Friday, September 23, 2022
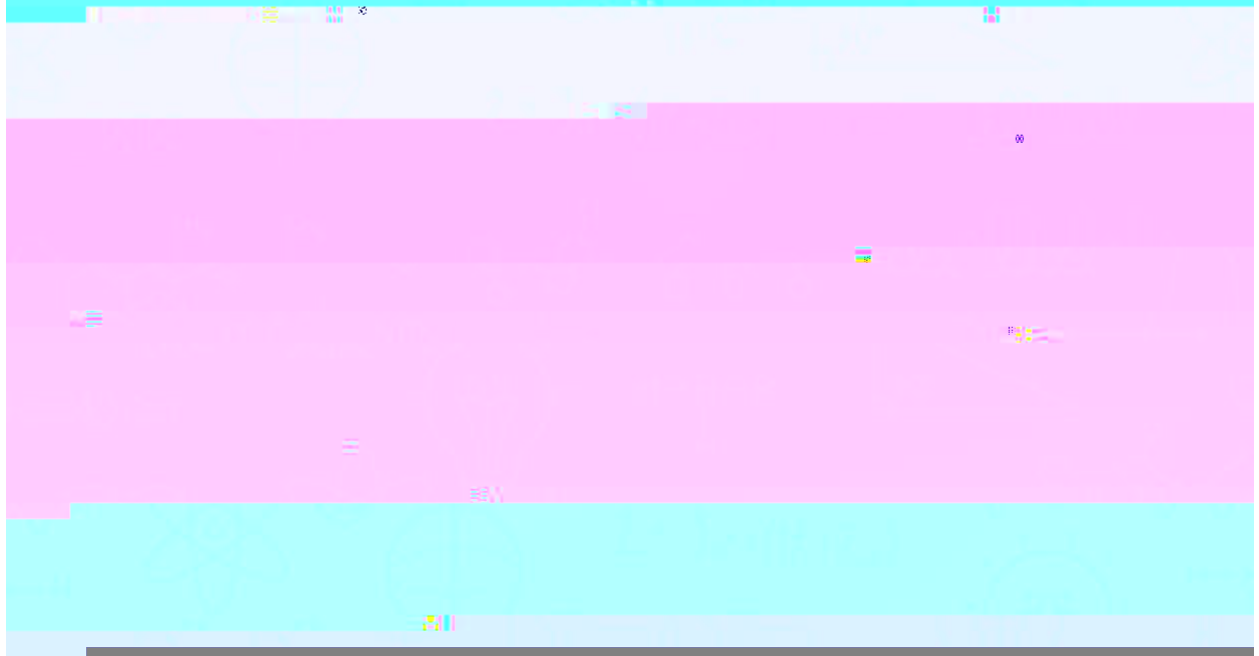
Table of Contents

POSTER

CLINICAL MEDICINE/COMMUNITY HEALTH RESEARCH (CC)

Does Tumor-Produced TEP3 and PGRP-

Clinical Medicine/Community Health Research

These projects aim to produce knowledge valuable for understanding human disease, preventing, and treating illness, and promoting health. These projects embrace a continuum of studies involving interactions with patients, diagnostic clinical materials or data, or populations.

An Analysis of Sagittal Suture Variation in Trauma Specimens Using Computed Tomography

Z. Rasheed, S. Baker, P. Martin
Advisor: P. Lewis

Introduction: Cranial sutures are fibrous tissues that unite the different bones of the skull. However, it is currently unknown exactly how different trauma alters these structures and compromises the skull's integrity. Here, we analyze cranial sutural separation in human specimens with known head trauma using mCT scans to understand how cranial trauma alters the anatomy of the sagittal suture.

Methods: To measure variation in the sagittal suture, three crania with patent sagittal sutures were borrowed from the Southeast Texas Applied Forensic Science Facility: Control, Intraoral Gunshot Wound, and Repetitive Antemortem Trauma. Specimens were transported to the University of Texas CT Lab for high-resolution microCT scanning. Avizo 9.7.0 was used to segment the scans of each specimen's sagittal suture and the total open sutural volume was calculated.

Results/Anticipated Results: Preliminary results indicate total sutural volume of the Intraoral Gunshot Wound specimen was 458.99 mm^3. It is anticipated for the Repetitive Antemortem Trauma specimen to have a value greater than the control, but less than the intraoral gunshot wound specimen. These anticipated results would provide a quantitative value to the altered integrity of the crania.

