effects of Methamphetamine on Oxidative Stress Markers in the Brain

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC587

Presenter Name: Delaney Davis

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Submission Type: Oral Presentation

Department: GSBS: Pharmacology & Neuroscience

Classification / Affiliation: GSBS Student

Abstract: In the last decade, prescription stimulants have gained popularity in young adults despite the potential adverse consequences. Amphetamine-like compounds, even at moderate doses, promote the production of reactive oxygen species via dopamine-dependent pathways. We hypothesized that late neurobehavioral deficits were caused by heightened oxidative stress as a response to early chronic exposure to methamphetamine. Four-month-old male and female mice were injected with either saline or methamphetamine twice a day for 4 weeks. After behavioral testing at 9-10 months of age, the mice were euthanized and brain regions were dissected (cortex, cerebellum, hippocampus, striatum, midbrain). These regions were used to measure markers of oxidative stress and dopaminergic function. Preliminary outcomes revealed that dopaminergic function was not majorly affected by methamphetamine treatment, whereas lipid peroxidation levels were increased in the cerebellum of males and in the cortex and midbrain of females. These preliminary results suggest that early chronic methamphetamine administration induced changes in oxidative stress, and more so in the females than the males. These data indicate possible long-term consequences on functional and biochemical changes that will be examined in future studies.

The Effects of TGF β 2 on Uveoscleral Outflow in the Mouse Eye

Research Area: Eye / Vision

Abstract ID: UNTHSC662

Presenter Name: Cooper Stevenson

Authors:

Cooper Stevenson ^{1*}

Abe Clark ²

John Millar ³

Submission Type: Competition Poster

Department: North Texas Eye Research Institute

Classification / Affiliation: GSBS Student

Abstract: Purpose: Elevated intraocular pressure (IOP) is a risk factor for primary open-angle glaucoma (POAG). Transforming growth factor beta-2 (TGF β 2) contributes to POAG pathogenesis via effects on the conventional aqueous outflow pathway. However, its effects on the uveoscleral (unconventional) aqueous outflow pathway, and effects of euthanasia and enucleation on TGF β 2 action, are unknown. Methods: We quantified the impact of overexpression of TGF β 2 on uveoscleral outflow (Fu) in mice. TGF β 2 was overexpressed in left (OS) eyes by intravitreal (IVT) injection with Ad5.CMV.hTGF β 2C226/228S (2×10^{-7} pfu in $2 \mu\text{L}$). Right (OD) eyes were injected IVT with Ad5.CMV.null (same titer/volume). After 14 days IOP was elevated in OS (84.29%, $p < 0.001$). Fu was determined by perfusing the anterior aqueous chamber with FITC-dextran (2.5×10^{-3} M), followed by dissection of eyes into component tissues and measurement of each sample's fluorescence. Fu was inferred using a standard curve. Living animals, euthanatized animals, and enucleated eyes (exposed to air or submerged in PBS) from euthanatized animals were studied. Results: Fu was reduced in vivo in OS ($0.0048 \pm 0.0017 \mu\text{L/min}$) vs. OD ($0.0987 \pm 0.0126 \mu\text{L/min}$, $p = 0.025$). In euthanatized mice, Fu was reduced in OS ($0.0215 \pm 0.0101 \mu\text{L/min}$) vs. OD ($0.1543 \pm 0.0241 \mu\text{L/min}$, $p = 0.010$). In ex-vivo eyes exposed to air, Fu was reduced in OS ($0.0702 \pm 0.0087 \mu\text{L/min}$) vs. OD ($0.1377 \pm 0.0106 \mu\text{L/min}$, $p = 0.008$). In ex-vivo eyes submerged in PBS, there was no difference between OS ($0.0222 \pm 0.0065 \mu\text{L/min}$) and OD ($0.0137 \pm 0.0078 \mu\text{L/min}$, $p = 0.175$). Conclusions: This study quantifies TGF β 2 effects on uveoscleral outflow, providing insight on the effects TGF β 2 has on POAG pathophysiology.

The Genetic Link between Phocomelia, Endometrial Stromal Sarcoma and Dysplastic Marrow: A Case Study

Research Area: Cancer

Abstract ID: UNTHSC467

Presenter Name: Laura M. Garcia

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Tyler Hamby ²

Richard Howrey ³

Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Phocomelia is a malformation of the upper limbs, which can occur from various causes such as genetics, spontaneous mutation, and in utero teratogenic exposure (e.g., thalidomide). It is often associated with other congenital malformations. Myelodysplastic syndrome (MDS) signifies ineffective hematopoiesis. Patients are often asymptomatic and diagnosed through an incidental finding. However, there is risk of progression to myeloid leukemia for which a bone marrow transplant is needed for cure. Endometrial stromal sarcoma (ESS) is a rare, malignant uterine tumor most often seen in women 40 to 55 years of age. It is characterized by myometrial invasion with polymenorrhagia at presentation. Case Information: We report a case of phocomelia, MDS, and ESS in a pediatric patient, which demonstrates the impact a genetic link can have in clinical management. Patient is a 20-year-old female with phocomelia of the upper extremities. She presented with dysfunctional bleeding, which was thought to be secondary to uterine fibroids. An MRI was performed for evaluation and revealed a uterine sarcoma. Pre-operative screening revealed pancytopenia with intermittently persistent thrombocytopenia and dysplastic marrow with suspected MDS. Conclusions: With the presentation of three seemingly unrelated disorders, it is important to consider an underlying genetic link. There was suspicion that a chromosome 7 abnormality could link phocomelia, ESS and MDS, leading to a high risk of progression to leukemia. However, microarray analysis revealed a genetic mutation associated with thrombocytopenia absent-radius syndrome, which has a much lower likelihood of progression to bone marrow malignancy in the future.

