66th Annual Student Research Day
September 28, 2022

ABSTRACT BOOK

Meharry Medical College
### 66th Annual Student Research Day

#### Schedule At-A-Glance

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Oral Session 1: SOGSR MPH and SOM Community
Cal Turner Auditorium

9:00 – 9:50 AM  
**Student Presentations**

Blare Gerido (SOGSR MPH - ABSTRACT NO. O-15) - PREPARING FOR FUTURE PANDEMICS BY UNDERSTANDING INFLUENZA AND COVID-19

Malakai Miller (SOGSR MPH - ABSTRACT NO. O-23) - “I JUST WASN’T GETTING WHAT I NEEDED”: A THEMATIC ANALYSIS OF THE BARRIERS SEXUAL AND GENDER MINORITY YOUTH (SGMY) ENCOUNTERED RECEIVING HEALTHCARE DURING THE COVID-19 PANDEMIC

Taylor Perry (SOGSR MPH - ABSTRACT NO. O-30) - IMPACT OF COVID-19 ON SUBSTANCE ABUSE AND MENTAL HEALTH

Anastasia Abongnела (SOM - ABSTRACT NO. O-1) - BRIDGING THE GAP: ANTI-RACIST COMMUNICATION PRACTICES FOR PHYSICIANS WITH BLACK PEDIATRIC PATIENTS

Abiola Adekunle (SOM - ABSTRACT NO. O-2) - EXPLORING THE EXPERIENCES OF BLACK MEN WHO PARTICIPATED IN MULTI-LEVELS OF THE RESEARCH PROCESS: A CASE STUDY

Allison Banks (SOM - ABSTRACT NO. O-6) - PHYSICAL ACTIVITY AND CO-MORBID CONDITIONS AMONG AFRICAN AMERICAN BREAST CANCER SURVIVORS

9:50 -10:00 AM  
**Break (10 minutes)**

10:00 – 10:50 AM  
**Student Presentations**

Erin Blalock (SOM - ABSTRACT NO.O-8) - REDUCING RACIAL INEQUITIES IN GENETIC COUNSELING AND TESTING IN AFRICAN AMERICANS WITH BREAST CANCER

Jenee Graham (SOM - ABSTRACT NO.O-16) - VIEWS TOWARDS THE IMMUNIZATION NEIGHBORHOOD TO INCREASE ACCESS TO THE HPV VACCINE AMONG AFRICAN AMERICAN ADOLESCENTS: A MULTI-STAKEHOLDER PERSPECTIVE

Aireyl Jordan (SOM - ABSTRACT NO. O-18) - SOCIAL DRIVERS OF HEALTH & THE DIGITAL WORLD

Deborah Otuno (SOM - ABSTRACT NO. O-27) - MOBILIZING DOULAS TO EMPOWER BLACK WOMEN IN POSTPARTUM DIABETES PREVENTION

Maya Ricketts (SOM - ABSTRACT NO. O-32) - PRESENCE 5 FOR RACIAL JUSTICE IN PEDIATRICS: CONNECT WITH THE PATIENT’S STORY
Sachindra Sanam Venkata (SOM - ABSTRACT NO. O-36) - URO-ONCOLOGIC DISEASE BURDEN COMPARED TO RESEARCH EFFORT IN THE UNITED STATES, 2019

Oral Session 2: SOGSR PhD
West Basic Science Building Room 1206

9:00 – 9:50 AM  Student Presentations
Jerome Arceneaux (SOGSR - ABSTRACT NO. O-4) - MAPPING THE CELLULAR COMPOSITION OF RESECTED CORTICAL TUBERS AND PERITUBERAL TISSUES

Chauncey Darden (SOGSR - ABSTRACT O-10) - STRUCTURAL MOTIFS WITHIN TRYPANOSOMA BRUCEI TIM17 ARE KEY TO MITOCHONDRIAL TARGETING

Ireti Eni-Aganga (SOGSR - ABSTRACT O-12) - KRÜPPEL-LIKE FACTOR 6 PROMOTES SPECIFICITY PROTEIN 1-MEDIATED PROLIDASE GENE EXPRESSION IN RESPONSE TO TGFβ1

Gerald Nwosu (SOGSR - ABSTRACT O-24) - CHARACTERIZATION AND POTENTIAL RESCUE MECHANISM OF A NOVEL LENNOX-GASTAUT SYNDROME MOUSE MODEL VIA ERAD MECHANISMS

9:50 -10:00 AM  Break (10 minutes)

10:00 – 10:50 AM  Student Presentations
Adrian Padron (SOGSR - ABSTRACT O-28) - CYCLOPHILIN A PROMOTES HIV-1 PRE-INTEGRATION COMPLEX (PIC) FUNCTION

Linda Quinones (SOGSR - ABSTRACT NO. O-31) - IN VITRO AND IN VIVO STUDIES SHOW A UNIQUE PROFILE OF THE SMALL TBTIMS IN TRYPANOSOMA BRUCEI

Tunde Smith (SOGSR - ABSTRACT O-37) - THE KDM5 INHIBITOR PBIT REDUCES PROLIFERATION OF CASTRATION-RESISTANT PROSTATE CANCERS VIA THE INDUCTION OF SENESCENCE

Fidel Soto Gonzalez (SOGSR - ABSTRACT O-38) - “HEY TIM, THIS IS A TRAP” HOW BIOID FOUND TBTAP1 NEIGHBORING TBTIM17 IN TRYPANOSOMA BRUCEI

Oral Session 3: SOM Basic Science
Location: West Basic Science Building Room M001

9:00 – 9:50 AM  Student Presentations
Josephs Anudokem (SOM - ABSTRACT NO. O-3) - THE IMPACT OF HEART FAILURE ON MITOCHONDRIAL MORPHOLOGY
Bryan Ashong (SOM - ABSTRACT NO. O-5) - GALECTIN-1 ROLE IN TARGETING AND KILLING MICROBES

Sunetessa Billings (SOM - ABSTRACT O-7) - A COMPUTATIONAL APPROACH TO MAKING DATA F.A.I.R.

John Ejim (SOM - ABSTRACT O-11) - MODULATORY EFFECTS OF HESPERETIN ON AUTOPHAGY AND NEUROINFLAMMATION IN BV-2 MICROGLIAL CELLS

Kiandra Hawkins (SOM - ABSTRACT NO. O-17) - MIRNA-21’S IMPACT ON THE DEVELOPMENT AND PROGRESSION OF HEPATOCELLULAR CARCINOMA

Deja-Marie LaBorde (SOM - ABSTRACT NO. O-19) - ROLE OF SEX HORMONES IN DIABETIC GASTRIC FUNCTION

9:50 -10:00 AM Break (10 minutes)

10:00 – 10:50 AM Student Presentations
Daniel London (SOM - ABSTRACT NO. O-21) - DYSREGULATION OF MACROPHAGES EphB2 MITIGATES DIET-INDUCED OBESITY IN MICE

Evans Marrero (SOM - ABSTRACT NO O-22) - NAMPT INHIBITION IN CHIP HEMATOPOIETIC STEM CELLS

Remi Parker (SOM - ABSTRACT NO. O-29) - ALTERED MITOCHONDRIAL NETWORKS IN AGED MOUSE SKELETAL MUSCLE IS ASSOCIATED WITH THE DECREASED ACTIVITY OF THE MICOS COMPLEX

Camaray Rouse (SOM - ABSTRACT O-34) - EVALUATION OF COLD ATMOSPHERIC PLASMA AS A DISINFECTANT TO REDUCE INCIDENCE OF CRBSI

Beilul Weldai (SOM - ABSTRACT O-40) - TSH RECEPTOR DRIVE OF ADIPOGENESIS ON PRIMARY CILIUM

Austin Woodard (SOM - ABSTRACT O-44) - EFFICACY OF T FOLLICULAR HELPER 1 CELLS IN GENERATING ANTIBODIES AGAINST PLASMODIUM YOELII IN MICE

Oral Session 4: SOD and SOM Clinical
Location: West Basic Science Building Room 1106

9:00 – 9:50 AM Student Presentations
Antonio Roberts (SOD - ABSTRACT O-33) - RACIAL/GENDER DISPARITY OF POTENTIAL BIOMARKERS IN COVID-19 PATIENT SERUM SPECIMENS: IMPLICATIONS TO PERIODONTAL DISEASE

Jacob Carter (SOD - ABSTRACT O-9) - ENTERIC NEURONAL AND GLIAL CELL GENES AND THEIR IMPLICATIONS TO ORAL AND GASTROINTESTINAL DISEASES
Alex Ewane (SOM - ABSTRACT O-13) - MANUAL LABELING OF CTA SCANS OF PATIENTS WITH TYPE B AORTIC DISSECTION COMPARED TO DEEP REINFORCEMENT LEARNING

Chardae Foster (SOM - ABSTRACT O-14) - METHODS FOR INCREASING CLINICAL TRIAL DIVERSITY - A RETROSPECTIVE ANALYSIS OF COLLECTED RACE/ETHNICITY DATA FOLLOWING A CLINICAL TRIAL DIVERSITY INTERVENTION AT A CLINICAL RESEARCH ORGANIZATION IN NASHVILLE, TN

Joiliana Lecointe (SOM - ABSTRACT O-20) - THE FONTAN CIRCULATION SHOWS DECREASED CELL SURVIVAL AND OXIDATIVE DAMAGE

Vanessa Okechuku (SOM - ABSTRACT NO. O-25) - MRI (MAGNETIC RESONANCE IMAGING) DIFFUSION-WEIGHTED IMAGING WITH PATHOLOGY CORRELATION OF HEAD & NECK TUMORS

9:50 -10:00 AM  Break (10 minutes)

10:00 – 10:50 AM  Student Presentations
Oluwatobi Oshomoji (SOM - ABSTRACT NO. O-26) - HIGHER MUSCLE SODIUM ASSOCIATES WITH IMPROVED INSULIN SENSITIVITY IN PATIENTS ON HEMODIALYSIS

Devona Samuel (SOM - ABSTRACT O-35) - RELATIONSHIPS OF PERPETRATORS TO VICTIMS IN CHILD MALTREATMENT FATALITIES AMONG CHILDREN WITH DISABILITIES

Noah Thomas (SOM - ABSTRACT O-39) - FASCIA ILIAC BLOCKS IN ELDERLY WITH HIP FRACTURES: A CRITICAL EVALUATION

Sundae Williams (SOM - ABSTRACT NO. O-42) - THE IMPACT OF INFERIOR TEMPORAL LOBECTOMY VOLUME ON SEIZURE FREEDOM RATES IN PATIENTS WITH TEMPORAL ENCEPHALOCELES

Tierrra Williams (SOM - ABSTRACT O-43) - OBESITY’S IMPACT ON MORBIDITY ASSOCIATED WITH CARDIOVASCULAR DISEASE IN PREGNANCY USING THE CARPREG-II PREDICTION SCORE

Matthew Wells (SOM - ABSTRACT O-41) - AN EXAMINATION OF PATTERNS OF DISTRESS AMONG BREAST CANCER SURVIVORS THAT PREMATURELY DISCONTINUE ADJUVANT ENDOCRINE THERAPY
ORAL SESSION ABSTRACTS
BRIDGING THE GAP: ANTI-RACIST COMMUNICATION PRACTICES FOR PHYSICIANS WITH BLACK PEDIATRIC PATIENTS

Anastasia Abongnelah¹, Maya Ricketts¹, Tylanna Baker³, Baraka Floyd²,⁵, Catí Brown-Johnson², Raquel Garcia, Zoe Braddock, Sonoo Thadaney Israni, Melvin Faulks, Megha Shankar⁴, Donna Zulman²,⁴
¹School of Medicine, Meharry Medical College, ²Stanford School of Medicine, Division of Primary Care and Population Health, ³Moorehouse School of Medicine, ⁴Stanford School of Medicine, Primary Care Outcomes and Research/Center for Health Policy, and ⁵Gardner Packard Children’s Health Center and Roots Community Health Center

Racism is deeply rooted in the US healthcare system. There have been many attempts to understand the intersectionality of race and medicine. These activities often point out differences but don’t explain why these disparities exist, nor do they provide solutions or practices that improve health outcomes in racial minority patients. Evidence continues to show disparities in health outcomes, and this can be linked to several factors, one of which lies with the quality of care from healthcare providers.² The Presence 5 for Racial Justice (P5RJ) framework for anti-racism in medical health practices aims to improve the patient-provider encounter by giving a premise through which humanism is present, clinical bias and internalized racism can be diminished, and a meaningful connection between the physician and the patient can be encouraged. Literature exists which recommends many strategies for the care of black children including the unlearning of biases, the provision of family-centered care, the expression of compassion and so much more. A qualitative analysis of clinician practices was extracted from literature reviews (n= 157) and disseminated to physicians in huddle guides. Physicians can seek out patient preferences, ensure patients are aware of rights and explore best resources for them. Black pediatric patients and their families who encountered physicians that utilized these clinician practices reported lower social needs, better health outcomes, increased resource utilization, and improved adherence to medical advice. Limitations include racial bias in literature. The nature of racial disparities in healthcare varies with country and so most articles were limited to U.S. only. Biases may be present such as volunteer bias because most reported outcomes were dependent largely on self-reporting surveys. In conclusion, huddle guides will be disseminated to clinical partners at Stanford School of Medicine Department of Pediatrics. Further assessment of the implementation and its effectiveness will also be done in future.

This work is supported by a grant from the Maternal & Child Health Research Institute under Dr. Baraka Floyd.

EXPLORING THE EXPERIENCES OF BLACK MEN WHO PARTICIPATED IN MULTI-LEVELS OF THE RESEARCH PROCESS: A CASE STUDY

Abiola Adekunle, Cunningham-Erves, Mayo-Gamble, Wilkinson, Stewart
School of Medicine, Meharry Medical College, Nashville ,TN

Black men continue to be underrepresented in biomedical studies compared to other racial and ethnic groups. Studies have commonly explored reasons for non-participation including past research abuses and distrust in researchers and the process. Little to no studies have explored positive experiences of Black men. The objective of this qualitative case study is to demonstrate experiences of Black men who participated in different phases of the research process. We also explored their views towards research and perceived strategies to increase recruitment and retention of Black men in the research process. We conducted eight case reports among Black men who have been involved in various roles of research. A purposeful sample was used to identify men meeting the following criteria: Black, male, 18 and older, and had prior history of participating in select research roles. Data was collected through semi-structured interviews with a brief
demographic survey prior to the interview. Interviews were conducted over the months of July and August 2022. Verbal informed consent was taken prior to the interview. Interviews were 15-20 minutes and audio-recorded. Data was analyzed using thematic analysis. Specifically, three trained qualitative analysts individually coded the transcript. Discrepancies were resolved, and coding was conducted until saturation met. Codes were combined using axial coding, and then themes were identified after conducting within-across comparisons of codes. The verification procedures of the interview data were done using triangulation, peer debriefing, and rich, thick description. Quantitative survey data analysis was performed using SPSS version 28. In the future recruitment of Black men should focus on understanding the history of Black in research and the social stigmas involved in participation in the past. Engaging with Black male participants may require the involvement of female loved ones or other African American men who participated and can attest to their positive experiences regarding research. Limitations included results not being generalizable and this study has a sample size. Common themes that were seen in these interviews were the importance of understanding the Black experience regarding research, understanding that trust will take time to build, and the importance of transparency throughout the research process. Also, many of the interviewees stated that their experience in research had been positive overall, and they felt it was important that their voices were heard. In conclusion, we gained information to improve transparency and potential trust between biomedical researchers and African American men in different phases of the research process. This could ultimately increase trust of Black men across different research phases.