Conclusion: From this project's completion, we can gain a better understanding of how repetitive traumas impact the skull's integrity. With future projects, we can expand our knowledge on how contact sports, such as football, impact the protective barrier around the brain and assist with developing better guidelines and protective equipment (such as helmets) for athletes. This health education will help reduce the number of sports medicine cases damaging the cranium, causing conditions such as Chronic Traumatic Encephalopathy and progressive brain damage.

Body Composition Changes in Gestational Diabetes Treated Conservatively or With Insulin: A Pilot Study

G. Magno
Advisors: O. Kelly, P. Taylor

Introduction: Gestational diabetes (GDM) incidence has increased in the past decade. Women who are a minority and/or of lower economic status are at higher risk. Treatment includes insulin and lifestyle/dietary modifications. However, insulin can contribute to increased type II diabetes risk and weight gain. Measuring body composition through bioelectrical impedance (BIA)throughout pregnancy may offer better insight into metabolic changes occurring as fat mass percentage was shown to be a good predictor of GDM later in pregnancy. Comparing the impact of GDM diagnosis and treatment between rural and urban populations is understudied. Only a few BIA studies have been performed on pregnant women. The purpose of this study is to evaluate body composition changes with gestational diabetes between urban and rural populations while comparing treatment with insulin or conservatively.

Methods: Body composition measures (fat versus fat-free mass) will be obtained peri- and postpartum. All interventions (conventional or pharmacotherapy) will be per standard of care at each physician's discretion. Control group will be pregnant women without GDM. Questionnaires (experiences and attitudes before, during, and after pregnancy, demographics, lifestyle, nutrition) and food diaries will be collected.

Anticipated Results: Women with GDM will have higher fat and lower lean mass compared to those without, and insulin therapy will increase fat mass in those with GDM.

Conclusion: This study will provide new evidence on the role of standard interventions in GDM on BIA. Future work will look at BIA from conception to one year postpartum to help predict pregnancy outcomes in hopes of diminishing health disparities.

Characterization of Motor and Speech Phenotypes in Children Under 18 Years of Age Diagnosed with *MBD5*-Associated Neurodevelopmental Disorder (MAND) Associated with 2q23.1 Deletions Inclusive of *MBD5*

L. Zhan, *S.* Elsea
Advisor: S. Mullegama

Introduction: MBD5-

Developing a Counseling Psychology Course Elective at an Osteopathic Medical School

A. Arauzo, L. Banuelos, R. Bhattacharjee, W. Williams
Advisors: R. Marek*, Y. Zhao*

Introduction: Counseling psychology is a field of primary healthcare that uses culturally informed practices to assist individuals with their mental well-being and crisis management. Though mental illness is similarly prevalent in both metropolitan and rural areas, this service is largely inaccessible to individuals in rural and medically underserved areas. Consequently, primary care physicians in these areas serve as first-line mental healthcare providers. Unfortunately, current undergraduate medical education lacks a strong foundation in counseling and psychotherapy education. Our study aims to create a counseling psychology elective and determine whether this course will better prepare students to address the mental healthcare shortage in rural and medically underserved areas.

Methods: Four osteopathic medical students conducted a literature evaluation on the state of counseling psychology education in American medical schools. Next, SHSU-COM curriculum was mapped and evaluated for the existence of counseling psychology themes and concepts. A student and preceptor survey was then created to assess student perceptions on counseling skills and gauge interest in the proposed program. Expected

Results: Literature evaluation demonstrated a lack of structured counseling psychology education within

Etiology of Diffuse Idiopathic Skeletal Hyperostosis: The Influence of Smoking, Diabetes, and Obesity

I. Esparza, J. Ross

Evaluation of Copy Number Losses in the MBD5 5'-Untranslated Region: Expression Matters

K. Kashyap, S. Milosavljevic, M. Zschappel, R. Mendoza-Londono, W. Han Tan, J. Innis, T. Ezashi, S. Elsea
*Advisor: S. Mullegama*