The Impact of Comorbidities on Chronic Low Back Pain

Research Area: Other

Abstract ID: UNTHSC653

Presenter Name: Patrick Bibb

Authors:

Patrick Bibb ^{1 *}

John Licciardone ²

Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: With an estimated treatment cost of \$635 billion, low back pain is one of the costliest national public health challenges. The NIH Pain Consortium defines chronic low back pain as pain lasting longer than 3 months, with pain symptoms in more than half of the days during the past 6 months. Since 2016, the PRECISION Pain Research Registry has been collecting data from patients with CLBP in Texas. Purpose: This purpose of this study is to determine the impact of multiple comorbidities on psychological and physical components of pain in patients with CLBP. Methods: There were 519 patients in the study, including 264 (50.9%) standard patients with < 2 comorbidities (CLBP-L) and 255 (49.1%) patients with >3 comorbidities (CLBP-H). The psychological characteristics of these two comorbidity groups were compared using the Pain Self-Efficacy Questionnaire (PSEQ) and the Pain Catastrophizing Scale (PCS). The physical characteristics of the groups were compared using a numerical rating scale for pain intensity (NRS) and the Roland-Morris Disability Questionnaire (RMDQ). Results: There was a statistically significant ($p < 0.05$) negative correlation between comorbidity scores and PSEQ scores, and there were significant positive correlations between comorbidity scores and PCS, NRS, and RMDQ scores. Conclusions: These results provide evidence that patients with CLBP and a greater number of comorbidities may experience more difficulty in psychologically coping with physical pain and disabilities than such patients with fewer comorbidities. These results suggest that psychological interventions, such as cognitive behavioral therapy, may benefit patients with CLBP and numerous comorbidities.

The Influence of Ecogeographic Variation in Human Nasal Morphology on Thermal Conditioning of Inspired Air

Research Area: Structural Anatomy

Abstract ID: UNTHSC534

Presenter Name: Elizabeth Thai

Authors:

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Hasintha Amaranayaka ²

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Brian Dennis ⁵

Scott Maddux ⁶

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (1st Year)

Abstract: Most air conditioning of inspired air occurs in the nasal passages and is largely dependent on external environments. Studies show strong associations between climate and ecogeographic patterning of human nasal morphology. Individuals indigenous to cold-dry environments exhibit relatively longer/taller/narrower nasal passages than individuals from hot-humid climates, and these morphologies are assumed to reflect functional differences. To test these associations between nasal morphology and air-conditioning function, we assessed cranial CT scans of 2 individuals—one of European ancestry (EA) and one of West African ancestry (WA). 3D models of nasal passages were created using 3D Slicer software and were artificially dilated in-silico to simulate fully decongested nasal passages prior to collecting morphometric measurements, mucosal surface area (SA), and airway volume (AV). 3D models of each individual were then employed in Computational Fluid Dynamics (CFD) simulations, via ANSYS fluent software, to assess differences in intranasal airflow heat and moisture transfer. Ambient air conditions were set at -5°C, 35% relative humidity. As expected, the EA individual exhibited longer/taller/narrower nasal passages compared to the WA individual. The EA individual exhibited higher mucosal SA and lower AV resulting in a higher surface-area-to-volume (SA/V) ratio compared to the WA individual. Our CFD simulations also followed theoretical predictions. The higher SA/V ratio of the EA individual resulted in increased heat transfer compared to the WA individual. The results of our study provide support for assertions that ecogeographic variation in human nasal passages reflects climate-mediated evolutionary demands for intranasal air-conditioning.

The Potential of a Medical Legal Partnership to Improve the Health of a 17 year old Patient with Undiagnosed Intellectual Disability

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC478

Presenter Name: Sarah Jethro

Authors:

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Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Medical legal partnerships (MLP) foster equity and addresses Social Determinants of Health through legal advocacy and expertise. MLPs educate medical professionals on the legal rights of individuals with intellectual disabilities concerning medical services. Implementation of an MLP program in the pediatric setting could address the unmet need for a school evaluation. A related model, medical legal psychological partnerships (MLPP) add the benefit of psychological expertise to address school-related mental health needs. Here we apply the MLP and MLPP model to a single case. Case: The case is a 17-year-old girl who was admitted to a children's hospital for pain control and hydration post-tonsillectomy. She had a clinical suspicion of Autism and Bipolar disorder. This was believed to contribute to a three-year delay in her formal school education. The patient and her mother presented with multiple gaps in her care related to social determinants of health and health literacy. These included difficulties communicating pain level, comprehending therapy goals, and inappropriate expectations of recovery. Conclusions: If the patient presented in this case had access to an MLP or an MLPP she would have been able to access testing and treatment services resulting in an individualized education plan, receive medical and psychological treatment, as well as school-based behavior plan. MLP can be effective in removing barriers to care by addressing structural problems at the root of health inequities. MLPP's are effective at addressing complex needs with the goal of achieving equity.