THE IMPACT OF HEART FAILURE ON MITOCHONDRIAL MORPHOLOGY

Josephs Anudokem Jr.1,2,3, Heather K. Beasley2,3, Zer Vue2,3, Andrea G. Marshall2,3, Bret Mobley2,3 and Antentor Hinton, Jr.2,3

1School of Medicine, Meharry Medical College, 2Department of Molecular Physiology and Biophysics, Vanderbilt School of Medicine, 3The Vanderbilt Diabetes Research Training Center, Nashville, TN

It has been long recognized that deterioration in mitochondrial function causes pathophysiology and might contribute to the detected age dependent decrease in organ function. Heart failure happens when blood backs up and fluid can build up in the lungs, causing shortness of breath, and narrowing of arteries. These symptoms and signs caused by cardiac dysfunction, result in reduced longevity. At present, HF represents an unmet need with no approved clinical therapies to replace the damaged myocardium. HF has been associated with dysfunction of mitochondria, a critical organelle for the energy demands of cardiomyocytes. Thus, we hypothesize that reduced cardiac function in response to heart failure affects not only mitochondrial function but also morphology. To test this hypothesis, we investigated mitochondrial morphological changes and dysfunction using 3D reconstruction of samples of control human hearts and human heart failure patients. We visualized the samples using serial block face electron microscopy. This technique cuts the sample cells into ultrathin sections and then these sections can be layered for analysis. We then reconstructed the sample mitochondria using Amira software, which uses the slices to form 3D structures for analysis. Our results show that there are indeed differences between the mitochondrial morphologies of non-HF hearts and HF hearts. Our 3D characterization of both heart samples, display possible fragmentation of mitochondria in the HF samples compared to the non-HF. Using bioinformatic analysis via prism, we found that the volumes, areas, and perimeters of the HF mitochondria were significantly less than those of the non-HF mitochondria. We also created a mitotype, which organizes the mitochondria from the samples by volume and size, to further display the differences in the mitochondria of the sample groups. Our study demonstrates that HF is related to the fragmentation of mitochondria, which may cause the associated mitochondrial dysfunction. Using this information, it may be possible to develop novel therapeutics for the treatment of HF. However, as our study is a novel exploration into the
structural changes in mitochondria, more information is required. Future directions include determining the morphological changes in mitochondria during heart development.

**Support/Funding:** The Vanderbilt-Meharry James Puckette Carter Summer Scholar Program, and the Hinton Laboratory at Vanderbilt University

Hinton Lab Grant support: UNCF/BMS E.E. Just Faculty award, Burroughs Wellcome Fund CASI, Burroughs Wellcome Fund Ad-hoc Award, NIH SRP Subaward to #5R25HL106365-12 from the NIH PRIDE Program, DK020593, and Vanderbilt Diabetes and Research Training Center for DRTC Alzheimer’s Disease Pilot & Feasibility Program awarded to Dr. Hinton.

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**O-4**

**MAPPING THE CELLULAR COMPOSITION OF RESECTED CORTICAL TUBERS AND PERITUBERAL TISSUES**

**Jerome S. Arceneaux**¹², Rohit Khurana³, Asa A. Brockman³, Mary-Bronwen L. Chalkley³, Laura C. Geben³, Robert P. Carson⁴,⁵,⁶, Kevin C. Ess³,⁵,⁶, and Rebecca A. Ihrie³,⁷

¹School of Graduate Studies and Research, ²Department of Biochemistry, Cancer Biology, Neuroscience, and Pharmacology, School of Medicine, Meharry Medical College, Departments of ³Cell and Developmental Biology and ⁴Pharmacology, Vanderbilt University, Departments of ⁵Neurology, ⁶Pediatrics, and ⁷Neurological Surgery, Vanderbilt University Medical Center, Nashville, TN

Tuberous sclerosis complex (TSC) arises due to heterozygous mutations in \( TSC1 \) or \( TSC2 \) and affects approximately 1 in 6000 births. Neuropsychiatric symptoms of this disorder include autism spectrum disorder (ASD), developmental delay, intellectual disability, and epilepsy, and mutations in \( TSC2 \) are often associated with increased symptom severity. Unfortunately, epilepsy in TSC patients is often refractory to drug treatment, requiring surgical resection. Within resected brain tissues from patients with TSC, detection of enlarged “balloon” cells is diagnostic for this disorder. Analysis of tubers and perituberal tissues indicates seizures in TSC originate in the perituberal tissues, and “balloon” cells may contain loss of heterozygosity (LOH) of \( TSC1/2 \) compared to surrounding tissue. Though mutations in \( TSC1/2 \) produce epilepsy and cause mTORC1 hyperactivation, unified criteria to identify “balloon” cells and infer their lineage are lacking, and these diagnostic cells have not been studied across large TSC cohorts at the protein level. In addition, how “balloon” cells influence their microenvironment to produce epileptogenic foci is poorly understood.

High-dimensional approaches such as imaging mass cytometry (IMC) offer the opportunity to directly assess thirty (30+) proteins and signaling events in single cells while documenting spatial relationships within the tissue. We developed a custom imaging panel, where each of thirty-five (35) antibodies was successfully tested on known positive and negative controls, including pharmacological manipulations of signaling proteins in human tissues and cells. We developed a customized machine-learning workflow that identifies prospective balloon cells with 93% precision and 69% efficiency within archived cortical tubers. Currently, we are mapping the cytoarchitecture and signaling perturbations within these samples, with a specific focus on balloon cells and their immediate neighbors. These data will comprise a rich dataset for understanding the abundance, structure, and signaling activity of neuronal, glial, and immune cells within archived tubers and perituberal tissues, enabling quantitative comparison of TSC with other mTORopathies.

This project was funded, in part, by the MD/PhD Endowment Grant (JSA) and the NINDS Grant 5R01NS118580-03 (RAI, KCE).
GALECTIN-1 ROLE IN TARGETING AND KILLING MICROBES

Bryan Ashong1, Shang-Chuen Wu2, Justin Jan2, Matt Rathgeber2, Sean R. Stowell2
1School of Medicine, Meharry Medical College, Nashville, TN and
2Brigham and Women’s Hospital, Department of Pathology, Harvard Medical School/NRB, Boston, MA

BACKGROUND: Previous studies suggest that galectin-3 (Gal-3), galectin-4 (Gal-4), galectin-7 (Gal-7) and galectin-8 (Gal-8) may provide a unique form of innate immunity against molecular mimicry by specifically targeting microbes that coat themselves in self-like antigens (Stowell et al., 2010; Wu et al., 2021b). For example, Gal-4, Gal-7 and Gal-8 have shown strong capabilities in binding and killing *Eschericia Coli* O86. Aside from their role in unique cellular functions such as cell migration, angiogenesis and platelet activation, the galectin family recognizes a diverse range of pathogens. Galectin-1 has demonstrated the ability to recognize several viruses such as human immunodeficiency virus (HIV) and human T-cell lymphotropic virus (HTLV). However, the binding specificity and antimicrobial activity of many other human galectins remains incompletely explored. In this study, we focused on the binding specificity of galectin-1 (Gal-1). Our aim is to demonstrate the effectiveness of Gal-1 in binding and killing various strains of bacteria.

METHODS: Expression plasmids encoding human Gal-1 were transformed into *E.Coli* BL21 (DE3). Briefly, transformed bacteria were cultured in LB broth containing 100 μg/ml ampicillin with agitation. (250 rpm) at 37 °C. When bacteria were grown to the mid-log phase, protein expression was induced by addition of isopropyl 1-thio-β-D-galactopyranoside (IPTG, 1.5mM). After 20-h induction in 16 °C, 6L cultured bacteria were pelleted and harvested by centrifugation and then resuspended in 60 ml bacterial lysis buffer (PBS with 14 mM 2-mercaptoethanol (2-ME), 60 μl ribonuclease A (RNase A), 60 μl DNase I, 60 μl lysozyme, and 2 protease inhibitor cocktail tablets). The suspension was passed through a cell disruptor, and the lysate was centrifuged at 17,000 rpm at 4 °C for 1h. Supernatant was applied to lactosyl-sepharose affinity chromatography column. For elution, the elution buffer (PBS with 14mM 2-ME and 100 mM lactose) was added. The desired fractions were pooled and stained with Coomassie blue on SDSPAGE gel to test purity. Before derivatization, 2-ME and lactose were removed from Gal-1 using a PD-10 gel filtration column for bacteria killing assay.

RESULTS: Our results demonstrate that the innate immune lectin Gal-1 binds several microbes, all of which contain lactosamine structures and share features of blood group-like antigens. The ability of Gal-1 to kill microbes that express self-like antigens is similar to other galectins, such as Gal-3, Gal-4, Gal-7 and Gal-8. This study furthered our understanding of galectin’s innate immune function in response to distinct strains of harmful bacteria. Microbial Glycans Microarray (MGM) showed that Gal-1 is capable of targeting microbes that express distinct lactose containing glycans. In the CFG microarray, Gal-1 had higher binding affinity with LacNAc containing glycans and was observed at the concentration of 0.12 μM. When analyzed with MGM array, Gal-1 had higher binding affinity with *Streptococcus Pneumoniae* serotype 14. This demonstrates the ability of Gal-1 to preferentially bind and kill microbes. CONCLUSION: Gal-1 recognizes the microbial glycans of bacterial strains that express self like antigens. Further research must be done to confirm the interaction of Gal-1 with the host cell and if it plays a role in autoimmunity. MGM demonstrated that Gal-1 tightly binds bacteria, particularly lactosamine containing structures as well as strains of Providencia Alcalifaciens (PAO5) and Streptococcus Pneumoniae (SP14). Killing assays showed that Gal-1 can ultimately kill these strains of bacteria with considerable specificity.
PHYSICAL ACTIVITY AND CO-MORBID CONDITIONS AMONG AFRICAN AMERICAN BREAST CANCER SURVIVORS

Allison D. Banks, Katherine Busen, Heather Wallace, Sarah Nechuta, Maureen Sanderson
School of Medicine, Meharry Medical College, Nashville, TN

Purpose: Physical activity (PA) has been shown to improve physical health in cancer survivors and an improved cancer prognosis. The current literature does not include studies of the association between physical activity and cancer survivorship among minorities. African American women are more likely to engage in poor lifestyle habits and have obesity and other comorbidities. We examined the correlation among PA types and patterns, obesity, and other comorbidities in long-term breast cancer survivors.

Method: This cross-sectional study included 323 women who previously participated in a case-only study in Tennessee, South Carolina, and Georgia. The participants completed a survivorship-focused questionnaire using validated measures to collect data on cancer treatment, PA and other lifestyle factors and comorbidities. Logistic regression models estimated adjusted OR and 95% CIs for total PA and meeting PA guidelines.

Results: The mean age of the participants was 59.1 years (range: 27.9 - 79.5). The most frequent PA types (≥1/month) included routine household cleaning (92.9%), shopping (94.7%), walking slowly (42.1%), and walking briskly (40.6%). Less than 40% met PA recommendations. Women with more total comorbidities, arthritis, and obesity had lower levels of total PA (min/week) and/or recreational PA. In adjusted models, BMI ≥35 kg/m2 was associated with reduced odds of total PA (adjusted OR=0.33, 95% CI: 0.12 - 0.88, highest tertile). Arthritis was associated with reduced odds of meeting PA guidelines (OR=0.61, 95% CI: 0.36 - 1.05). Conclusion: Women with a high BMI and other comorbidities were associated with a lower total PA level. Obesity, a history of arthritis, and a current prescription for depression and/or anxiety were associated with a lower total PA level and an inability to meet PA guidelines. Increased access for PA, social support, and education on the benefits of PA is needed to increase cancer survivorship in African American women. Self-report of PA was a limitation of the study which could lead to the overestimation of PA. More research is needed to discern the role of specific types of physical activity on long term breast cancer survivorship in African American women.

Supports: STSBHS was supported by the National Cancer Institute (grants U54 CA163069, U54 CA163072, and R03 CA192214); AABL Survivorship Study was supported by the National Cancer Institute (K07 CA184257). A.D. Banks was supported by the MVTCP Cancer Partnership funded by the National Cancer Institute (U54 CA163069).

A COMPUTATIONAL APPROACH TO MAKING DATA F.A.I.R.

Sunteasja Billings1, Josef Hardi1,2,3, Michael O’Connor2,3, John Graybeal1,3, Mark Musen2,3
1School of Medicine, Meharry Medical College, Nashville, TN, 2Stanford Center for Biomedical Informatics Research, Stanford University, Stanford, CA, and 3CEDAR The Center for Expanded Data Annotation and Retrieval

HuBMAP is a research consortium that aims to develop an open, global atlas of the human body at the cellular level. Through molecular analysis technologies and computational tools, an atlas composed of 3D tissue maps will be created to accelerate our understanding of the function and relationships among cells in the human body and how those functions and relationships affect our health. Though operative, it remains challenging for metadata to maintain FAIR standards without enforced controlled vocabularies and internal linkages to ontologies and metadata standards. To be considered FAIR, metadata must be findable, accessible, interoperable, and reusable. In efforts to create such metadata, we have collaborated with the Center for Enhanced Data Annotation and Retrieval (CEDAR) to develop metadata templates linked to ontologies and standards present in the NCBO Bioportal. This study investigated whether existing
HuBMAP metadata can be integrated into CEDAR templates to simplify the workflow of data submission, processing, validation, and publication to optimize the metadata pathway. Using the HuBMAP Sample Data v2b Spreadsheet (an Excel spreadsheet containing data on how the tissue sample was collected, processed, and stored), 3 templates were created in CEDAR: Sample Block, Sample Section, and Sample Suspension. There were various concepts in the sample data spreadsheet that could not found the BioPortal repository. For those concepts, vocabularies were created using Excel, converted into RDF files through SKOS Play, and submitted as new ontologies into BioPortal. With the newly available ontologies, templates were created and published in CEDAR. Our results show that this metadata management framework supports authoring, curation, validation, management, and sharing of HuBMAP metadata. CEDAR technology allows users to guarantee their input metadata are FAIR prior to submission for public release. We hope to expose limitations in our model and issues in the metadata being collected by HuBMAP to identify problems in how the experiment is being described. Upon integrating the submission of all these components into one submission tool and workflow, we aim to significantly simplify the workflow of HuBMAP dataset submission, processing, validation, registration, and publication to optimize the metadata pathway from submission to discovery and allow more datasets to become cross-searchable.