Genomic tools, such as chromosomal microarray analysis and exome sequencing, allow for detection of copy number variants (CNVs) or single nucleotide variants (SNVs) in patients with suspected genetic conditions. However, these tools do not detect an important component of gene transcription which is the 5' untranslated region (5'UTR). We hypothesize that when there is alteration of mRNA gene expression in the 5'UTR of a dosage-sensitive gene, this defect could lead to a clinical phenotype. Therefore, to confirm the importance of the 5' UTR, we investigated CNV losses in *MBD5* which is associated with 2q23.1 deletion syndrome. 2q23.1 deletion syndrome is one of the many disorders that are grouped under *MBD5*-associated neurodevelopmental disorder (MAND). These disorders affect the function of *MBD5* and share developmental disabilities, neurological disturbances, language impairments, and hyperactive behavior. Patients were recruited with deletions in the 5' UTR region of *MBD5* to evaluate whether these deletions may be responsible for haploinsufficiency of *MBD5* which is present in all 2q23.1 deletion patients. The patients were grouped based on their 5'UTR *MBD5* deletions into six categories of deletions. Genotype-phenotype studies of these deletions revealed that Category 1 5'UTR deletion phenotypes resembled a traditional MAND phenotype. We conducted qPCR studies to evaluate the mRNA expression of the various 5'UTR deletions. We saw decreased *MBD5* mRNA expression in Category 1 and Category 3. This study confirms the importance of careful assessment of the 5' UTR in clinical genetics testing, particularly for dosage-sensitive genes for we could be missing genetic diagnoses.

Further Elucidation of Mullegama-Klein-Martinez Syndrome

K. Liang
Advisor: S. Mullegama

Deriving its name from its central role in sister chromatids cohesion, the cohesin multi-protein complex is involved in many cellular mechanisms. The cohesin complex includes four subunits and interacts with
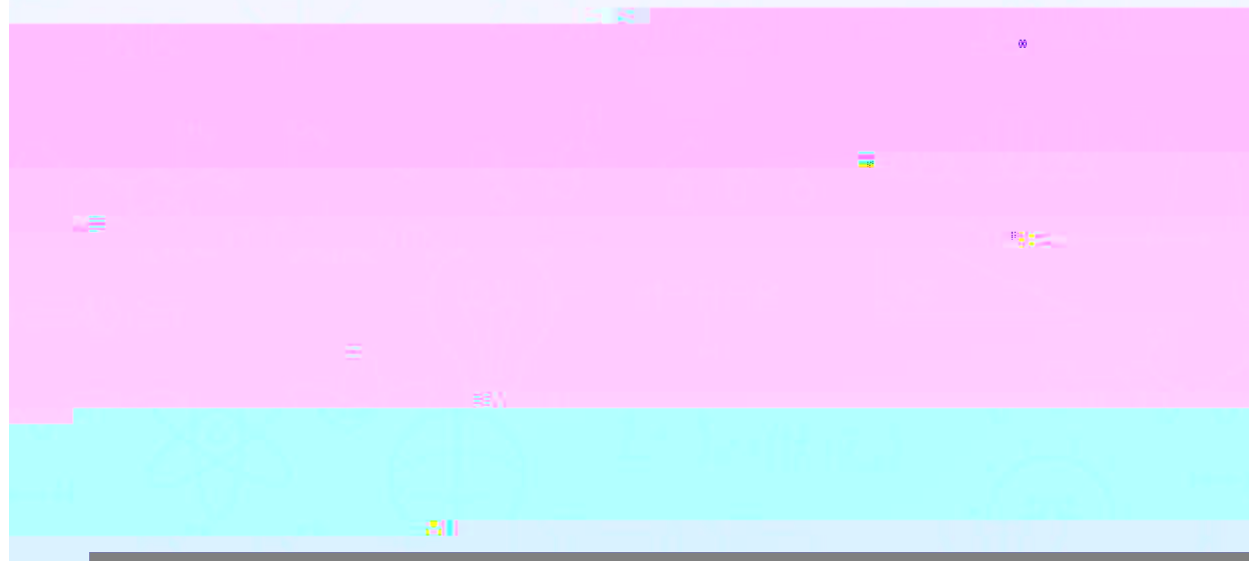
Impact of COVID-19 on the Self-Report Assessment of Obsessive-Compulsive Disorder

Medical Education Research:

These projects aim to advance the knowledge, skills, and professionalism of medical students by understanding and evaluating educational ecosystems. These ecosystems include policies related to admissions and curriculum, people who serve as teachers and mentors, instructional technology and other resources, the attitudes that pervade a given institution or educational experience, and even the medical students themselves.