The Risk Factors and Causes Associated with Ectopic Pregnancies

Research Area: Structural Anatomy

Abstract ID: UNTHSC620

Presenter Name: Pulkit Vats

Authors:

Pulkit Vats ^{1 *}

Nathan Hannay ²

Submission Type: Non-Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: An ectopic pregnancy occurs when the fertilized egg implants in an improper location. Fertilization normally occurs in the uterine tube. Following zygote formation, the fertilized egg then travels to the superior part of the uterus and implants into the endometrium where it can receive proper nutrients and blood supply. This implantation however can occur elsewhere, most commonly the uterine tube, and results in the fetus receiving improper nutrients, ultimately leading to death of the zygote. This process is known as ectopic pregnancy, specifically tubal pregnancy. There are many factors associated with ectopic pregnancies, including hormonal imbalances, fallopian tube inflammation, abnormal development of the fertilized egg, and smoking (Mayo Clinic). Ectopic pregnancies can be specifically harmful when gone unnoticed. If this condition is not recognized and treated promptly, the fallopian tube can rupture and cause fatal consequences. Further research is prompted to further understand the correlation that exists between pathologies found in a donor cadaver, including a history of smoking, cirrhosis, uterine fibroids, and cancers in the lungs, tongue, and skin.

The Role of Lipid Rafts on Androgen's Neurotoxic Effects

Research Area: Aging/Alzheimer

Abstract ID: UNTHSC555

Presenter Name: Oluwadarasimi Fadeyibi

Authors:

Oluwadarasimi Fadeyibi ^{1 *}

Nataliya Rybalchenko ²

Rebecca Cunningham ³

Submission Type: Non-Competition Poster

Department: UNT System College of Pharmacy: Pharmaceutical Sciences

Classification / Affiliation: GSBS Student

Abstract: Purpose: Vascular dementia (VaD) is a form of cognitive decline resulting from cerebrovascular disease in blood vessels. VaD is an age-related disease accounting for approximately 17–25% of cases of dementia, with men having a higher risk. Oxidative stress (OS) plays a large role in aging associated diseases, such as VaD. Using an in vitro model, our prior studies show androgens, the major male sex hormone, through an androgen receptor (AR) localized to lipid rafts in the plasma membrane exacerbates OS, which may worsen VaD. We seek to determine if interfering with AR localization to cholesterol-rich lipid rafts decreases androgen induced neurotoxicity. Methods: Since testosterone is only toxic under OS conditions, we exposed N27 cells to H₂O₂ (20 μ M) to induce an OS condition followed by testosterone (100 nM). Nystatin (50 μ M) was used to decrease cholesterol-rich lipid rafts that contain AR in order to block testosterone's damaging effects in an OS environment. The MTT assay was used to quantify cell viability. AR and lipid raft proteins were quantified. Results: Cholesterol inhibition using nystatin decreased both AR and lipid raft proteins. Nystatin blocked testosterone exacerbation of H₂O₂ induced cell loss. Conclusion: This study shows that the loss of lipid rafts via nystatin blocked androgen-induced OS in cells by altering the structure and function of AR. During VaD, neuronal dysfunction can impair cognition, thus this study suggests that repurposing statins for the treatment of VaD may be useful.

The Use of a Modified Total Knee Arthroplasty to Treat End-Stage Osteoarthritis and Concurrent Osseous Metastasis to the Distal Femoral Metaphysis

Research Area: Cancer

Abstract ID: UNTHSC413

Presenter Name: Griffin Rechter

Authors:

Griffin Rechter ^{1 *}

Stephen Brotherton ²

Submission Type: Non-Competition Poster

Department: TCU/UNTHSC School of Medicine

Classification / Affiliation: TCU/UNTHSC School of Medicine

Abstract: Background: In recent years, improved survivorship in cancer patients is paralleled by increasing demand for total knee arthroplasty (TKA) procedures. Thus, there is a need to explore different approaches to patients requiring a TKA with comorbid metastatic disease of the distal femur. We herein present a patient who underwent a modified primary TKA for end-stage osteoarthritis and concurrent skeletal metastasis to the distal femur. Case Information: An 84-year-old woman presented to our clinic for severe osteoarthritis. Imaging revealed an osteoblastic lesion in the distal femoral metaphysis, and MRI identified it to be a metastasis of an undisclosed diagnosis of renal cell carcinoma. She underwent a modified TKA with a 175-mm femoral stem with resection of the bony metastasis. The postoperative course was unremarkable. Conclusions: We believe patients with distal femoral metastases and end-stage osteoarthritis should be considered candidates for a modified TKA. It offers immediate weight-bearing, tumor resection, pathologic fracture prevention, and is fiscally favorable to the alternative, a limb salvage procedure with endoprosthesis. The femoral stem component allowed for immediate stability, decreased risk for aseptic loosening, and protection of the canal from further development of metastases. This is the first report discussing the utilization of a modified TKA in treating end-stage osteoarthritis with simultaneous resection of bony metastases from renal cell carcinoma and prophylactic pathologic fracture management. Improvements in cancer survivorship requires orthopedic surgeons to consider modified interventions for patients with osteoarthritis and comorbid metastatic disease of the distal femur.

The use of Telemedicine in primary care setting.