### REDUCING RACIAL INEQUITIES IN GENETIC COUNSELING AND TESTING IN AFRICAN AMERICANS WITH BREAST CANCER

**Erin Blalock¹, Graham Colditz², and Ashley J. Housten²**

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Breast cancer specific mortality disparities exist among African American (AA) women compared to their White counterparts. Genetic counseling and testing (GCT) has the capability to identify those at high-risk before receiving a breast cancer diagnosis, yet AA women are tested at lower rates, and physicians play key role for referrals. The aim of this project is to explore the cause of lower rates for GCT among AA women with breast cancer as well as identify what providers consider at when recommending GCT to patients. We hypothesized social determinants of health (e.g., access, cost) related barriers impact provider referrals for GCT for AA women with breast cancer. We conducted 3 semi-structured focus groups with 13 breast oncologists from Washington University School of Medicine. Audio recordings were transcribed verbatim, and transcripts were analyzed by two independent coders using an inductive and deductive approach with NVivo, a qualitative data analysis software. Our analysis found that providers’ demonstrated interest and shared concerns about disparities; however, only briefly discussed the specific reasons for disparities in GCT among AA women. Of the limited discussion of disparities, participants shared their perceptions regarding: 1) Limited familiarity of GCT among African American women, 2) Incomplete knowledge of family history among African American women with cancer, and 3) Concerns of insurance coverage and cost for GCT as contributing factors to GCT disparities. One limitation is that all data came from providers from the same academic setting; however, it provided specific insight for GCT within a clinical context treating patients with various insurance types, including Medicaid. Our findings have the potential to address racial inequities and provide the opportunity to improve breast cancer related health outcomes. The remaining aims of project will examine the patient perspective and evaluate the pilot GCT intervention. This project was funded by the Lilly Grant and the Siteman Investment Program.
**O-9**

ENTERIC NEURONAL AND GLIAL CELL GENES AND THEIR IMPLICATIONS TO ORAL AND GASTROINTESTINAL DISEASES

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The enteric nervous system (ENS), comprised of enteric glia and neuronal cells controls gastrointestinal functions, including motility, secretion, and local immunity. The purpose of this study is to isolate genes from the ENS and investigate their mechanistic role to GI and oral health. Primary enteric neuronal crest (pENC’s) cells were isolated from adult female mice (9–10-week-old C57BL/6J [WT, n=4]) intestines. The cells were stained to determine glial and neuronal cell markers and sorted respectively using a flow cytometer cell sorter (BD biosciences). The single cell RNA-sequencing (scRNA-seq) method used in this study by IFIIDDW (Murdoch University, Australia) is an adapted version of the SMARTseq2 and MARS-seq approach in which single cells from the target population are FACS-sorted into 96- or 384-well plates containing 3µL of lysis buffer inclusive of a ribo-nuclease inhibitor. Differential expression analysis and visualization was performed using the normalized count file using the visual genomics analysis studio (VGAS), an in-house program for visualizing and analyzing RNAseq data. The Kyoto Encyclopedia of Genes and Genomes (KEGG) database were utilized to analyze the pathways and the backgrounds of the genes. Our data generated from scRNA-seq isolated thousands of genes from the enteric nervous system of adult female mice. Many of these genes were found to be expressed in both enteric glial and neuronal cells. However, there were eight genes found to be expressed at much higher levels than the others with four genes found to be exclusively expressed in the enteric glial cells and four found to be expressed in the enteric neurons. These eight genes have important roles in regulating the GI tract and participate in other health conditions. Dysfunction of these genes leads to GI and oral problems that can adversely affect health.

This project was supported, in part, by The National Institute of General Medical Sciences (NIGMS)-SC1 (GM121282). Dental student research is supported by the HRSA-COE grant D34HP00002.

**O-10**

STRUCTURAL MOTIFS WITHIN *TRYPANOSOMA BRUCEI* TIM17 ARE KEY TO MITOCHONDRIAL TARGETING

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Recently, the role of mitochondrial dysfunction has been indicated in a multitude of diseases such as neurodegeneration, aging, cancer, and diabetes. Using around 1,000 proteins that are mostly nuclear encoded, mitochondria perform an abundance of functions within the cell. Since these proteins travel from the cytosol to the mitochondria, this makes mitochondrial localization and protein import highly critical for function. Using a sophisticated multi-protein import machinery (or translocases), mitochondria recognize various types of mitochondrial targeting signals. Multi-spanning inner membrane proteins such as Tim17/Tim23/Tim22 which are the channel forming proteins of the translocases contain internal signal(s) that are not well characterized. Using a homolog of yeast and human Tim17, Tim17 in *Trypanosoma brucei*
(TbTim17), we hypothesize that structural motifs and characteristic amino acid residues within this protein are important for mitochondrial localization. We generated a series of deletion mutants that either deleted the N-termini, C-termini, or each transmembrane domain successively. Using western blot analysis, confocal microscopy, and prediction software tools, we found that TbTim17 may possess more than one internal targeting signal (ITS) within TMDs 1 and 4. To further validate if TM1 contains a localization signal we created N-terminal fragments consisting of either N-termini only, TM1 only, or both. We additionally validated TM4 by creating additional C-terminal deletion mutants where we deleted two successive amino acids at a time to narrow down individual amino acid residues required for localization. Overall, it was determined that both TM1 and a portion of TM4 between amino acid residues 121 and 134 are necessary for mitochondrial localization.

O-11
MODULATORY EFFECTS OF HESPERETIN ON AUTOPHAGY AND NEUROINFLAMMATION IN BV-2 MICROGLIAL CELLS

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The goal of the present study is to investigate the effect of hesperetin on LPS-activated BV-2 microglial cells. Our hypothesis is that Hesperetin will have a modulating effects on the gene expression of genes associated with autophagy and neuroinflammation. To do this, we conducted four investigations into the effects of hesperetin in conjunction with LPS. Cell Cultures, Cell Viabilities, Morphologic Studies, and Autophagy RT-PCR Arrays. BV-2 Microglial Cells were cultured using 75 ml flasks with Dulbecco’s modified Eagle’s medium supplemented with streptomycin/penicillin and Fetal Bovine Serum (FBS). The cells were then incubated at 37 C until they reached at least 80% confluency to start the experiments. Cell Viability was conducted by pipetting in a 96-well plate and treated with DMSO (control), hesperetin, LPS, and the combination of hesperetin and LPS. After a 48-hr period, the cells were incubated with Alamar Blue reagent. The plates were then read using a fluorescent analyzer. The Morphologic Study required the BV-2 cells to be treated the same way as in cell viability for 48 hr and placed in a 96-well plate. Images were taken to observe cell morphological changes using a Cell Imaging Analyzer (Biotek). Finally, the Autophagy RT-PCR Arrays (Bio-Rad) were used to investigate hesperetin (100 µM) modulatory effect in a range of genes associated with autophagy. The data yielded showed significant LPS-mediated upregulation of FAS, NFKB-1, TNF, and CTSS genes. According the current literature, these genes are mediators of neuroinflammation and in some cases inhibitors of Autophagy. Hesperetin was shown to downregulate the expression of these genes which is the likely cause of the increase in the cell counts resulting from the cell viability experiments. The Morphological imaging indicated distinct changes in BV-2 Cell shape when culture with Hesperetin vs. LPS, and a combination of these difference were seen during Co-treatment of the BV-2 cells with both compounds. After assessing the results of the four procedures, we have concluded that our hypothesis is supported by the data. Future studies will be done to further investigate the mechanisms activated when Hesperetin and LPS are simultaneously cultured and the specific causes of the morphological changes seen between the two compound cultures.
KRÜPPEL-LIKE FACTOR 6 PROMOTES SPECIFICITY PROTEIN 1-MEDIATED PROLIDASE GENE EXPRESSION IN RESPONSE TO TGFβ₁

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Prolidase, also known as peptidase D (PEPD), is a hydrolase that cleaves dipeptides containing C-terminal proline or hydroxyproline. The substrates for prolidase are primarily produced during collagen biosynthesis, and prolidase catalyzes the rate-limiting step in collagen production. Prolidase is vital for collagen metabolism, matrix remodeling, and wound healing. The hallmarks of Prolidase Deficiency, a rare autosomal recessive condition, are ulcerative sores, bone abnormalities, intellectual disabilities, and poor wound healing. Also, prolidase mRNA and activity are upregulated in scar tissue and wound fluid. Although the literature shows that prolidase plays a significant role in wound healing, its molecular and cellular regulation remains understudied. Our preliminary in silico analysis of the PEPD promoter (PEPDpro) highlighted key regulatory elements upstream of the transcription start site. We selected Kruppel-like factor 6 (KLF6) and Specificity factor 1 (Sp1), transcription factors associated with vascular injury, wound healing, and collagen metabolism. We amplified the promoter from the human genome and inserted it into a luciferase reporter construct. Our data demonstrate that KLF6 enhances PEPD promoter activity in a Sp1-dependent manner. Additionally, KLF6 is regulated by Transforming Growth Factor β₁ (TGFβ₁), and our data further illustrates that TGFβ₁ mediated signaling drives both PEPD promoter activity as well as an increase in prolidase mRNA and protein levels. Inhibition of TGFβ₁ or Sp1’s binding decrease prolidase mRNA and protein levels. Our current and ongoing findings generate new knowledge on the molecular regulation of prolidase and potentially aid in developing therapeutic approaches to regulate its expression in various physiological and pathological conditions related to defective wound healing. This project was supported, in part, by R25 GM59994-19, U54 MD007586, and U54 MD007586.

MANUAL LABELING OF CTA SCANS OF PATIENTS WITH TYPE B AORTIC DISSECTION COMPARED TO DEEP REINFORCEMENT LEARNING

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Background and purpose: Aortic branch localization in patients with acute type B aortic dissection (TBAD) is crucial to evaluate false lumen outflow pattern, which ultimately affects long-term patient management. Manual labeling is time-consuming, while deep reinforcement learning (DRL) could provide a more time-efficient solution. We aim to provide training data for DRL by manually labeling aortic branches on computed tomography angiography (CTA) scans. Methods: From a multicenter database, we retrospectively included 164 patients who underwent a CTA scan for acute TBAD between 2006 and 2018. Two readers were trained by an expert in cardiovascular imaging on how to identify and label the scans on a standardized custom imaging workflow on a dedicated software (iNtuition, TeraRecon, Durham, NC). The readers labeled the center line, the aortic annulus and all major aortic branches from the left subclavian artery to the aortic bifurcation. The cases were evaluated based on anatomical coverage (chest vs. abdomen
and pelvis) and the degree of intravascular attenuation. We tracked the time necessary to manually generate landmarks to allow comparison to DRL time. **Results:** Of the 164 cases, 12 were excluded (10 were incomplete and 2 didn’t have enough intravascular contrast), 66 cases were tracked for completion time with a mean time of 846+/− 357 sec. Preliminary results for DRL training on one landmark (IMA) resulted in an average time of 0.9 sec for branch detection. **Conclusion:** From our preliminary results, DRL seems to offer a faster method to identify and label major aortic branches in TBAD patients. Further analysis of DRL training results are underway and will ultimately allow a refined comparison of timing between manual and automated landmark detection.

**O-14**

**METHODS FOR INCREASING CLINICAL TRIAL DIVERSITY - A RETROSPECTIVE ANALYSIS OF COLLECTED RACE/ETHNICITY DATA FOLLOWING A CLINICAL TRIAL DIVERSITY INTERVENTION AT A CLINICAL RESEARCH ORGANIZATION IN NASHVILLE, TN**

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Clinical trial diversity has become a trending topic in clinical research, but it is a milestone that the clinical research community has yet to overcome. Many clinical trial sites lack a diversity plan or an assessment method to determine the success of an existing diversity plan. This study aimed to evaluate a Clinical Trial Diversity Intervention at Clinical Research Associates Inc (CRA) in Nashville, TN, to assess the intervention’s impact on clinical trial diversity. We hypothesize that the intervention will increase participants who identify as “Black or African American,” “Hispanic or Latino or Other Spanish Origin,” “Asian,” and “Alaska Native or American Indian.” We also expect the intervention to result in a reduction of unreported race and ethnicity data. The study population was individuals currently or previously enrolled in a clinical trial at CRA. Pre-existing race and ethnicity data were collected during telephone interviews in the pre-intervention phase and by self-reported surveys in the post-intervention phase. The data was recorded using spreadsheets of extracted demographic data from an on-site database at CRA. Data analysis was performed with SPSS software. We found that following the intervention, there was an increase in participants who identified as “Alaska Native or American Indian” or “Hispanic or Latino or Other Spanish Origin.” There was also a reduction in the unreported race and ethnicity data after the intervention. These results indicate that developing a direct intervention that targets diverse enrollment can improve clinical trial diversity. Though this study did not reveal a significant increase in Black or African Americans or Asians within clinical trials, these results call for more innovative solutions to reach these communities in the recruitment process. For further studies, CRA will improve the consistency of data collection methods and develop an enhanced data system that allows demographic data to be easily extracted. This study reveals that there is still much work to be done to improve clinical trial diversity. Our next steps are to explore the effects of increasing the diversity of physician investigators on diversity within clinical trials. The research reported in this publication was supported by Clinical Research Associates Inc (CRA).
O-15
PREPARING FOR FUTURE PANDEMICS BY UNDERSTANDING INFLUENZA AND COVID-19.
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Influenza and COVID-19 are respiratory illnesses that are infectious but are caused by different strains of viruses. While COVID-19 causes more serious illnesses than influenza, both viruses share similar symptoms ranging from no symptoms (asymptomatic) to more serious illnesses such as Pneumonia. Both diseases also share modes of transmission, including airborne and close contact transmission. COVID-19 and Influenza share similar populations that are at a higher risk of infection or complications with other diseases such as people with underlying health conditions, older adults, or pregnant women. Influenza and Pneumonia have historically been the leading causes of incidence and death, but in recent years, COVID-19 has transformed into one of the highest and leading causes of death.

A model can be created to predict trends in COVID-19 and other infectious diseases by looking at the trends in influenza. Since there is scarce data comparing the two different diseases and their effects on vulnerable populations this research looks to fill the gap in knowledge. Through Geographic Information Systems (GIS) the research assessed the vulnerable populations by state and county using previous influenza data and potentially predicts the spread and effect of future infectious diseases in different geographic locations. Mortality and Incidence data was used between the years 2010 and 2022 as it relates to COVID-19 and Influenza to create a visual map on the open-source data QGIS (v 3.22.5).