Accessibility to Sexual Health Education

A. Nair, H. Jeong, C. Schumann
Advisor: P. Taylor

Background: Texas has one of the highest rates of teen pregnancy in the country and the STI rates continue to increase each year. Currently, there is no data available for most of Texas that attempt to examine the quality of sex education provided by Texas Independent School Districts. The purpose of this study is to investigate the quality and occurrence of sex education in Texas and fill the current literature gap that exists in regards to sex education in Texas school systems. With this data, researchers hope to encourage more accessible and quality comprehensive sex education in the Texas education system.
Methods

An Evaluation Approach of Current Medical Students in the Context of an Implicit Bias Framework – A Mixed Methods Study

D. Dozier

Advisor: C. Collins

Introduction: The purpose of this study is to evaluate medical students within an implicit bias training (IBT) framework, and determine if group differences exist between gender, class, and race. Implicit bias (IB) in healthcare adversely affects marginalized patients, and strains patient-physician interactions. Implementing implicit bias trainings (IBT) in medical education is challenging due to a lack of priority, perceived relevance, and effective curricular integration. Evaluating medical students' adequacies and deficiencies in IB-related topics can guide programs in tailoring IBTs, increasing relevance, and improving integration.

Method: Students completed a survey measuring IBT Framework-guided topics: knowledge, awareness,

Facilitating the Integration Embryology, Histology, and Radiology with Clinical Anatomy Education

M. Tran, R. Buch
Advisor: M. Loomis

Introduction: Near-peer teaching has been shown to help students master the type of complex material taught in clinical anatomy. The purpose of this study is to determine if directing teaching assistants to reinforce the generally difficult subjects of histology, embryology, and medical imaging during their time with first-year students in the gross anatomy lab can improve exam performance in those subjects.

Methods: Each week, anatomy TAs are briefed with prepared review sheets highlighting key histology, embryology, and imaging points that were taught in the previous week's lectures. The TAs then reinforce this material by integrating it into the assistance they provide to students in the lab.

Anticipated Results: By comparing student performance between prior SHSU COM Osteopathic medical students in anatomy with the current first years, we will see if the focused guidance of the TAs leads to improved exam performance in the areas of histology, embryology, and imaging.

Conclusions: It is hoped that the integration of histology, embryology, and imaging highlights into the teaching assistants' guidance of students in the gross anatomy lab will lead to improved performance in these subject areas on first-year students' anatomy examinations.

ME8

T.

What's in a t ? Scheduling Disparities Among Non-English Speakers

K. Dang, K. Ibarra. E. Deya Edelen
Advisor: P. Taylor

Introduction: Translation in healthcare systems is a multifaceted issue with value-based considerations often anecdotally leading to reinterpretation of existing standards or use of more convenient measures, such as the use of a family member, to deliver care. This study seeks to provide evidence relating to the perceived disparities of care-delivery in non-English speakers, through the use of "cold-calls" and clinic surveys.

Methods: This study focuses on how language can be a barrier in non-English speakers. Obgyn clinics within the SHSU-COM clinical rotation will be "cold-called" on a rotating order: English, Spanish, and Vietnamese by Osteopathic Medical Students seeking to set up an appointment for the "soonest availability". In addition, clinics will receive a survey regarding their use of in-house translation systems, perceived barriers to implementation, and current knowledge of translation best practices and standards.

Results:

Pre-Clinical/Laboratory (PL):

These projects involve the application of the natural sciences, are performed in the laboratory setting, and will often require additional training (provided by the program) for working with animal tissue, human tissues, cultures, or biosafety protocols.

Airyscan Technology Fills the Gap Between Traditional Confocal Methods and New Super-Resolution Microscopy for Sensitive Immunohistochemistry Protein Studies

M. Kakakhe, L. Tebbe, M. Makia, M. Al-Ubaidi,
Advisor: M. Naas

Introduction: Protein abnormalities, errors in processing, transport, and breakdown may be implicated in several retinal and neurological diseases. Maintaining a good balance between spatial and temporal resolution without sacrificing fluorescence signal intensity and image contrast remains a challenge when studying these disease-causing proteins.

Methods: Classic confocal microscopes use point illumination to scan the sample (Figure 1A, Left [1]). A pinhole spatially limits this disk to block out light that is out of focus from reaching the detector. Closing the pinhole gives a higher resolution but detects fewer photons. Airyscan is an area detector with 32 concentrically arranged detection components (Figure 1A, right [1]) that allow you to obtain more of the disk while the pinhole remains open and prevents blockage of light. This produces greater light effectiveness while imaging and further enhanced deconvolution methods (Figure 1B [2]).