Research Area: General Medicine

Abstract ID: UNTHSC569

Presenter Name: Minh Di Le

Authors:

Minh Di Le ^{1 *}

Submission Type: Non-Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: During the COVID-19 pandemic, telemedicine has become a valuable tool for physicians to remotely care for patients. Limited quality of care has been a major barrier of telemedicine. This project attempts to resolve this barrier through the use of home visit and Eko Stethoscope device as parts of telemedicine. The hypothesis is that there is an improvement in the number of use of telemedicine in the elderly patients, 65 of ages or more, with the intervention. Methods: In this project, the number of patients, who is 65 years old or more and use at least one time of telemedicine, is documented through 2 designated periods, the months of April and June. The April period is prior to intervention and June period is the after. Results: The data shows there is 17 telemedicine used out of 84 patients who are eligible for the service during the period of April. The data also shows 38 calls out of 111 patients during June period. This is a rise of 14% in the number of telemedicine use in one period. Conclusions The data shows positive result in number of telemedicine use with intervention. Many patients prefer the in-office visit because of its quality and trust physician-patient relationship. The intervention has improved the telemedicine quality of care, thus, motivates patient to use the service. The next step would be training more nurses who are capable of home visit. In addition, an in-office advertisement of telemedicine could be beneficial.

The Use of Yoga in Children with Autism

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC552

Presenter Name: Lezirel Gracia

Authors:

Lezirel Gracia ^{1 *}

Yasser Salem ²

Howe Liu ³

Submission Type: Competition Poster

Department: School of Health Professions: Physical Therapy

Classification / Affiliation: School of Health Professions Student

Abstract: Purpose: Yoga is a Complementary and Alternative Medicine that uses breathing exercises, physical postures, and meditation to promote overall health. Over the last several years studies of yoga effects on children with autism have been published, but there was no literature report that analyzed and synthesized these available studies. Thus, the purpose of this systemic review was to examine the evidence regarding the effectiveness of yoga for children with autism. Methods: Articles were searched by using electronic databases PubMed, CINAHL, PEDro, and Scopus. A list of relevant literature was compiled and sorted based on predefined article selection criteria. The inclusion criteria included children up to the age of 18 years old with a diagnosis of autism spectrum disorder and any form of yoga used as the main exercise intervention. The exclusion criteria were systematic reviews, adults with autism, presence of other neurological disorders/diagnosis, or no-English version of a relevant article. Results: A total of 11 articles with 333 participants were analyzed. The articles analyzed were randomized control study, quasi-experimental, single group pretest-posttest, and pretest-posttest control group. There were wide ranges of participants' ages, sample sizes, intervention parameters, yoga exercises, and outcome measures used in the studies. Overall improvements were observed in behavior changes that consisted of communication, social interaction, and imitation skills. Conclusions: The evidence suggest that yoga exercises are effective in improving common behaviors seen in children with autism. Those being improvements in symptoms such as improved behavioral problems, social, emotional, and communication skills.

The wall stress hypothesis for myogenic responses in the coronary circulation

Research Area: Cardiovascular

Abstract ID: UNTHSC660

Presenter Name: Alexander Bale

Authors:

Alexander Bale ^{1 *}

Gregory Dick ²

Johnathan Tune ³

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: Coronary arterioles demonstrate myogenic reactivity, as the caliber of the arteriole is actively adjusted in response to the intraluminal distending pressure. The teleological purpose of myogenic reactivity remains unclear, but it has been proposed that myogenic responses act to mitigate pressure-induced changes in circumferential wall stress (σ). We investigated pressure-induced variations in σ with and without myogenic reactivity. Methods: Using previously published data, we calculated σ in coronary arterioles in both the longitudinal (branch order) and transmural (epicardial vs endocardial) directions with and without myogenic tone. Results: Active constriction from the myogenic response reduced σ in all arterioles examined. Arteriolar σ was higher in the endocardium in both the passive and active state, but the percent change from passive σ to active σ was similar when compared to epicardial arterioles of the same branch order. There was no major change in active arteriole σ in the longitudinal direction, except for branch order 5 epicardial arterioles, which had a larger reduction in σ and a larger change from passive when compared to other epicardial branch orders. Conclusions: The results indicate that the myogenic response reduces arteriole wall stress. The greater passive and active σ seen in endocardial arterioles compared to epicardial arterioles is due to transmural differences in wall thickness. Yet, the fact that the thinner endocardial arterioles were able to produce the same degree of reduction in active σ may indicate that these vessels have more myogenic activity.

Thoracic Duct Lymph Reduces the Production of TNF-alpha IFN-gamma by Pulmonary Leukocytes in vitro

Research Area: Immunology

Abstract ID: UNTHSC463

Presenter Name: Russell Vo

Authors:

Russell Vo ¹ *

Submission Type: Competition Poster

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: Streptococcus pneumoniae, a cause of community acquired pneumonia, accounts for nearly one million hospitalizations in the U.S., annually. The lymphatic pump technique (LPT) is a manipulative medicine technique used by osteopathic physicians to mobilize lymph and treat pneumonia. Our objective was to identify the biological effect of thoracic duct lymph (TDL) mobilized with LPT on the immune response against S.pneumoniae. We hypothesized that lymph mobilized during LPT would suppress the in vitro activity of lung leukocytes in mice infected with S.pneumoniae. Methods: TDL was collected from dogs during 4min of baseline, 4min of LPT, and 10min post-LPT. Mice were intranasally infected with 5×10^5 CFU of S. pneumoniae. Lung leukocytes were isolated from healthy and infected mice (24hr post-infection.) Leukocytes were cultured with media plus 5% saline, 5% baseline TDL, 5% LPT TDL, or 5% post-LPT TDL, and co-cultured with/without LPS. The TNFa and TNFg were measured in supernatants after 6, 12, and 24hrs. Results: When cultured with LPS, the addition of baseline LPT, LPT, or post-LPT lymph decreased TNFa and TNFg production by leukocytes from healthy mice. Leukocytes from infected mice did not produce cytokines even when stimulated with LPS, suggesting expended biological activity in vivo. There were no differences in TNFa and TNFg production by leukocytes cultured with baseline LPT, LPT, or post-LPT lymph. Conclusion: TDL reduced inflammatory cytokine production by lung leukocytes. Mobilization of lymph during LPT may release protective factors that limit inflammation and protect the lungs from pulmonary disease.