O-16
VIEWS TOWARDS THE IMMUNIZATION NEIGHBORHOOD TO INCREASE ACCESS TO THE HPV VACCINE AMONG AFRICAN AMERICAN ADOLESCENTS: A MULTI-STAKEHOLDER PERSPECTIVE
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The human papillomavirus (HPV) remains a public health issue as the leading sexually transmitted infection contributing to rising cancer cases. HPV has been implicated in cervical (91%), oropharyngeal (70%), vaginal (75%), vulvar (70%), anal (>90%), and penile (>60%) cancers, resulting in 35,900 new cases annually. The highest prevalence of HPV infection, oral and genital, is among African Americans. The goal of this project was to obtain views towards the immunization neighborhood to increase access to the HPV vaccine among African American adolescents using a multi-stakeholder perspective. A qualitative phenomenological study design was used to explore the role the immunization neighborhood could play in maximizing access to the HPV vaccine among key stakeholders. Semi-structured interviews among 30 African American parent-child dyads and 9 pharmacists located in Middle Tennessee where vaccination rates remain below the national average we conducted between August 2016 and May 2018. We used a purposive sampling method to recruit African American parent-child dyads and immunization providers. Data analyses was conducted by the Vanderbilt University Medical Center Qualitative research core. Using knowledge about the IN concept and the Diffusion on Innovation, we developed an a priori, hierarchical coding system. An iterative inductive/deductive approach was used to form high-order themes. Results showed that 50% of parents would allow their child to receive vaccines at the pharmacy; while 46.6% of children expressed they would receive vaccines at pharmacy. Limitation included small sample size. In
conclusion, several stakeholders saw increased competition among them as a potential downside of the immunization neighborhood. Competition among IN partners rather than collaboration makes IN efforts counterproductive. In the future, it is recommended strategies included an online communications platform, increasing stakeholder awareness, establishing partnerships, providing leadership, collaborative events, and outside collaborations. This project was supported by a National Center for Advancing Translational Sciences under award number 3UL1TR000445-11S1, Agency for Healthcare Research and Quality under award number 1K12HS022990-01, and National Cancer Institute under award number 1K01CA237748-01A1.

O-17
MIRNA-21’S IMPACT ON THE DEVELOPMENT AND PROGRESSION OF HEPATOCELLULAR CARCINOMA
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According to the American Cancer Society, liver cancer accounts for approximately 700,000 deaths worldwide, each year. Among the different types of liver cancer, hepatocellular carcinoma (HCC) makes up about 80% of liver cancer, and it has become one of the leading causes of metastasis-related cancer deaths. During the course of my research, I sought to analyze microRNAs (miRNA) as they relate to tumor suppression and carcinogenesis. Specifically, I investigated miR-21, a miRNA that has been shown to be overexpressed in a variety of cancer tissues and types. Previous research has pointed towards it having oncogenic properties, so we hypothesized that overexpressing miR-21 in zebrafish hepatocytes will increase the development and progression of HCC in zebrafish larvae and adults. To test this hypothesis, transgenic zebrafish lines were created that over-expressed my miRNA of interest, miR-21. For comparison, a line of zebrafish with an activating beta catenin mutation was created to use as a positive control. Zebrafish were used as our model due to their high fecundity and easy genetic manipulation. This allowed us to perform multiple rounds of experiments testing our hypothesis. Our data showed that in 6 dpf larvae, miR-21 overexpression significantly increases WT liver size; however, miR-21 does not appear to have oncogenic effects on the progression of HCC in adult zebrafish at 10 weeks. The findings in this research so far show that miR-21 expression may be correlated with an increase liver size in larvae, but this does not seem to translate to diseased livers in adult zebrafish. Future studies such as RNA sequencing will be done on miR-21OE to find genes that are down regulated by miR-21. Limitations: Zebrafish, while similar, are not as similar as mammalian models. Proteins and genes found in humans may not be found in zebrafish.

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O-18
SOCIAL DRIVERS OF HEALTH & THE DIGITAL WORLD
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Background: The social environment can be a major contributor to health. An unhealthy social environment can lead to disease via chronic exposure to psychological stress. Screenomics is a new method that securely captures a snapshot of a smartphone screen every five seconds while the phone is being used.
In order for researchers to use this method we must first build a database of social measures that can be identified within the screenome. **Specific Aim:** The aim for this project was to identify health disparities and social drivers of health from prior research and adapt these measures to be identified within the screenome. **Hypothesis:** Existing measures of social drivers of health and health disparities can be adapted and applied to screenome. **Methods/Data Analysis:** Two reviewers developed a search strategy using terms seen from background literature. The search was conducted using the Pubmed database. Each article was reviewed by a coder who extracted the measures and categorized them according to the NIMHD framework for social determinants of health. Of the 285,240 articles found from the search strategy, 68 were kept for final analysis and synthesis. **Results:** Current literature focuses mainly on the individual level of influence within the NIHMD framework and primarily uses self reported questionnaires to collect data. **Conclusion:** It was noted that context behind certain statuses was lacking among the current literature. Less than 50% of the sampled studied assessed the most common domains within the NIHMD framework. This review was only a limited sample of research but provided valuable information on how to proceed within the screenome. Future research should develop a database to measure social drivers of health within the screenome.

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**O-19**

**ROLE OF SEX HORMONES IN DIABETIC GASTRIC FUNCTION**

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**Background/Hypothesis:** Diabetic gastroparesis is characterized by delayed gastric emptying due to impaired nitrergic relaxation. Although female patients are more susceptible to diabetic gastroparesis, the mechanisms for this gender bias is poorly understood. Our lab has reported that diabetes reduced tetrahydrobiopterin (BH₄) synthesis, neuronal nitric oxide synthase (nNOS) dimerization, nitrergic relaxation, and led to delayed gastric emptying in female but not in male rats. We hypothesize that reduced female hormones, such as estradiol-17β (E₂), may lead to impaired 1) nNOS function, 2) BH₄ synthesis, 3) Nuclear factor (erythroid-derived 2)-like 2 (Nrf2) mediated Phase II enzymes, and 4) delay in gastric emptying. Restoration of BH₄/nNOS/Nrf2 attenuates nitrergic mediated gastric emptying in diabetic female mice.

**Methods:** Groups (n=4-6) of female mice were injected with STZ (50mg/Kg b.w, i.p) for 5 days. Diabetes was confirmed by measuring fasting glucose levels over 250 mg/dL. Four doses of 17β estradiol were given intramuscularly (0.001 mg/kg, 0.005mg/kg, 0.25 mg/kg, or 1.0 mg/kg) at the start of 4th week after diabetes induction and continued for 6 weeks. RT-qPCR and western blots were performed to measure changes in nNOS, BH₄ enzymes, Nrf2 and Phase II enzymes (GCLM, GCLC, NQO1) in gastric tissues. All antibodies were purchased from cell signaling or Santa Cruz Inc. Statistical analysis was performed using one way ANOVA. P value less than 0.05 considered as significant.

**Results:** Our results show that diabetes induction with STZ significantly (p<0.05) reduced BH₄/nNOS/Nrf2-Phase II mRNA and protein expression in gastric specimens. Treatment with E₂ at specific doses significantly (p<0.05) restored Nrf2 (control: 0.93 ± 0.26, STZ: 0.36 ± 0.17, E₂: 0.89 ± 0.09) and Phase II enzymes. In addition, E₂ treatment significantly (p<0.05) attenuated impaired GCH1 (control: 0.63 ± 0.03, STZ: 0.59 ± 0.02, E₂: 0.63± 0.03) and nNOSα expression by restoring E₂ receptors in diabetic gastric specimens (control: 1.25± 0.18, STZ: 0.56± 0.06, E₂: 1.21± 0.12).

**Conclusion/Future:** We conclude that E₂ normalizes delayed gastric emptying by restoring gastric BH₄/nNOS/Nrf2-Phase II enzymes and nitrergic relaxation in STZ-induced diabetic female mice. Future considerations include clinical trial research to aid women who may be suffering from the complications of diabetic gastroparesis.
O-20
THE FONTAN CIRCULATION SHOWS DECREASED CELL SURVIVAL AND OXIDATIVE DAMAGE
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Background and Significance: Single ventricle congenital heart disease such as hypoplastic left heart syndrome (HLHS) with a Fontan circulation accounts for the largest group of children hospitalized with circulation failure, with an in-hospital mortality of 20-50%. The mechanisms of circulatory failure are not well understood, and standard imaging such as echocardiography and cardiac MRI only detect late changes once failure has set in. We sought to develop a non-invasive, blood-based signature to provide insight into the mechanisms leading to single ventricle circulation failure. Materials and Methods: Blood was collected from patients with HLHS s/p Fontan and from controls with normal cardiac anatomy and function (N=5/group). Plasma microvesicles (MV) were isolated and proteomics assessed using data dependent acquisition mass spectroscopy. Proteins with a fold change (FC) in expression >1.5 or < -1.5, p<0.05 were evaluated using DAVID and Ingenuity Pathway programs. Results: Age of Fontan patients vs. controls was 17.04±2 vs. 14.82±2.2, p=0.1552; 20% were male in both groups. 60% of Fontan patients were in NYHA class II/III, 40% in NYHA class IV; 80% had Fontan-associated liver disease. Circulating MVs were released from cardiomyocytes, endothelial cells, and hepatocytes based on cell type specific proteins. Upregulated proteins (N=27) implicated cell death pathways (Solute carrier family 2, Angiotensinogen, CD14); while downregulated proteins (N=88) implicated impaired cell survival (Tyrosine-protein kinase Yes, endothelial growth factors). MVs contained mitochondrial and endoplasmic reticulum proteins implicating upregulation in reactive oxygen species signaling (S100A8) and downregulation in antioxidant enzymes (GPX1, PRDX 5). Conclusions: Circulating MVs from patients with HLHS s/p Fontan are released from the heart, blood vessels, and liver, providing a noninvasive signature of organ remodeling. The MV protein cargo implicates heightened cell death, oxidative damage, and impaired cell survival, thereby providing insight into the mechanisms of Fontan associated circulation failure and highlighting novel therapeutic targets. Limitations and Future Research: This study is limited by a small sample size, decreasing the generalizability of the results. It is also unclear whether the circulating proteins are reflective of cardiac remodeling. Future studies will evaluate cardiac muscle along with plasma proteomics to address this limitation.

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O-21
DYSREGULATION OF MACROPHAGES EPHB2 MITIGATES DIET-INDUCED OBESITY IN MICE
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Obesity is still on the rise especially in the developed world and constitute a major public health threat. Sterile inflammation and constitutive activation of pro-fibrotic cells in the stromal vascular fraction (SVF) of adipose tissue (AT) are hallmark of obesity. Macrophages and AT progenitors plays an important roles in the development and progression of this pathology in fat depots. EphB2, a member of the EphB receptors, has been reported to promote hepatic and renal fibrogenesis in mice. To test the hypothesis that defective
EphB2 signaling in macrophages could potentially mitigate adipose tissue fibro-inflammation and insulin resistance in obesity. Disease phenotyping was performed in males and females wild type (WT); EphB2KO (EphB2−/−); leptin-deficient ob/ob mice and in EphB2 specific deletion in macrophages (Cre+) Mice were subsequently administered Tamoxifen by intraperitoneal injection for 5 consecutive days and placed on diet after 2 weeks washout period was observed. Mice were fed the obesogenic Gubra-Amylin NASH (GAN) diet for 6-26 weeks. Mice were euthanized at the end of the study via isoflurane anesthesia in nonfasted state; liver tissue, inguinal white adipose tissue (iWAT), brown adipose tissue (BAT), epididymal white adipose tissue (eWAT) and heart were collected and weighed. Adipose tissue was separated into adipocytes and SVF. Histology, Flow Cytometry and qPCR were performed on samples EphB/EfnB mRNA transcripts are upregulated in fat depots of obese mice and more specifically in the stromal vascular fraction of iWAT and eWAT. EphB2 signaling is activated in the stromal vascular fraction of eWAT. EphB2 deficiency mitigates weight gain and improves glucose tolerance in DIO mice. Deletion of EphB2 receptor in macrophages dampens inflammatory response in DIO in mice. The future implication would warrant future inquiry into the mechanism of which causes this observed phenotype and how it mitigates migration and or presence of macrophages and the proliferation of adipocytes. There would also be a prompt for future experiment to knockout EphB2 on adipocytes to further elucidate this process.

O-22
NAMPT INHIBITION IN CHIP HEMATOPOIETIC STEM CELLS
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Background: NAMPT is a protein involved in NAD synthesis, an important part of leukemic stem cell metabolism. NAMPT inhibitors have been shown to be effective in treating de novo and relapse leukemia by depleting cellular NAD, however their effectiveness in treating Clonal Hematopoiesis of Indeterminate Potential (CHIP), a premalignant condition, has yet to be investigated. Hypothesis/Specific aims: We hypothesized that NAMPT inhibitors have a negative effect on CHIP HSC proliferation and mitochondrial function. We investigated the metabolic effects and proliferative effects of NAMPT inhibitor KPT 9274 on 3 CHIP mutant HSCs (ASXL1, DNMT3A, TET2) using CFU, liquid culture, and mitochondrial function assays. Methods: A CFU assay was conducted using patient derived (mobilized peripheral blood cells) CRISPR edited HSCs from previous studies. 500 cells were plated in methocult media, treated with 100nm KPT or DMSO, incubated for a week, then counted and replated. A liquid culture assay was conducted using CRISPR edited cells from the CFU assay sorted for specific HSC markers, plating them in RPMI media (100nm KPT or DMSO), incubating them for 4 weeks, counting the cells per well, then sorting for HSC biomarkers to count HSCs. A seahorse mitochondrial function assay was conducted using THP-1 CRISPR edited CHIP mutant cell lines. Data analysis was performed using Microsoft excel. Results: There were no significant differences in colony formation between treated and untreated CHIP cells. The liquid culture test demonstrated a significantly higher HSC population in the TET2 KPT group. The Seahorse mitochondrial functional assay demonstrated that the treated CHIP groups had significantly lower spare and maximal respiratory capacity. Discussion: KPT 9274 has an inhibitory effect on mitochondrial function, demonstrating that NAMPT inhibition has an effect on cellular metabolism in CHIP HSCs. However its effect on HSC proliferation is unclear, as the results were contrary to our expectations. KPT 9274 does not appear to have any clear inhibitory effect on CHIP HSC proliferation. Future Work: The TET2 HSC population warrants investigation through repeat experiments. To further observe the effects of NAMPT inhibition, we could investigate the dose response curve of KPT, to determine any dosage relationships.
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**O-23**

“I JUST WASN’T GETTING WHAT I NEEDED”: A THEMATIC ANALYSIS OF THE BARRIERS SEXUAL AND GENDER MINORITY YOUTH (SGMY) ENCOUNTERED RECEIVING HEALTHCARE DURING THE COVID-19 PANDEMIC

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The COVID-19 pandemic has prompted the stretching of resources within the healthcare industry, limiting the workforce and inducing non-emergency care to adapt to virtual and telehealth options. For sexual and gender minority youth (SGMY), this disruption has the potential to create additional barriers to preventative and treatment medications in youth at risk or living with HIV. These disruptions to health-related services could lead to postponed care and treatment. This study aims to understand the pandemic’s effect on care receipt in a sample of SGMY recruited to participate in an online survey about COVID impact on health barriers. Participants who participated in the PUSH Study, a randomized control study, and were living in Baltimore, MD, Washington, DC, Philadelphia, PA, and Tampa, FL, were invited to complete a 30-minute online survey between July – November 2021 about the impact of COVID in their lives. Participants were also invited to join a one-on-one 45-minute in-depth interview (IDI) to further explore this impact. We used an exploratory mixed methods analysis to examine impact of COVID and barriers to receiving care during this time. An iterative approach was used to produce a thematic analysis of interview responses. A total of 131 persons completed a COVID survey. A representative sample of participants (N=13) from Baltimore, Philadelphia, and Tampa completed IDIs about COVID. We found that participants described encountering barriers and delays in care universally regardless of the care received. Four key themes emerged around barriers to receiving care: 1) Inability to receive in-person testing; 2) Limited access to telehealth services; 3) Difficulty retrieving prescriptions; 4) Barriers to getting tested for COVID-19. Despite barriers, our findings highlight that SGMY displayed resilience to obtain the services they sought. This work highlights the need for health systems to improve technology, efficiency, and access to needed services.