Results: Airyscan imaging was utilized in a study analyzing mutated Ush2aprotein in retinal diseases. Figure 1Cpresents confocal imaging which displays an overview of protein localization, while airyscanshows direct membrane integration of the protein. Figure 1Dpresentsanother useful component of airyscan, which is enhancing the mutated flag labeledUsh2a. This feature enables the ability to see the difference between mutated protein (flag labeled) and non-mutated protein (no flag label) which is useful for tracking and localization studies.

Conclusion: Airyscan is a combination of super-resolution imaging and high sensitivity image quality. This is crucial to distinguish sub-cellular features. This technology will open new possibilities for advanced studies that focus on protein labeling, which can allow for the faster development of gene therapy targets for retinal diseases.

Assessing if Tumor Secreted IL-6 Type Ligands Regulate Peripheral Tissue in a Drosophila Tumor Model

B. Birks, C. Everson, I. Perez
Advisor: M. Atkins

In Drosophila melanogaster, the fat bodies have functional analogy to both human adipose and liver tissues as they function to store both fats and glycogen. Previous studies suggest that tumors may induce cachexia-like wasting in the fat body and activation of the STAT transcription factor. In Drosophila the JAK-STAT pathway is activated by the Unpaired ligands (Upd1-3). Unpaired ligand 2 (Upd 2), analogous to Interleukin 6, has been linked to tumorigenesis, but further characterization of Upds(1, 2, and 3) is needed. This study assesses the role of tumor derived Upds(1-3) on inducing fat-body wasting by assess0 g0 G[,0.00000912 0 612 792

Effect of Neuropsychiatric Medications on Gut Microbiome

I.Ali

Advisor: O. Kelly

Introduction: A *bidirectional* connection between the GI tract and CNS exists, termed the "gut-brain axis." Mechanisms of this relationship include modulation of neurotransmitter secretion by bacterial metabolic byproducts that affect pain perception and cognition. Gut dysbiosis has been identified in Parkinson's, depression, autism, chronic pain, post-op delirium, addiction, and sleep disorders. According to previous studies, medications that act primarily on GABA and NMDA receptors have changed the intestinal microbiota diversity. However, there is limited data on the particular bacterial phyla most affected. The effects of CNS-targeting medications (isoflurane, midazolam, propofol, morphine, methadone,

Oral

Application of Osteomyelitis Classification Systems in Skeletal Samples

J. Ross, I. Esparza
Advisor: K. Lesciotto

Adult cases of osteomyelitis, or an infection in bone, are most frequently observed in the tibia, although other long bones and vertebrae are also commonly affected. Expedient evaluation of the infection is critical to prevent bacteremia and possible amputation of an affected limb; however, a lack of universal agreement on diagnostic criteria has led to the creation of 13 classification systems. These systems are intended to aid in the description, management, and/or prognosis of osteomyelitis patients, primarily relying upon clinical symptoms and medical imaging. This research tested the application of the most common osteomyelitis classification systems to dry bone, using the Southeast Texas Applied Forensic Science Facility Skeletal Collection. Eleven individuals were identified as having at least one bone that exhibited characteristics of osteomyelitis (6 tibiae, 3 femora, 1 fibula, and 1 clavicle). Each was scored according to the Cierny-Mader, Weiland, Waldvogel, Kelly, and Romano systems, as these are widely known classification systems that provide a descriptive or etiologic explanation. Classification systems that focused on pediatric populations or soft tissue examination were excluded from this study. The Romano system uses the largest number of criteria to grade osteomyelitis, providing more criteria that could be applied to skeletal samples and therefore providing the highest level of description. Three case studies are included to highlight the benefits and limitations of each classification system, as well as demonstrate characteristics observable on dry bone that may affect the treatment and progression of osteomyelitis which may not be fully appreciated through traditional imaging.

Comparing Two Methods of Calculating Acute: Chronic Workload Ratio on Girls, Youth Volleyball

C. Schumann, M. Wojciechowski
Advisor: J. Bunn

Novel Partial MBD5 Duplication in a Patient Expands and Refines the Phenotypic Spectrum of 2q23.1 Duplication Syndrome

J. Chang, R. Webster, G.B. Peters, J. A. Martinez-Agosto, S. Ghedia, S. Elsea