Tibialis Anterior and The Bridle Procedure

Research Area: Structural Anatomy

Abstract ID: UNTHSC586

Presenter Name: Jacob Cronk

Authors:

Jacob Cronk ^{1 *}

Cara Fisher ²

Submission Type: Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (1st Year)

Abstract: Background: The Bridle procedure is a surgical intervention for the treatment of foot drop due to common fibular nerve damage. It involves the transfer of the tibialis posterior tendon through the interosseous membrane and anastomosis to the tendons of the tibialis anterior and fibularis longus muscles. Case Information: A 54-year-old Caucasian male cadaver presented with abnormal anatomy of the tibialis anterior muscle. Dissection revealed a bifurcation of the tibialis anterior tendon at the level of the superior extensor retinaculum with one part of the tendon continuing to its normal insertion on the medial cuneiform and 1st metatarsal and the other part inserting on the lateral aspect of the cuboid. Further dissection revealed sutures at the point of insertion on the cuboid indicating that surgical fixation had been performed and that this was not an anatomical variation. It was subsequently identified as a "Bridle procedure." Atypically, both tibialis posterior and fibularis longus tendons remained attached to their typical insertions, while the tibialis anterior tendon was split longitudinally. The free part of the tibialis anterior was fixed to the cuboid rather than joined with the fibularis longus tendon. The authors suspect a modified version of the Bridle procedure, but identifying the specific name may be difficult given a limited medical history. Conclusions: This cadaveric case study illustrates a unique presentation of the reconstructed anatomy of a surgical procedure used in the treatment of foot drop or steppage gait pathologies.

Tools to Reduce High-Risk Medication Use in Patients 65 Years and Older

Research Area: Patient Safety

Abstract ID: UNTHSC517

Presenter Name: Victoria Pierce

Authors:

Victoria Pierce ¹ *

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Purpose: With increased use of medications in the elderly, it is important to conduct a medication review at each visit and review changing recommendations for different patient populations. The purpose of this enhancement is to see if a single page, patient led review of medications before each visit can reduce high-risk medication use in patient populations 65 years and older. Methods: For 4 weeks patients 65 years or older were given a summary of high-risk medications per the Beers Criteria prior to each visit. The medications were organized by disease, and the patients were asked to circle any active medications. The physician then reviewed the medication list and made note of which medications could be discontinued, changed, or would remain the same. The number of high-risk medications were recorded before and after the intervention as 0, 1, or 2+. Results: Through this intervention the use of high-risk medications was reduced overall. The intervention also encouraged a scheduled review of high-risk medication recommendations. A reduction of one high-risk medication occurred in >66% of patients and >57% for patients on 2+ high-risk medications. Conclusion: The results suggest a regular review of changing medication recommendations and full medication reviews at yearly appointments can reduce the use of high-risk medications in elderly populations. While the Beers criteria is not a perfect tool, as some medications are needed and cannot be substituted, it is useful as a way to review high-risk medications in elderly patient populations.

Trauma-induced Neuropathy of the Ulnar Branch to the Abductor Digiti Minimi

Research Area: Physical Medicine / OMM

Abstract ID: UNTHSC591

Presenter Name: Ann Wingard

Authors:

Shahana Momin ^{1*}

Ann Wingard ²

Hayley Holbrook ³

Callie Hoelscher ⁴

Omar Selod ⁵

Submission Type: Competition Poster

Department: Non-UNTHSC

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background Innervated by the ulnar nerve, the abductor digiti minimi (ADM) is an intrinsic muscle of the hand that serves as an abductor of the fifth digit. Denervation of the ADM can result in fifth digit weakness and atrophy. Classically, ulnar nerve entrapment at the cubital tunnel or Guyon's canal may present with these findings, and this would be evident on electrodiagnostic evaluation. There is no current literature documenting a case of fifth digit weakness and atrophy with electrodiagnostic studies showing an isolated neuropathy to the ulnar branch of the ADM. Case Presentation A 45-year-old male presented to an orthopedic clinic with weakness of his right fifth digit. As the patient arose from bed two months prior, he heard something pop and felt a sharp pain in his right fifth digit and hypothenar aspect. Physical exam showed diminished abduction of the right fifth digit and hypothenar atrophy. The patient was referred for an electromyogram (EMG) and nerve conduction study (NCS). EMG/NCS of the ulnar nerve, tested distally using the first dorsal interosseous muscle, was normal. Afterwards, he was sent to follow up with the orthopedic surgeon, who requested another EMG to specifically test the ADM. The repeated EMG study showed isolated neuropathy of the ADM. Discussion This patient's clinical case highlights the significance of using the history and physical exam findings to probe deeper despite unremarkable initial electrodiagnostic studies. This case also exemplifies the importance of exploring less common pathologies, as this is a unique and uncommon diagnosis.