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**O-24**

CHARACTERIZATION AND POTENTIAL RESCUE MECHANISM OF A NOVEL LENNOX-GASTAUT SYNDROME MOUSE MODEL VIA ERAD MECHANISMS

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The β subunits of the GABAA receptor are abundantly expressed during the development of the central nervous system and mutations of such have been linked to a clinical diagnosis of Lennox-Gastaut Syndrome (LGS) in humans. The impact of the mutation in the brain and how it can cause a developmental and epileptic phenotype are poorly understood, let alone mechanism-based treatment. Ubiquinolin-1(Plic-1), a
ubiquitin-like protein serves as an adaptor protein between ubiquitin and the proteasome and has been reported to bind and stabilize GABA<sub>A</sub> receptor subunits. Preliminary work in the lab has shown that the overexpression of Plic-1, can rescue mutant subunit containing receptors. We have developed a novel mouse model of LGS (Gabrb3<sup>+/N328D</sup>) to assess molecular and neurobehavioral abnormalities. With overexpression of Plic-1, we can determine if molecular and functional phenotypes of the mutant mice can be rescued. Expression of the α<sub>1</sub>, β<sub>3</sub>, and γ<sub>2</sub> subunits of the GABA<sub>A</sub> receptor in both total lysates, cell surface level, and synaptosomes will be determined in mice without or with overexpression of Plic-1. Video monitoring and synchronized EEG recordings will be conducted. The receptor subunits will be assessed via immunoblot within mice for differences in gross protein expression and subcellular localization. There was seen reduced expression of this subunit within heterozygous mice compared to wildtype. The expression of β<sub>3</sub> subunits was reduced in both total lysates and synaptosomes in the Gabrb3<sup>+/N328D</sup> and Gabrb3<sup>−/−</sup> mice compared to wild-type littermates. There was seen a significant learning and memory deficit in mice accompanied by increased locomotion. Plic-1 increased the expression of mutant β3 subunit containing receptors in vitro and in Gabrb3<sup>+/N328D</sup> mice. Plic-1 over-expression also reduced seizure severity and frequency over a 48-hour recording period. In conclusion the Gabrb3<sup>+/N328D</sup> mouse model proves to be a useful model for studying disease mechanisms and therapeutic intervention.

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O-25

MRI (MAGNETIC RESONANCE IMAGING) DIFFUSION-WEIGHTED IMAGING WITH PATHOLOGY CORRELATION OF HEAD & NECK TUMORS

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**Background:** Definitive differentiation of benignity versus malignancy of head and neck tumors requires biopsy and histopathological assessment. Despite appropriate localization of biopsy needles into tumors via computed tomography (CT)-guided biopsy technique, a minority of imaging-guided biopsies prove non-diagnostic or hypocellular, leading to the ambiguity of tissue diagnosis. Prior studies have shown that functional MR imaging in diffusion-weighted Imaging (DWI) and diffusion tensor imaging (DTI) can serve as adjunct sequences to conventional MRI for predicting tumor benignity. In this study, we assess the role of quantitative DWI/DTI in the prediction of diagnostic yield of CT-guided fine needle aspiration (FNA) of head and neck tumors in hopes of guiding biopsy technique, predicting the necessity of converting FNA to a core needle biopsy, and predicting benefit of CT-guided versus open surgical biopsy. **Methods:** I used IRB-approved retrospective studies from IU Health electronic medical record, radiology information system, and picture archiving and communication system. The inclusion criterion are patients with CT-guided FNAs and/or core needle biopsies of head and neck lesions. Pre-biopsies with DWI/DTI MRI were obtained for lesion-to-medulla apparent diffusion coefficient (ADC) calculations. A region of interest (ROI) analysis of lesions on pre-biopsy MRI helps determine the mean ADC value. **Results:** From 2015 to 2022, eighty-one patients with CT-guided biopsy head and neck lesions were surveyed. There were forty-one patients with FNA only and thirty-nine with both FNA and core biopsies. Fifteen patients had hypocellular biopsies; seven had both non-malignant and hypocellular diagnoses. **Conclusions/Potential Impact:** This project is ongoing research, and statistical analysis will be procured. The data from the MRI parameters could add comprehensive ways to evaluate head and neck lesions during routine MRI sequences.
Multivariate analysis, including quantitative DWI/DTI and FDG-PET/CT data, could improve the prediction of diagnostic yield of CT-guided FNA and core needle biopsy of head and neck lesions.

O-26
HIGH RER MUSCLE SODIUM ASSOCIATES WITH IMPROVED INSULIN SENSITIVITY IN PATIENTS ON HEMODIALYSIS
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Objective / Hypothesis: Patients on maintenance hemodialysis (MHD) frequently experience metabolic and nutritional derangements, including chronic inflammation and insulin resistance, which are associated with worse clinical outcomes. High tissue sodium accumulation, especially in the muscle compartment, is also common in MHD patients. In this study, we hypothesized that excessive muscle tissue sodium accumulation in MHD patients leads to insulin resistance through pro-inflammatory mechanisms.

Approach: Tissue sodium accumulation and insulin sensitivity were assessed in MHD (n= 25) and matched healthy controls (n=24) without kidney disease using 23NaMRI imaging and hyperinsulinemic clamp technique. Glucose disposal rate (GDR) and leucine disposal rate (LDR) were used as the marker of insulin sensitivity in terms of glucose and amino acid metabolism, respectively.

Results: MHD patients had significantly higher muscle sodium (22.18 mmol/L) compared to matched healthy controls (18.86 mmol/L, p=0.026). Among all study subjects, muscle sodium content positively correlated with GDR (r= 0.46, p=0.001) but not with LDR. When analyzing subgroups, muscle sodium content significantly correlated with GDR (r=0.59, p=0.002) among patients on MHD, but not in controls. There were no statistically significant correlations between muscle sodium content and LDR in entire cohort or within subgroups individually.

Limitations: There are more African Americans enrolled in the MHD group in comparison to the control. However, as the study progresses, we hope to enroll more patients.

Summary / Conclusions: Contrary to our apriori hypothesis, our preliminary data show a significant positive correlation between muscle sodium accumulation and improved insulin sensitivity to glucose utilization in patients on MHD. The mechanisms underlying the association between higher muscle sodium accumulation and improved insulin sensitivity remains to be elucidated.

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O-27
MOBILIZING DOULAS TO EMPOWER BLACK WOMEN IN POSTPARTUM DIABETES PREVENTION
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Background: Non-Hispanic Black mothers with gestational diabetes are more likely than other races to develop type 2 diabetes due to increased barriers to medical treatment and increased distrust in medical systems. The Diabetes Prevention Program (DPP) significantly reduces the progression to type 2 diabetes in high-risk patients. However, less than 50% of patients who enter a diabetes prevention program complete
Research has shown that community doulas positively affect birth outcomes. Expanding the role of a postpartum doula to coaching new moms through diabetes prevention programs may increase participation in the diabetes prevention program. **Research Question:** The purpose of this study was to evaluate if using doulas in addition to Healthiby Diabetes Prevention Program was feasible in increasing DPP attendance/completion rates. **Samples:** Four Black doulas from Homeland Heart, an organization that focused their efforts on serving Black women in Nashville, TN, were trained weekly for one hour for three weeks on principles in motivational interviewing on the Healthiby platform, and five Black postpartum mothers who had gestational diabetes less than six months postpartum were enrolled into the online program. **Procedures & Methods:** Each participant and local doula were paired together and had weekly coaching calls on zoom and video call for 14 weeks, weekly phone calls, and text messages between one another. During this time, each participant weighed themselves weekly. There were a total of fourteen sessions between mothers and doulas. Total attendance and weight loss percentages were calculated at the end of the 14 weeks. **Data Analysis:** Average attendance on the teleconferencing platform was 12/14 (84%), and average weight loss percentage was 4%. Highest rate of attendance was 100%, and lowest rate of attendance was 57%. Largest weight loss was 10%, while the smallest was 0%. Additionally, data suggests there is a moderate, positive correlation between attendance rates and weight loss. Mothers who attended more sessions had higher weight loss, and mothers who attended less sessions had decreased weight loss. **Conclusion:** In conclusion, it is feasible to train doulas to help increase completion rates of DPP for Black women. The average attendance rates were higher than the standard national DPP completion rate, which is approximately 50%. **Limitations:** In a continuation of this study, increasing the population size would occur to better observe correlation between attendance and weight loss. Expanding the study to include other races/ethnicities and utilization of surveys that ask about doula and mother experience about using Healthiby would help provide better understanding of doula impact on DPP completion. **Support & Funding:** This research is supported through Vanderbilt Medical School and Meharry College of Medicine (stipend)
Therefore, the overarching goal of this project is to probe PIC extracts from acutely infected T cell lines for integration function *in vitro*. The human T cell lines Jurkat parental, CypA−/−, TRIM5α−/−, CypA/TRIM5α−/− were inoculated with high virus amounts, collected and used to extract PICs 5 hours post infection. Then, an *in vitro* assay was used to carry out vDNA integration from the PICs with a known DNA substrate. Subsequently, the number of integration events is quantified via a nested qPCR-based strategy. Concurrently, the products of reverse transcription were quantified in PICs extracted from all four cell lines. Then, PIC function was normalized to PIC-associated products of late reverse transcription in order to calculate specific PIC function. Specific PIC-mediated integration function was determined to be considerably reduced in PICs from CypA−/− cells compared to PICs isolated from WT cells. Further, *in vitro* assays with PICs extracted from TRIM5α−/− demonstrated comparable integration function to WT cells whereas specific PIC activity from cells lacking both CypA and TRIM5α is reduced but still higher than cells lacking CypA only. These results demonstrate that CypA promotes vDNA integration and identifies a novel role of this CA-binding factor in post-nuclear entry steps of HIV-1 infection.

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**O-29**

**ALTERED MITOCHONDRIAL NETWORKS IN AGED MOUSE SKELETAL MUSCLE IS ASSOCIATED WITH THE DECREASED ACTIVITY OF THE MICOS COMPLEX**

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**Background:** Mitochondrial cristae have been established as key drivers for the production of ATP. Previous studies of cellular respiration and protein turnover also demonstrate that mitochondria within skeletal muscle gradually decline in function over time, resulting in a progressive loss of mass and oxidative capacity. However, there is currently a limited body of literature surrounding mitochondrial changes in aging skeletal muscle, and which genes may be associated with these morphological changes. **Methods:** Changes in mitochondrial morphology and connectivity during aging of the murine gastrocnemius muscle were measured with serial block facing-scanning electron microscopy and 3D reconstruction. We quantitatively analyzed 3D networks of specialized mitochondria at single-organelle resolution in murine skeletal muscle biopsies at 3 months, 1 year, and 2 years of age. CRISPR/Cas9 KO was performed to analyze changes in mitochondrial upon loss of the mitochondrial contact site and cristae organizing system (MICOS) complex. **Results:** Our findings suggest mitochondrial network configuration, nanotunneling, size, shape, number, contact sites, MICOS gene expression in skeletal muscle are altered during aging. The results also indicate that MICOS KO in murine myotubes is associated with structural and functional changes in mitochondrial fragmentation and oxygen consumption rates. **Conclusions:** The data support a correlation between MICOS proteins and mitochondrial metabolism and oxidative capacity. Although studies of mitochondrial changes in aging skeletal muscle are limited, the current study adds to the developing literature by using 3D reconstructions of nanotunnels to showcase novel patterns of mitochondrial aging in skeletal muscle. MICOS transcripts decreased with age, which may be correlated with mitochondrial fragmentation. Our data support a relationship between the MICOS complex and aging, which could be potentially linked to disease states through the use of 3D reconstruction. However, our limitations include differentiating between fiber types in skeletal muscle analysis, and examining how MICOS proteins can be restored once lost.
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**O-30**

**IMPACT OF COVID-19 ON SUBSTANCE ABUSE AND MENTAL HEALTH**

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**Background:** The Opioid Crisis is considered one of the most severe crises in United States History. Nearly 10.1 million Americans misused medically prescribed medications in 2021 and approximately 70,000 Americans overdosed on these controlled substances. Additionally, the Covid-19 pandemic exacerbated worse mental health outcomes amongst various age groups and populations. Here we aimed to research mental health, opioid abuse and the potential rise of opioid death related cases in the United States by county and state. With the inclusion of age-adjusted and crude-level data. In 2019, an estimated 10.1 million people aged 12 or older misused opioids in the past year. Specifically, 9.7 million people misused prescription pain relievers and 745,000 people used heroin (Data | CBHSQ, 2000). From April 2020 to 2021, more than 100,000 people died from drug overdose; which is an increase of 28.5% from the prior year. Because of the sudden impact of COVID in 2020, the influx of problems pertaining to mental health and opioid abuse has risen. Many states within the U.S. have been subject to higher numbers of deaths per year.