Treatment Resistant Cellulitis Complicated by COVID-19: A Case Study

Research Area: General Medicine

Abstract ID: UNTHSC434

Presenter Name: Marshall Hall

Authors:

Marshall Hall ^{1 *}

Henry Lim ²

Sajid Surve ³

Submission Type: Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Cellulitis is a common dermatological condition that affects nearly 1 in every 20 individuals. This disease places a significant burden on both patients and the healthcare system. In this case report, we present a 70-year-old male who had a chief complaint of arm pain following a fall from ground level. The patient was diagnosed with cellulitis and placed on multiple empiric antibiotic treatments for several weeks without success in reducing symptoms. In conjunction with the patient's treatments, during the patient's stay, the patient developed acute dyspnea and tested positive for COVID-19 pneumonia. The patient was successfully treated for COVID-19 pneumonia and cellulitis through a combined effort of surgical and medical interventions. Recognizing treatment-resistant cellulitis and how COVID-19 may affect patient outcomes with dermatological conditions may help patients in the future when encountered with similar medical conditions.

Ultrasound and Computerized Tomography in Managing Cellulitis: A Case Study

Research Area: General Medicine

Abstract ID: UNTHSC556

Presenter Name: Kara Hurley

Authors:

Marshall Hall ^{1 *}

Henry Lim ²

Kara Hurley ³

Jonathan Hatch ⁴

Sajid Surve ⁵

Submission Type: Non-Competition Poster

Department: TCOM: Internal Medicine & Geriatrics

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Cellulitis is a common cutaneous tissue infection that affects approximately 14.5 million people in the United States each year. This skin disease is usually a clinical diagnosis. With the development of technology, especially bedside ultrasound, imaging techniques have become integrated into the physical exam, diagnosis, and treatment of disease. Ultrasound and computerized tomography (CT) have become part of the management of cutaneous infections such as cellulitis, abscess, and necrotizing fasciitis. However, it is still not clear what role these imaging techniques hold. In this case report, we present a patient with cellulitis refractory to standard antibiotic regimens. Ultrasound and CT scan were performed which showed soft-tissue edema, phlegmon without drainable abscess. Without improvement, the patient underwent incision and drainage for possible abscess. Following the surgical procedures, the patient's symptoms resolved, and the patient was discharged. This case raises to the surface limitations that may still exist in imaging studies in the treatment of soft tissue infections. Further research, training, and perhaps technological development are necessary to assist in using imaging studies in the diagnosis of soft tissue infection.

Underlying Causes of the Disproportionate Effect of COVID-19 within Minority Communities in the United States

Research Area: Health Disparities

Abstract ID: UNTHSC471

Presenter Name: Alyssa Nguyen

Authors:

Alyssa Nguyen ^{1 *}

Submission Type: Competition Poster

Department: TCOM: Medical Education

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: The Coronavirus Disease 2019 (COVID-19) crisis has had detrimental impacts globally, but it has disproportionately affected minority groups especially in the United States. In particular, Indigenous and Black Americans have continued to have the highest proportion of COVID-19 cases as well as case fatalities. The goal of this study was to conduct a systematic literature review to understand why there are disproportionate effects within these communities in the United States. It also serves to provide methods that should be in place to protect these vulnerable communities from facing worse outcomes of this pandemic. Key information was gathered from twenty-one sources including quantitative studies related to this topic. The following causes that are supported by the results of this systematic literature review include health disparities, higher risk of comorbidities, implicit biases of health care providers, air pollution in urban settings, and genetic variations in the androgen receptor. Based on these results, there should be improved preventative plans with a health equity lens so that these communities don't face the disproportionate burden in the future.

Utility of Geospatial Visualization and Social Vulnerability Index to Inform the Dissemination of School-Based Asthma Initiative

Research Area: Health Disparities

Abstract ID: UNTHSC684

Presenter Name: Connie Ly

Authors:

Connie Ly ^{1 *}

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Cameron Zie ke ⁴

Submission Type: Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (2nd Year)

Abstract: Purpose: The contributors to pediatric asthma disparities are multifactorial; low-income and minority students face higher risks of school absences, hospitalization, and mortality. The CDC has recognized the Asthma 411 Model as an evidence-based program to improve asthma outcomes. In 2017, a Consortium was formed to enable Tarrant County school districts (ISDs) to adopt and implement Asthma 411. This study's objective is to determine whether ISD adoption of Asthma 411 reaches students at great risk for adverse outcomes. Methods: The independent variable is a three-level, categorical indicator of Asthma 411 adoption by ISDs: primary adopters (initiated 2017), secondary adopters (initiated 2018-2020), non-adopters. ArcGIS, a Geographic Information System (GIS) platform, was used to map the independent variable. A data layer was added with CDC's 2018 Social Vulnerability Index (SVI). The SVI includes American Community Survey census tract data organized around four distinct themes associated with disparities: Socioeconomic status, Household Composition & Disability, Minority Status and Language, and Housing Type & Transportation. Results: Visually, primary adopters appear to include communities with higher risk as defined by SVIs. Non-adopters appear to include less socially vulnerable communities but do include pockets of students at risk. Conclusion: The Asthma 411 Consortium appears to reach the majority of communities at risk but targeted expansion may be beneficial. GIS may assist public health planning by visualizing access to services. Application of spatial statistics and further investigation of the SVI as a measure of risk will strengthen the analysis and better inform dissemination.

Utilization of Mental Health Prescription Claims in Texas Health Plan Members in Relationship to the Novel Coronavirus Pandemic

Research Area: General Public Health

Abstract ID: UNTHSC529

Presenter Name: Michael Leytman

Authors:

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Ahmed Guhad ²

Alvah Stahlnecker ³

Rafia Rasu ⁴

Christy Xavier ⁵

Submission Type: Non-Competition Poster

Department: UNT System College of Pharmacy: Pharmacotherapy

Classification / Affiliation: Resident (Not for Competition)

Abstract: Objective: To evaluate the utilization of mental health disorder prescription claims in relationship to the novel coronavirus pandemic.

Methods Design: Retrospective analysis of mental health utilization prescription claims between March 2020 to August 2020 compared to March 2019 to August 2019. Inclusion, ≥ 18 years of age, Prescription claims for anti-anxiety, anti-depressant, anti-psychotic/anti-maniac agents, Health Plan members filling prescriptions within the state of Texas. Exclusions, < 18 years old. Data Collection, Mail and Retail Pharmacy utilization claims data: March 2020 – August 2020 & March 2019 – August 2019, Gender, Fill date, Member age. Statistical Analysis, Chi-Square Test to identify a P-value for the primary endpoint Endpoints • Primary o Difference between the number of mental health utilization prescription claims between March 2020 to August 2020 compared to March 2019 to August 2019 • Secondary o Difference in utilization rate between men and women o Difference in age o Percentage of patients receiving Mail vs Retail claims (pre/post COVID) o Comparing public health infection rate data vs. prescription claim rate (pre/post COVID) Results: For all primary endpoints, statistical significance was observed with p-values < 0.001 . Conclusion: Work-In-Progress, N/A ©2020 CVS Health and/or one of its affiliates. All rights reserved. This article contains proprietary information and cannot be reproduced, distributed or printed without written permission from CVS Health. Data use and disclosure is subject to applicable law, corporate information firewalls and client contractual limitations.

Variation of prevertebral musculature in cadaveric studies

Research Area: Structural Anatomy

Abstract ID: UNTHSC472

Presenter Name: Austin Dickerson

Authors:

Austin Dickerson ^{1 *}

Cara Fisher ²

Submission Type: Non-Competition Poster

Department: Center for Anatomical Sciences

Classification / Affiliation: TCOM DO Student (4th Year)

Abstract: Background: This case report documents muscular variation observed in a detailed dissection of the prevertebral region of multiple cadavers. The prevertebral region contains the muscles lying between the prevertebral layer of cervical fascia and the vertebral column. The deep location of these muscles means that they are often understudied during routine dissections. The prevertebral muscles lie in close proximity to numerous important neurologic and vascular structures, including the contents of the carotid sheath and the jugular foramen. The rectus capitis lateralis muscle, in particular, is used as a landmark in the microsurgical anatomy in certain extracranial approaches to the jugular foramen. The anatomical variations described in this report have little previous documentation in the literature, and their characterization here adds to the current understanding of variation in the region and its impact on surgical anatomy. Case Information: Detailed dissection of the prevertebral region of multiple embalmed cadavers revealed differing variations in the muscular anatomy. One such variation involved accessory muscles running in superolateral fashion over the anterior portion of the transverse processes of the atlas bilaterally. Conclusions: The muscular variation detailed in this report has implications in surgical approaches to surrounding structures, including the jugular foramen and its contents. Various approaches rely on specific landmarks, which have the possibility to be mistaken or obscured by anatomic variation in the region. Continued study and reporting of variation discovered in the prevertebral region can help characterize common deviations from normal anatomy and aid in surgical planning.

When is LDL Cholesterol Too Low?

Research Area: Pediatrics & Women's Health

Abstract ID: UNTHSC701

Presenter Name: Dania Bairuty

Authors:

Dania Bairuty ^{1*}

Submission Type: Non-Competition Poster

Department: TCOM: Pediatrics & Women's Health

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Familial hypobetalipoproteinemia (FHBL) is a rare genetic disorder that causes unusually low levels of LDL-C and apolipoprotein B (apoB). There are higher incidences of FHBL in pediatric patients with fatty liver disease than the general population and they tend to have more severe hepatic steatosis. Case Presentation: A 6-year-old Caucasian male presented with his mother as a referral with an LDL-C of 25 mg/dL, well below the 5th percentile for age and sex. No pertinent past medical history is recorded. Per mother, his maternal grandfather had a history of low LDL-C with no known heart disease. Mother is well without recorded LDL-C. Father's health status is unknown. A lipid panel of the patient revealed: total cholesterol of 82 mg/dL, triglycerides (TG) of 31 mg/dL, HDL-C of 55 mg/dL and a direct LDL-C of 24 mg/dL. The patient's apoB level was < 30 mg/dL (RR 52-109 mg/dL) and apoA1 was 134 mg/dL (RR 94-136 mg/dL). Additionally, liver function tests (LFTs) were performed: AST of 23 U/L (RR 12-32 U/L) and ALT 24 U/L (RR 8-32 U/L). APOB sequencing revealed a heterozygous mutation (c.10848delT). A lipid panel of the patient's 8-year-old brother showed a total cholesterol of 91 mg/dL, TG of 37 mg/dL, HDL-C of 54 mg/dL, and an LDL-C of 30 mg/dL. Conclusions: Follow-up recommendations for FHBL include laboratory testing of lipids and LFTs every year with clinical evaluation every 6-12 months.