**Questions**
- How does mental health and substance misuse compare by race in 2010-2019 vs. 2020?
- How does mental health and substance misuse compare by gender in 2010-2019 vs. 2020?
- How does mental health and substance misuse compare by age in 2010-2019 vs. 2020?

**Method:** We report results of state and county, age-adjusted and crude level data from the United States. **Data:** The data comes from CDC Wonder, a website for querying public health data sets. The data sets are then processed through QGIS (Geographic Information System). **Analysis:** Create maps and tables to compare poor mental health outcome and substance abuse within the United States using QGIS Outcome Maps and Tables will be created at the state and county level for statistical analysis using QGIS (Ver 3.22.5). QGIS is an open source Geographic Information System (GIS). **Discussion:** By creating maps and tables at the state and county level for the years 2010-2019 and also 2020, we will be able to analyze correlative relationships between poor mental health and substance abuse, trends of increase or decrease in poor mental health outcomes between the years from 2010-2019 and 2020, and comparison among state and county level data.
IN VITRO AND IN VIVO STUDIES SHOW A UNIQUE PROFILE OF THE SMALL TBTIMS IN TRYPANOSOMA BRUCEI

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Trypanosoma brucei causes a deadly disease known as African trypanosomiasis that affect rural population in Sub-Saharan Africa. T. brucei contains a single mitochondrion that needs to import thousands of proteins for its function, making mitochondrial protein import essential. However, the translocase of the mitochondrial outer and inner membranes (Tom and Tims) in T. brucei are significantly divergent. T. brucei possesses 6 homologues of the Tims (TbTim9, TbTim10, TbTim11, TbTim12, TbTim13, and TbTim8/13) with a characteristic secondary structure, but except for TbTim9 and TbTim10, others are unique to T. brucei. Therefore, it is necessary to understand how these TbTims interact with each other. Previous studies show that, all the TbTims are present in the single TbTIM complex and critical for the stability of this complex. Here, we analyze the interactions pattern of TbTims by yeast two hybrid (Y2-H) analysis. All TbTims are expressed in yeast and show direct interaction with each other, however, stronger interactions were found between TbTim8/13 with TbTim9 and TbTim10. To determine the structural domain(s) necessary for their interaction, the small TbTims were split into their N-terminal and C-terminal helices to use for Y2-H analysis in all sorts of combinations. We found that both helices of TbTim9, TbTim10, and TbTim8/13 are involved in interaction among themselves and with TbTim11, TbTim12, and TbTim13, indicating a central role of the former 3 TbTims. Furthermore, we observed that overexpression of TbTim10 in T. brucei could complement the deficit of TbTim11, TbTim12, and TbTim13, suggesting these are iso-functional. However, TbTim10 overexpression could not complement the effect of TbTim9 and TbTim8/13 knockdown on TbTIM complex integrity, because TbTim10 stability depends on TbTim9 and TbTim8/13. Altogether, our in vitro and in vivo data suggest that TbTim9, TbTim10, and TbTim8/13 are the core of the small TbTim complex and other TbTims have auxiliary functions.

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O-32
PRESENCE 5 FOR RACIAL JUSTICE IN PEDIATRICS: CONNECT WITH THE PATIENT’S STORY

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The historical presence of anti-Black racism in the clinical environment has led to inequitable health care and outcomes for Black patients {citation}. The Presence 5 for Racial Justice (P5RJ) project addresses knowledge gaps by identifying evidence-based techniques for clinicians to foster more meaningful clinician-patient relationships and promote health equity for Black patients {citation}. Evidence-based racial health inequities in pediatrics were identified in the literature, mapped to P5RJ domain “Connect with Your Patient’s Story”, and categorized into three main components: 1) Advocate (provide resources to help
the patient and their family navigate the healthcare system), 2) Contextualize (learn about their values, familial health routines, and socioeconomic background), and 3) Endorse (openly support and encourage Black cultural expression). These anti-racism practices can strengthen the communication and connection between patients and clinicians, leading to improved quality of care and, ultimately, better health outcomes.

O-33
RACIAL/GENDER DISPARITY OF POTENTIAL BIOMARKERS IN COVID-19 PATIENT SERUM SPECIMENS: IMPLICATIONS TO PERIODONTAL DISEASE
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The objectives of this study were to investigate the differential expression of periodontitis-associated cytokines levels within the serum of COVID-19 positive and negative patients and to compare their respective levels between Caucasians/Blacks and Male/Female. 24 serum samples were obtained from patients with moderate/severe COVID-19 symptoms, with the other 24 having no COVID symptoms. The levels of 5 potential biomarkers (Furin, Cathepsin L, Galectin-3, Endothelin-1, and MMP-1) were analyzed using specific ELISA kits. Patient samples were then sorted by race, gender, and COVID-19 status. The levels of these biomarkers were compared to determine significant differential expressions. To measure biological/molecular interaction of interested genes, we have used GeneMANIA software. Statistical analyses were performed using t-Test: Two-Sample Assuming Equal Variances for the gender and race samples. Serum levels of Furin, Cathepsin L, Galectin-3, Endothelin-1, and MMP-1 levels were significantly (p<0.05) elevated in COVID-19 patients compared to healthy group. However, COVID-19 infection significantly elevated Furin (p-value= 6.0E-7), Cathepsin L (p-value=0.0001), Galectin-3 (p-value=0.03), Endothelin-1(p-value=0.005), and MMP-1(p-value=0.0001) levels in AA’s (p<0.05) when compared to CA counterparts. In addition, significant (p<0.05) increases of Furin (p-value= 4.4E-10), Cathepsin L (p-value = 0.02), Endothelin-1 (p-value=0.01), and MMP-1 (p-value = 0.0001) were noticed among infected males when compared to females. Finally, our data demonstrates various gene and biological mapping that is linked to periodontal disease (PD) and COVID-19 infection. Our data suggests significant gender and racial differences among these markers amongst moderate/severe COVID-19.

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O-34
EVALUATION OF COLD ATMOSPHERIC PLASMA AS A DISINFECTANT TO REDUCE INCIDENCE OF CRBSI
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Nosocomial infections are of great cost toward the individual and healthcare system. Resistance towards antimicrobial agents remains an ongoing issue. While there are various routes of transmission from
respiratory pneumonia to urinary tract infection Catheter Related Bloodstream Infections (CRBSI) are among the can cause significant morbidity. CRBSI from long indwelling catheters are often a result of the patient's skin flora invading the catheter. Standards of medical practice include antimicrobial scrubs (betadine, chlorhexidine) however the incidence of infection remains high and these result in allergy. We propose cold atmospheric plasma (CAP) has a potential alternative to traditional scrubs during installation and maintenance of the catheter. Plasma, the 4th state of matter, ionizes atmospheric gas which generates reactive oxygen and nitrogen species that have bactericidal effects. In this study we investigated the antibacterial efficacy of CAP and safety on known materials (PVC). According to Terraplasma, Utilizing the Plasmacare device for more than 6 min in a treatment session is not recommended in Humans. Step 1: We exposed ampicillin resistant E coli to plasma at a time interval of 30 second, 1 min, 2 min, 3 min. We found that even at 30 seconds the CAP was able to significantly reduce the bacterial colonization over a 24 hr incubation period. Step 2: After comparable results to Betadine, we investigated the safety of CAP to butterfly catheters over a time period of 9 min. Through qualitative and microscopic analysis we found that even at 150% of the maximum recommended daily exposure there was no significant damage. The goal of this study is to lay foundational work for eventual human trials involving CAP in the United States. CAP is intended for topical application, we identified pig ear skin as an adequate ex vivo model for human skin. In further steps, we plan to investigate two pronged approaches: in pig ear skin ex vivo model: 1) investigate the safety of CAP exposure on indwelling catheter via histological staining 2) evaluate the efficacy of CAP on live skin flora via bacterial culture.

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O-35
RELATIONSHIPS OF PERPETRATORS TO VICTIMS IN CHILD MALTREATMENT FATALITIES AMONG CHILDREN WITH DISABILITIES

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Research Question: Research has shown that children with disabilities (CWD) are at increased risk of being treated violently compared to children without disabilities. Previous literature has demonstrated that biological mothers are the most likely to perpetuate abuse and/or neglect leading to fatality in children. The purpose of this study is to see if this pattern remains true for CWD. Procedure/Methods/Sample: This study will use data from the National Violent Death Reporting System (NVDRS) to epidemiologically describe the child maltreatment fatalities among CWD from 1/1/2010-12/31/2019. To identify the child maltreatment fatalities among CWD, information from case narratives were utilized to identify disabilities. Information regarding any alleged perpetrator is presented to understand the fatalities and to identify key areas of prevention. Data Analysis: The data analysis will focus on the characteristics of the fatalities and perpetrators. Comparisons between groups will examine statistical significance by using chi-square tests and P-values of <0.05. Limitations: One of the major drawbacks of this study was the inability to include data from all states in order to make the findings nationally representative. Because certain states were still in the early stages of data collection, data from these states were not given for analysis. Another limitation was the possibility of underreporting relevant cases in data analysis due to vague and incomplete narratives. Results: 119 out of 21216 violent deaths submitted to the NVDRs has a history of child maltreatment and mentioned the victim having at least one disability. Out of these 116, 61.3% of the perpetrators of the maltreatment were biologically related to the victims and in 28.3% of cases the maltreatment was perpetrated by the biological mother. There was significant association between perpetrator relationships
and the utilization of physical abuse as well as neglect when leading to a fatality in CWD. **Conclusions:**
This study showed biological mothers were the most frequent perpetrators of fatal maltreatment among children with disabilities. Children with disabilities are at a higher risk of facing maltreatment leading to a violent death by a perpetrator who is biologically related. Interventions must be put in place to address frustrations, concerns, and lack of adequate support for caregivers of CWD.

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**O-36**

**URO-ONCOLOGIC DISEASE BURDEN COMPARED TO RESEARCH EFFORT IN THE UNITED STATES, 2019**

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The aim of this study was to analyze the relationship between research effort and cancer burden by considering the difference between population level and personal burden between types of urologic cancer. We hypothesized that there were disparities in the amount of research effort directed towards different types of cancer based on prior literature suggesting that funding for different cancers is not proportional to their population disease burden. To address this aim and our hypothesis, we employed three strategies to quantify research effort: NIH RePORTER search, PubMed search, and ClinicalTrials.gov search. These three strategies covered NIH funding (broad effort), number of publications, and number of clinical trials (focused effort). These data were compared via scatter plot and linear regression with the disease burden, Years of Life Lost (YLL) in the US, for four urologic cancers, Kidney, Bladder, Prostate, and Testis, as extracted from the Global Burden of Disease Study 2019. Research effort in all three categories was proportional to the population level disease burden (YLL per 100,000 population), with prostate cancer having the highest research effort and population burden. However, research effort was not proportional to individual level disease burden (YLL per diagnosed person); instead, kidney and bladder cancers had a high individual burden while their research effort was not the greatest, suggesting high premature mortality and highlighting the need for research expansion in these areas. Similarly, research effort was not proportional to the years of potential life lost (YLL per death), with testicular cancer patients dying earliest while receiving the least research effort. This study focused only on research effort and disease burden in 2019, limiting the bigger picture in which some cancers may have received more proportional research effort in the past. Future studies can expand the time interval, stratify to see which subpopulations are most burdened, or look at kidney and bladder cancer burden using more recent data.

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**O-37**

THE KDM5 INHIBITOR PBIT REDUCES PROLIFERATION OF CASTRATION-RESISTANT PROSTATE CANCERS VIA THE INDUCTION OF SENESCENCE

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While chromatin alterations are linked to prostate cancer development, the role of histone demethylases in the development of prostate cancer is not fully understood. The members of the KDM5 family of lysine demethylases are best known for their ability to demethylate di- and trimethylated histone H3 at lysine 4 (H3K4me3). However, recent studies suggest at least three family members (KDM5A, KDM5B and KDM5C) promote prostate cancer growth and progression and may serve as effective therapeutic targets for this disease. The KDM5 family inhibitor 2-4(4-methylphenyl)-1,2-benzisothiazol-3(2H)-one (PBIT) has been suggested as a potential lead compound for cancer therapy since it suppresses proliferation of human breast cancer cells. Previous work from our laboratory has shown that PBIT inhibits the enzymatic activity of multiple KDM5 isoforms and reduces the viability of castration-resistant prostate cancer cells. The goal of this study was to further characterize the anti-tumor effects of PBIT within human prostate cancers. Two models of human castration-resistant prostate cancer were used to define the effects of PBIT: the androgen receptor (AR) positive C4-2B cells and the PC3 cells, which express little to no AR. Our group initially demonstrated via quantitative RT-PCR analysis that PC3 and C4-2B cells express varying amounts of KDM5A, KDM5B, and KDM5C, the therapeutic targets of PBIT. Presto Blue assays were next performed to determine the extent to which PBIT alters cell proliferation. Micromolar concentrations of PBIT significantly reduced prostate cancer cell proliferation in a time- and concentration-dependent manner. Data from Cell Death ELISAs suggest that PBIT at a concentration of 10 mM did not significantly induce apoptosis within C4-2B or PC3 cells. However, PBIT does appear to induce cellular senescence within the PC3 cell line. The level of senescence associated beta-galactosidase staining was increased in PC3 cells following treatment with 10 mM PBIT. The distribution of cell cycle phases was also altered after PBIT treatment, measured through flow cytometry analysis. Furthermore, PBIT decreased protein levels of a second senescence marker, Lamin B1. Together, these data strongly suggest that the induction of senescence contributes to the antiproliferative effect of PBIT.

**O-38**

“HEY TIM, THIS IS A TRAP” HOW BIOID FOUND TBTRAP1 NEIGHBORING TBTIM17 IN TRYPANOSOMA BRUCEI

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The protein translocase of the mitochondrial inner membrane in Trypanosoma brucei, TbTIM17, forms a modular complex in association with several other trypanosome-specific proteins. To identify transiently interacting proximal partner(s) of TbTim17, we used Biotinylation Identification (BioID) by expressing a modified biotin ligase-TbTim17 (BirA*-TbTim17) fusion protein in T. brucei. BirA*-TbTim17 was targeted to mitochondria and assembled in the TbTIM complex. In the presence of biotin, BirA*-TbTim17 biotinylated several mitochondrial proteins. Interestingly, TbHsp84/TbTRAP1, a mitochondrial Hsp90 homologue, was identified as the highest enriched biotinylated proteins. Interaction and colocalization of TbTim17 and TbHsp84 in T. brucei mitochondria was further validated by co-immunoprecipitation analysis and confocal microscopy, respectively. TbTim17 association with TbTRAP1 increased several folds during denaturation/renaturation of mitochondrial proteins in vitro, suggesting TbTRAP1 acts as a chaperone for
TbTim17 refolding. Knockdown of TbTRAP1 reduced cell growth and decreased the levels of the TbTIM17, TbTim62, and mitochondrial (m)Hsp70 complexes. However, ATPase, VDAC, and Atom69 complexes, were minimally affected. In addition, the steady state levels of TbTim17, TbTim62, and mHsp70 were reduced significantly but Atom69, ATPase β, and RBP16 were mostly unaltered due to TbTRAP1 knockdown. Quantitative proteomics analysis also showed significant reduction of TbTim62 along with few other mitochondrial proteins due to TbTRAP1 knockdown. TbTRAP1 depletion did not hamper the import of the ectopically expressed TbTim17-2xMyc into mitochondria but reduced its assembly into the TbTIM17 complex, suggesting TbTRAP1 plays a critical role in the later process. This is the first report showing the role of TRAP1 in the TIM complex assembly in eukaryotes.

O-39
FASCIA ILIAC BLOCKS IN ELDERLY WITH HIP FRACTURES: A CRITICAL EVALUATION
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Introduction: Hip fracture risk for patients over the age of 65 displays a high morbidity rate. The Fascia Iliac Block (FIB) is used in elderly hip fracture patients considering the risks of opioids in this population. The purpose of our study was to determine the effectiveness of the FIB in our geriatric hip fracture population and any positive or negative implications it may carry. Methods: All hip fractures 65 and older admitted to our Orthopaedic Hospital from May 2020-May 2021 comprised our study population. Our hospital implemented use of the FIB in hip fracture patients with the administration in the preoperative holding area by the anesthesiologist at their discretion. During data collection, the following was studied and compared: anesthesia type, number of hours until surgery, fracture pattern, fracture fixation, physical therapy parameters including getting out of bed (OOB) postop, highest pain scores postop, first pain score postop, narcotic medication use, length of stay (LOS) and discharge disposition. Statistics were calculated with a significance value of (p<.05). Results: There were 109 hip fracture patients serving as control group who did not receive the FIB and 80 patients who received the FIB. The average age for the control group was 80 (62-100) and 83(62-102) for the FIB (p<.003) For the FIB group, 53% (51) had spinal anesthesia while 47% (38) had general anesthesia (GA). In the non-FIB group, 47% (51) had SA, while 53% (58) received GA (p<0.05). For the FIB group, most patients took narcotics by mouth (PO) 70 % (46) compared to 19 patients taking both IV and PO (30%). In the Non-FIB group, 62 patients took only PO (58 %) compared to the 45 (42%) taking IV and PO (p<.002). On the day of surgery, 38% (30) of patients in the FIB group were out of bed in comparison to Non-FIB 45% (49) (p<.481). On POD 1 60% (48) of patients in the FIB were recorded taking steps in comparison to 76% (83) of Non-FIB (p<.501). Postoperatively, the FIB group reported their highest pain score an average pain score at an average of 32 hours compared to the Non-FIB group at 16 hours after surgery (p<.006). Postoperatively, the FIB group reported a highest pain score average of 7.4, compared to Non-FIB group of 2.29 (p<.027). The discharge disposition was significantly improved in the non-FIB with 44% (48) of the group discharging home and 37% (40) discharged to a skilled nursing facility (SNF), in comparison to 24% (19) of FIB patients discharging home and 44% (61) SNF (p<.001). Conclusion: The FIB significantly increased the hours until highest pain score. The highest pain score was greater in the FIB group after the block wore off. However, a concern with the FIB use is possible delays in physical therapy participation due to the duration of the block. In our study, objective PT parameters were more robust on the day of and POD#1 for the group who did not receive the FIB.
My goal will be to test the hypothesis that TSH and potentially other thyroid hormones act from the primary cilia of preadipocytes (in addition to their known roles in the thyroid) and that they may play a critical role in driving preadipocyte differentiation. Furthermore, if TSH does play a role in adipogenesis, how does its role in differentiation compare with other known ciliary and non-ciliary regulators of adipogenesis, including omega 3 fatty acid? The objective of this lab is to focus on what factors drive adipogenesis and how they work in concert to drive life's functions. Take away from this is that there has yet to be an identified relationship between thyroid hormone and fat regulation. In instance when people suffer from hypo or hyper thyroidism due to deficiency in the thyroid gland, they then suffer from low or high metabolism. This will be helpful in the future in understanding those who suffer from diabetes due to having hypothyroidism. 

**Methods:** 3T3-L1 mouse preadipocyte stable cells were grown over the course of a 12-day protocol. Cells were allowed to grow to 100% confluence, treated with differentiation cocktail supplemented with different hormones, and allowed to differentiate over the course of 8 days. Lower panel: To study the role of TSH and other hormones in adipogenesis, we used immunofluorescence to observe TSHR localization and BODIPY live cell assay to readout the effects of TSHR activation on adipogenesis. 

**Conclusion:** Collection of later time points and live cell imaging is needed to better understand how receptor activation leads to downstream changes in receptor localization and how proper trafic of these receptors is necessary for appropriate adipogenesis signaling. We observe that treatment of 3T3-L1 cells with TSH in combination with dexamethasone and insulin does indeed induce adipogenesis. We note that TSH, TUG891, TUG424, and Kisspeptin (also known regulators of adipogenesis) each have differential ability to induce preadipocyte differentiation. Alone, each of these drug treatments is weaker than general cAMP activation through IBMX treatment. Combination of these treatments leads to differential, additive activation of adipogenesis, suggesting that these diverse signals work in concert to regulate fat mass.

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**Background:** Patients with higher distress exhibited lower adherence to their medication, more dissatisfaction with care, higher financial burdens, and poor survival rates (Ownby, 2019). Over 50% of women in adjuvant endocrine therapy (AET) treatment discontinue before completion (Sheppard, 2021). Understanding patterns of distress will help us understand this phenomenon. Our aim is to examine the patterns of distress among breast cancer survivors that discontinue AET at initiation and discontinuation. We hypothesize that among discontinued women, women will have greater change in distress from baseline to discontinuation. 

**Methods:** This secondary analysis focused on women that discontinued AET (N=93). National Comprehensive Cancer Network (NCCN) Distress Thermometer (DT) was used to measure distress at initiation and discontinuation, and the reductions in mean distress scores were calculated using the NCCN guidelines. The study was approved by the University's Institutional Review Board, and all participants provided informed consent.
distress. A paired T-test was used to examine changes in distress from baseline to discontinuation and modeled with linear regression. **Samples:** Women hormonal initiation and persistence study (WHIP) is a large longitudinal cohort focused on women’s AET adherence and discontinuation (N=592). Participants for this study were hormonal receptor positive women over the age of 21 and diagnosed with breast cancer. **Data analysis:** For this secondary analysis (N=93), women’s ages ranged from 46 to 78 years old (m=60.7), 64.5 % identified as White, and 35.5 % Black. Linear regression modeling found that change in distress was not significantly associated with age, race, or symptoms. Distress at discontinuation was significantly lower (p<.01). **Limitations:** First, women were not followed for the complete five years of therapy, which may have included more women who discontinued. Second, follow-up survey results may be farther away from pharmacy measured discontinuation dates. While taking the nearest follow-up survey gives us an idea of their distress levels before discontinuation, it is not exact. **Conclusion:** In this study, we found no association between change in distress with age, race, or symptoms. However, we found that distress at discontinuation was significantly lower than at baseline. We also found women self-reported more physical problems as a cause of their distress than any other type. Future research on non-adherent behavior before discontinuation, may help us understand distress levels, concerns, and associated factors.

**Support:**
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**O-42**

THE IMPACT OF INFERIOR TEMPORAL LOBECTOMY VOLUME ON SEIZURE FREEDOM RATES IN PATIENTS WITH TEMPORAL ENCEPHALOCELES

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**BACKGROUND.** Encephaloceles—abnormal herniations of brain tissue—can be surgical targets for patients with intractable Temporal Lobe Epilepsy. Epileptogenic areas of the brain are often readily identifiable, yet the present challenge is determining the ideal amounts of tissue resection that yield the best seizure freedom rates. **OBJECTIVE.** This retrospective chart review aims to find what relationship exists between the volume of resected tissue and seizure freedom rates in patients who have undergone inferior temporal lobectomies and encephalocele resections for intractable epilepsy. It is our hypothesis that larger volumes of tissue resection will yield higher and more favorable seizure freedom rates. **METHODS.** Chart data for 11 inferior temporal lobectomy patients with encephaloceles and intractable epilepsy were retrospectively reviewed. MR imaging was used to determine the volume of tissue resection using hand drawn volumes and calculations. Statistical analysis was performed to uncover the relationship between resection volume and seizure freedom rates, if any. **RESULTS.** Overall, 73% of patients are seizure free with median follow up of 23 months. The mean volume of resection among all patients was 7566.5 mm³ ± 3675.5. 8/11 patients are currently seizure free, with a mean resection volume of 9249.9 mm³ ± 2720.5. Demonstrated by independent t-testing, this is a statistically significant larger volume than observed in patients that are not seizure free (3077.7 mm³ ± 2818.3), t(9) = -3.79, p < .001. 3/11 patients endorsed new postoperative verbal & memory deficits. These outcomes are being qualitatively studied and assessed to
determine any association with resection volume. **CONCLUSIONS.** This study supports our hypothesis that there is a benefit to surgical approaches that aim to resect larger amounts of surrounding cortical areas during the resection of epileptogenic encephaloceles rather than just the encephalocele itself. Considering the neurological side effects still being assessed in this study, and the study's limitations (small sample size, use of convenience sampling), we hope to see future studies that will help find a surgical approach that resects enough tissue to confer seizure freedom without triggering new adverse neurological effects.

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**O-43**

**OBESITY’S IMPACT ON MORBIDITY ASSOCIATED WITH CARDIOVASCULAR DISEASE IN PREGNANCY USING THE CARPREG-II PREDICTION SCORE**

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In pregnant women with an underlying cardiac condition, their chance of experiencing adverse cardiac effects during pregnancy are increased and correlates to an increased maternal body mass index (BMI). There are several established prediction models such as the Cardiac Disease in Pregnancy (CARPREG) and Pregnancy with Congenital Heart Disease (ZAHARA) models that have been established to assess risks of maternal complications and to identify major risk factors affecting maternal cardiac events and outcomes. Obesity, although not one of the ten criteria included on the CARPREG II score, is a crucial component in determining adverse cardiac complications during pregnancy. The goal of this study is to assess and compare cardiovascular morbidity and mortality in non-obese, obese, and super-obese patients with cardiovascular disease in pregnancy using the CARPREG-II score. This study retrospectively evaluated our experience with cardiovascular disease in pregnancy. The cohort was comprised of women >18 years old with cardiac disease who received care during pregnancy at the University of Mississippi Medical Center (UMMC) between January 1, 2013 and December 31, 2019 and have had a maternal echocardiogram performed. The inclusion criteria is based on the CARPREG II score. Using the UMMC Patient Cohort Explorer, 115 women met the criteria for inclusion. The patient’s demographic information and pregnancy data was collected and each patient was assigned a CARPREG-II score using the CARPREG-II study criteria. The women were then grouped and compared based on BMI: non-obese (BMI < 29.9), obese (BMI 30-40.9), and super-obese (BMI > 41). The results showed a positive correlation between increased BMI and adverse cardiac events during pregnancy. The average CARPREG score was 3.67 for non-obese women; 3.76 for obese women; 4.77 for super-obese women. So, super-obese women have an increased risk of experiencing cardiac complications during pregnancy. Including obesity as a major risk factor effecting pregnancy, we can better determine adverse cardiac events and ensure these expecting mothers have a team dedicated to protecting their health. Although this is a large retrospective cohort of pregnant women with heart disease, it is a single-center study of women seen at UMMC and our findings are specific to Mississippians. This study was not funded.
The World Health Organization estimates that, in 2020, there were 241 million cases and 627,000 deaths from malaria, which is caused by the mosquito-borne parasite *Plasmodium*. In response to *Plasmodium* infection, T follicular helper cells (Tfhs) stimulate B cells to activate and produce antibodies, which are considered a crucial part of anti-malarial immunity. A Tfhs subclass however, called Tfhs, produce interferon gamma (IFN-γ), which can drive harmful immunopathologies. This study examined the effect of Tfhs-derived IFN-γ on antibody production. I hypothesized that Tfhs unable to produce IFN-γ would more effectively stimulate an antibody response against blood-stage *Plasmodium*. Bcl6 is a transcriptional repressor that promotes Tfhs differentiation. To determine the effect of Tfhs-derived IFN-γ on a non-lethal rodent malaria infection (*Plasmodium yoelli* XNL), we adoptively transferred 5x10^5 CD4 cells from intact and IFN-γ-deficient mice into Bcl6 Flox X CD4 Cre mice, which have a CD4 T cell-specific Bcl6 deficiency that prevents them from developing Tfhs. At day 11 post-infection, we utilized flow cytometry on splenic tissue to quantify the activity of transferred cells and determine how intact or IFN-γ-deficient Tfhs influenced the proliferation of B cells. In addition, we performed a parallel experiment to monitor the progression of the infection, as measured by weight loss, anemia (Coulter counter), and peripheral parasitemia (flow cytometry; CD45- Hoechst+ cells), for 30 days, at which point the flow cytometry analysis was repeated. My data demonstrate that recipient mice were unable to establish significant Tfhs populations at either timepoint. Additionally, the mice could not effectively fight infection, regardless of IFN-γ status. This study was limited by the short time frame and availability of mice. Future studies will involve replicate experiments, with the inclusion of additional positive controls with Tfhs-sufficient mice to ensure the efficacy of the adoptive transfer. Additionally, increasing the number of CD4 cells that are transferred may improve Tfhs establishment in the recipient mice and alter their immune response. This study was funded by NIAID grant R01AI167422 (Dr. Tracey Lamb, Dr. Brian Evavold) and an Immunology, Inflammation and Infectious Diseases Initiative seed grant (Dr. Tracey Lamb, Dr. Scott Hale).
POSTER SESSION ABSTRACTS
THE EFFECT OF TOBACCO ON EFFICACY OF BH3 MIMETICS IN HEAD AND NECK CANCER CELLS

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Objectives: BH3 mimetics are a class of small molecules that antagonize pro-survival BCL-2 proteins promoting in apoptosis in cancer cells. Here, we explored the connections between BH3 mimetics and head and neck cancers. Having found published evidence that nicotine can influence the activity of multiple Bcl-2 family proteins, we developed the hypothesis that in cancer patients treated with BH3 mimetics, intake of nicotine may reduce their response. To test this hypothesis in silico, we are extending a published model of the Bcl-2 signaling pathway to include the effects of nicotine and of different BH3 mimetics. Research Methods: A literature search was done using PubMed and Google scholar to find background information on BH3 mimetics as well as nicotine involvement in the BCL-2 family proteins. Key words such as BCL-2 and nicotine pathway were used in the literature search. This led to development of a hypothesis that could be tested using a computational model. Network diagrams were developed where BH3 mimetics (Venetoclax, Navitoclax, S-055746, and S64315/MIK665) and nicotine were introduced to the interaction between BCL-2 protein. Results: BCL-2 family proteins are regulators of cancer cell apoptosis and BH3 mimetics are designed to inhibit the activity of pro-survival BCL-2 proteins. Experimental evidence has been published showing that nicotine has multiple effects on Bcl-2 proteins. Conclusions: Scientific studies on BH3 mimetics have shown that they successfully target pro-survival BCL-2 proteins and induce apoptosis. In a pre-clinical setting research, BH3 mimetics (Navitoclax and Venetoclax) induce cell death in head and neck squamous cell carcinoma. Nicotine stimulates phosphorylation of MCL-1 and BCL-2, which suggests that it may promote in tumor cell survival and affect the efficacy of BH3 mimetics.