White Mountain Expedition 2019: The Impact of Sustained Hypoxia on Cerebral Blood Flow Responses and Tolerance to Simulated Hemorrhage

Research Area: Cardiovascular

Abstract ID: UNTHSC450

Presenter Name: Alexander Rosenberg

Authors:

Alexander Rosenberg ^{1*}

Garen Anderson ²

Haley Barnes ³

Jordan Bird ⁴

Brandon Pentz ⁵

Britta Byman ⁶

Nicholas Jendzjowsky ⁷

Richard Wilson ⁸

Trevor Day ⁹

Caroline Rickards ¹⁰

Submission Type: Oral Presentation

Department: GSBS: Physiology & Anatomy

Classification / Affiliation: Postdoctoral Fellow

Abstract: Trauma-induced hemorrhage can occur at high altitude (HA) from a variety of causes, including battlefield injuries, vehicle/air accidents, and major falls. As the partial pressure of oxygen decreases with ascent to altitude, compensatory increases in cerebral blood flow (CBF) and oxygen delivery occur to preserve cerebral tissue oxygenation (ScO₂). Accordingly, we hypothesized that tolerance to simulated hemorrhage (via lower body negative pressure, LBNP) following sustained exposure to HA would be similar compared to low altitude (LA) due to compensatory increases in CBF and oxygen delivery, and the subsequent preservation of ScO₂. Healthy adults (N=8; 4F/4M) participated in LBNP protocols to presyncope at LA (1045m) and at HA (3800m) following 5-7 days of acclimatization. Arterial pressure, heart rate (HR), stroke volume (SV), internal carotid artery blood flow (ICA BF), and ScO₂ were measured continuously. Time to presyncope was similar between conditions (LA: 1276±304s vs. HA: 1208±306s; P=0.58). Similar maximal responses to LBNP were observed at LA and HA in mean arterial pressure (LA: -16±6% vs. HA: -16±6%; P=0.85), SV (LA: -57±14% vs. HA: -60±13%; P=0.39), and HR (LA: +69±33% vs. HA: +65±23%; P=0.71). ICA BF was elevated at baseline at HA vs. LA (P=0.04) and decreased with LBNP under both conditions (P<0.0001). There was no effect of altitude (P=0.59) on ScO₂, which decreased with LBNP under both conditions (P=0.09). Sustained exposure to hypoxia at an altitude of 3800m does not affect tolerance to simulated hemorrhage in adults, which may be due to 1) similar cardiovascular reflex responses, and 2) compensatory increases in CBF and subsequent preservation of ScO₂.

Whole Body OMT as a Treatment for Postural Instability in Parkinson's Patients

Research Area: Physical Medicine / OMM

Abstract ID: UNTHSC716

Presenter Name: Keenan Gibson

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Kendi Hensel ²

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Submission Type: Competition Poster

Department: TCOM: Family Medicine and Osteopathic Manipulative Medicine

Classification / Affiliation: TCOM DO Student (3rd Year)

Abstract: Background: Osteopathic Manipulation Treatment (OMT) is a manual therapy directed at relieving somatic dysfunction in patients. OMT has shown in previous studies to improve postural stability in specific patient groups and may be a treatment option for movement disorders. Parkinson's Disease (PD) is one such movement disorder where falls are a major cause of patient morbidity. However, an OMT protocol for PD has not been established. Methods: We performed a randomized control trial on PD and healthy patients to determine the efficacy of an OMT protocol. Group A received OMT treatment of the full body including cranial manipulation, Group B received OMT treatment from the neck down, and Group C received a "sham" OMT treatment. Pre- and Post-treatment clinical measurements of postural stability consisted of Functional Reach (FR) and Timed Up and Go (TUG) tests. Biomechanical measurements of quiet standing sway were observed using a 12 Camera motion analysis system and a force plate. Results: Patients showed improvement in the times to complete the TUG test across all three treatment groups with the greatest improvement (-0.52 s) demonstrated by Group A ($p < 0.05$). FR results showed improvement in all three treatment groups with the greatest change (+3.5cm) occurring in Group B ($p < 0.05$). Biomechanical data showed an increase in the RMS in the x and z directions following treatment ($p > 0.05$). Conclusions: Full body OMT that includes cranial techniques may improve postural stability and be considered as part of a multi-therapy management of PD.

Women experiencing homelessness and their knowledge, attitudes, and beliefs about contraception and pregnancy: A systematic review

Research Area: Pediatrics & Women's Health

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Abstract: PURPOSE: Women who are homeless experience unintended pregnancy at considerably higher rates compared to the general U.S. population. This systematic review aims to summarize pregnancy prevention and contraception knowledge, attitudes, and beliefs among women experiencing homelessness to identify information, motivation, and behavioral skill barriers and facilitators to planned pregnancy and contraception use among this high-risk population. METHODS: Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses, this study examined qualitative, quantitative, and mixed-method articles published before September 2019, via PubMed, EBSCOHost, and Embase databases. Inclusion criteria were English, peer-reviewed, U.S.-based observational studies measuring knowledge, attitudes, and beliefs related to contraceptive use for avoiding pregnancy, specifically sampling women experiencing homelessness. Article quality was calculated, and results were thematically synthesized using the Information-Motivation-Behavioral Skills model. RESULTS: The initial search identified 407 articles, and seven met inclusion criteria. Many women reported past use of contraception, but consistency, type, and preferences varied. Many women also knew where to get contraception but had misconceptions about how various contraception methods worked. Salient motivational factors influencing contraceptive use included personal experience with contraception, dislike of side effects, and the power and social dynamics within partner, peer, and health care provider relationships. Numerous shelter-related and clinic-related contraception barriers were identified that uniquely affected this population. CONCLUSIONS: With this consolidated information provided by a systematic review, future interventions can promote theory-informed, non-coercive contraception decision-making with better access to preferred contraception methods for women experiencing homelessness.