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ADAPT-SCD

A PILOT META-COGNITIVE STRATEGY TRAINING INTERVENTION FOR ADOLESCENTS AND YOUNG ADULTS WITH SICKLE CELL DISEASE

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This study is a pilot to a novel meta-cognitive strategy training intervention (Adapting Daily Activity Performance Through Strategy Training, ADAPT) with adolescents and young adults with sickle cell disease (SCD). The primary objective of the study is to determine the feasibility and acceptability of the strategy training intervention with adolescents and young adults with SCD. The secondary objective is to determine the efficacy of the intervention on improving executive function and fluid measures of cognition, self-awareness of deficits, and occupational performance and satisfaction. Eligible participants will be recruited from the SCD clinics at St. Louis Children’s Hospital and Washington University School of Medicine. Participants will complete a pre-intervention assessment battery, 10-14 strategy training sessions with a trained facilitator (in-person or via telehealth), a post-intervention assessment battery, and a 6 month post-intervention battery. Results from this study will inform the development of a larger intervention trial.
ROLE OF INTESTINAL MICROBIOTA ON CAR T CELL IMMUNOTHERAPY
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Chimeric antigen receptor T (CAR-T) cell therapy is one of the most effective treatments for hematological malignancies. CD-19 targeted CAR T therapy has revolutionized treating specific cancers that could otherwise not be targeted with known drug regimens. However, some of these patients continue to relapse. Innovations of CAR T cell therapy such as CD-22 targeting has shown promising results, but some patients continue to relapse. If we can discover what causes these patients to relapse, we can improve survival. How endogenous factors, such as the gut microbiome, play a role in CAR T therapy is not fully understood. Studies have shown a relationship between gut microbiome and immune checkpoint blockade. Investigators have identified specific bacterial species involved in the immune checkpoint blockade, but there is not yet a consensus to which taxa are favorable versus unfavorable for a clinical response. In a collaboration between investigators at Memorial Sloan Kettering Cancer Center and the University of Pennsylvania, we completed an initial study regarding the role of the intestinal microbiome and CAR T therapy. It was found that exposure to antibiotics in the four weeks before CAR T therapy was associated with worse overall survival of CAR T cells. Through linear analysis of effect size we found that Clostridia presence is positively associated with CAR T expansion and persistence. Metagenomic shotgun sequencing also showed that microbiome is associated varying clinical outcomes in CAR T therapy. We analyzed the longitudinal peripheral blood samples of a 16-patient cohort receiving CAR T therapy using multiparameter flow cytometry to examine CAR T expansion and persistence, and B cell aplasia. When compared to metagenomic sequencing, we should see a clear correlation between gut microbiome and CAR T therapy.

This research was funded by the Stanford HBCM summer REACH research program.

ROLE OF QUERCETIN, CLI-095, AND HUMAN EXOSOMES IN INHIBITING PROSTATE CANCER CELL GROWTH
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Growth of prostate cancer tumor cells in vivo is mainly driven by exosomes emanating from tumor cells or tumor associated fibroblasts. In the present studies, we exploited the knowledge that for tumor exosomes to mediate their growth promoting activities they should remain sequestered on the surface of tumor cells for extended periods. We therefore used normal human serum exosomes as well as nanoparticles (FNH) to compete for binding sites on LnCaP prostate cancer tumor cells in order to slow down the 3-D growth. We also used small molecules, CLI-095/Resatorvid and Quercetin that disrupt TLR4 that we determined is responsible for the surface deposition of exosomes to disrupt the 3-D growth of tumor cells. The study shows the importance of cellular exosomes in growth of tumor cells in both 2D and 3D attachment. This study will provide useful preliminary data to identify small molecules that can target tumor stem cells that we believe is largely responsible for tumor growth and expansion in vivo. The data shows the importance of CLI-095 and Quercetin as possible chemoprevention drugs for prostate cancer.
REGULATION OF NKG2A ON CD8\(^+\) T CELLS IN HEAD AND NECK CANCER

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PD-1 blockade has been approved for head and neck squamous cell carcinoma (HNSCC) patients. However, only 20% of HNSCC patients respond to PD-1 blockade. We hypothesize that other inhibitory receptors play a role as a resistance mechanism for this PD-1 blockade. Our laboratory and others found that the NKG2A/HLA-E pathway is highly expressed in HNSCC patients. NKG2A is an inhibitory receptor expressed by NK cells and CD8\(^+\) T cells. The expression of NKG2A and its functional ligand HLA-E via CD8 T cells and NK cells in HPV-induced head and neck cancer has been shown to have a worse clinical outcome. TILs express T\(_{\text{em}}\) markers CD69 and CD103. In addition, our laboratory previously observed a significant increase in NKG2A\(^+\) T cells in the tumors when compared to T cells in matching PBMC samples. We will confirm if the tumor microenvironment is inducing NKG2A expression. We hypothesize if transcription factors known to be important to regulate T\(_{\text{em}}\) are knocked down using short hairpin RNA (shRNA), this could lead to a decrease in the expression of NKG2A both with and without tumor conditioned media. These findings can aid in identifying new targets to treat cancer patients.

LANGERHANS CELL HISTIOCYTOSIS OF THE ORAL CAVITY

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Langerhans Cell Histiocytosis (LCH) is a disorder in which excess Langerhans cells accumulate in the body; whether systemically or locally. Presentation of LCH varies depending on the site of the body and where it is located. This case report will explore and analyze Langerhans Cell Histiocytosis, its presentation in the oral cavity, and treatment alternatives. Langerhans cells help regulate the immune system by acting as antigen presenting cells during an immune response. LCH commonly affects the bone, but can also affect the skin and lymph nodes [1]. About 10% of cases present in the mandible [2]. In LCH, granulomas may form at the site of multiplication and current literature suggests that a limited underlying defect in a yet unidentified molecule, such as a receptor, might hinder the switch from an innate to an adaptive immune response causing granulomatous formation—often presenting in bone [3]. LCH granulomas contain T-cells, eosinophils, neutrophils, and macrophages. The cause of LCH is unknown, but it is understood that it is not caused by infection and the entity itself is not contagious. We report a case of a 31-year-old African American male presenting to our Oral and Maxillofacial Surgery clinic with complaints of pain localized to his maxilla and mandible. A biopsy was completed which demonstrated positive markers for LCH.
THE TWO-WAY CONNECTION BETWEEN DIABETES AND PERIODONTAL DISEASE

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Diabetes mellitus refers to a group of diseases that affect how the body uses blood sugar also known as glucose. This is a disease that occurs when one’s blood sugar is too high. Glucose is a source of energy for the cells that comprise the muscles and tissues. Periodontal disease is the result of inflammation of the gums and bone that surround and support the teeth. There has been a known link diabetes mellitus and periodontal disease. Gum disease is a problem that can happen if diabetes is not well controlled. Also the body’s response to gum infections can result in blood sugar problems. Diabetes cause blood vessels to thicken which can reduce the flow of nutrients and the removal of waste from body tissues. This reduces blood flow can potentially weaken the gums and bone, putting them at a greater risk for infection. The objective of our research is to identify the two-way relationship between diabetes and periodontal disease. There is a lot of evidence supporting the existence of a two-way relationship between diabetes and periodontitis, with uncontrolled diabetes increasing the risk of periodontitis and periodontitis negatively affecting glycemic control. The two-way relationship between these diseases is often overlooked in academia. This study is designed to highlight how both diseases can be caused by the other.

DISPARITIES IN THE TREATMENT OF UNRUPTURED INTRACRANIAL ANEURYSMS: A COUNTY HOSPITAL EXPERIENCE

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There is an increasing prevalence of unruptured intracranial aneurysms (UIAs), due to increased radiologic imaging, which can cause life-threatening conditions such as aneurysmal subarachnoid hemorrhages. Studies have shown that minorities have limited access to non-invasive imaging screening and preventive care (1-3). We hypothesized that due to our diverse endovascular team and intentionality to equity in healthcare, there would be no difference in care between minorities and whites. A retrospective chart review was performed, and statistical analysis showed no difference in treatment of UIAs in Whites/Non-Hispanics versus the minority group. We conclude that a diverse physician team and intentionality, including providing adequate resources at hospitals that serve marginalized populations, can allow equity in healthcare.

FACIAL PROFILE DISTORTION FROM DRUG INDUCED GINGIVAL HYPERPLASIA

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Objective: To discuss a severe case of Nifedipine induced gingival hyperplasia. Experimental Methods: Gingival overgrowth could be hereditary (rarely), inflammatory due to adverse reactions from medications
or infiltrative. Inflammatory hyperplasia could be localized or generalized in the gingiva. Initial inflammation occurs in the area of the interdental papilla and eventually spreads to gingiva around the crowns which can lead to severe periodontal disease. The severity of drug induced gingival hyperplasia is usually due to the concentration of the medication in the gingiva and adequacy of oral hygiene. Often, culprits of drug induced gingival hyperplasia include but not limited to phenytoin, nifedipine and cyclosporin A. Gingival hyperplasia can be reversed if the offending drug is recognized early and discontinued. The mechanism of action is unknown and often treatment includes use of azithromycin probably due to its anti-inflammatory and antimicrobial properties and the more definitive treatment would be gingivectomy in severe cases. **Results:** In this case, the patient is a 56year old African American female with a medical history of uncontrolled hypertension and hypercholesteremia. Patient was placed on nifedipine by her primary care physician approximately two years prior to initial consultation in the oral and maxillofacial surgery clinic. Patient reports noticing initial changes in her dentition three months after starting medication but did not make a direct connection to the medication. At time of initial consultation, patient had grade three mobility of teeth with severe periodontal disease. Patient’s facial profile had changed drastically following the use of medication. In this case, the prognosis of teeth restorability was deemed poor. A full mouth extraction with extensive gingivectomy was subsequently completed in the operating room under general anesthesia. A few months after the initial surgery, twelve dental implants were placed in the maxillary and mandibular arches and dentures were fabricated. **Conclusion:** Health literacy regarding adverse effects of systemic medications is very important. Often times, patients are dealing with adverse effects of medications without understanding the root cause of the problem. In cases such as the one discussed above, it is important that the precipitating medication be discontinued as the first line of treatment. Often times as a dentist, a medical consultation and coordination with the patient’s primary care physician is paramount. Options for treatment could include use of azithromycin and chlorhexidine for mild to moderate cases. Gingivectomy is often the treatment of choice in severe gingival hyperplasia cases via conventional surgical methods or use of laser therapy.

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**ARF6 ROLE IN PROTECTING MELANOMA TUMOR CELLS FROM TARGETED BRAFV00E THERAPY-INDUCED APOPTOSIS**

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Cutaneous melanoma is the 5th most common cancer in the United States and the DEADLIEST skin cancer. With most melanomas being diagnosed at stage 2, after surgical resection current standard of care include a either immunotherapies or BRAF-MEK inhibitors. The issue comes in, if what happens if the patient progress on immunotherapies or if they’re immunocompromised. The only other treatment the patient has is targeted therapies. The problem with current target therapies, 80% of patient will developed a resistance, so it is important to understand the mechanism of therapeutic resistance for clinical needs. Cutaneous melanoma has 4 main driver mutations, with BRAF making up 50% of them, leading it to become the only mutation with a FDA-approved targeted therapy. With the combination of BRAF-MEK inhibitors being the current standard of care, the progression-free survival is only 10-11 months. Our lab wanted to discover why, in searching The Cancer Genome Atlas, we discovered that ARF6 is hyperactivated in human melanoma and reduced ARF6 GTPase activating proteins correlated to poorer survival in patients with Stage 3 melanoma. ARF6 is a small GTPase, part of the RAS superfamily that controls subcellular location of proteins, regulating inflammatory and oncogenic signaling and cell motility and invasion. And we wanted to determine what role does ARF6 has in melanoma. In our mouse model, BRAFV600E/Cdkn2aNull, the loss of ARF6 delayed tumor onset, reduced tumor growth and increased the
overall survival of the mice. To understand how ARF6 was doing this we looked at the proteinomic data of the same mouse model but this time with constitutively active ARF6 (ARFQ67L), where we saw an increase expression of anti-apoptotic proteins and downregulation of pro-apoptotic proteins. All this data suggests to us that there may be an unknown mechanism whereby the ARF6 may protect BRAFV600E melanoma from apoptosis. This is important clinically because current targeted therapies induce apoptosis in tumors, so ARF6 could be playing a role in a drug resistance mechanism. Which lead to the hypothesis for this project, ARF6 protects melanoma cells from targeted therapy induced apoptosis. In Fig. 5, we used established human melanoma cells lines and saw that the knockdown of ARF6 increased apoptosis when treated with Vem, in comparison to the control, thus, suggesting that ARF6 protects melanoma from Vem induced apoptosis. In conclusion, we were able to determine that ARF6 is sufficient for accelerated tumor progression. Data supporting that there is role for ARF6 in an anti-apoptotic pathway that is being utilized by BRAFV600E tumor cells for protection against BRAF inhibitors.

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HAPLOINSUFFICIENCY RESULTING FROM A PROXIMAL MICRODELETION OF SLC6A1 AND SLC6A11 ASSOCIATED WITH 3P- SYNDROME, EPILEPSY, AND NEURODEVELOPMENTAL AND PROPOSED 4-PHENYL BUTYRATE RESCUE

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GABA transporters GAT-1 and GAT-3, encoded by SLC6A1 and SLC6A11 genes respectively, are responsible for the reuptake of γ-aminobutyric acid (GABA) from the synaptic cleft. Mutations in SLC6A1 are associated with a spectrum of neurodevelopmental disorders, such as epilepsy syndromes, intellectual disabilities, and autism. While the association of SLC6A11 with disease is uncertain, both genes are located at the same region. A proximal microdeletion of SLC6A1 and SLC6A11 has been reported; however, the functional consequence of the loss of GAT-1 and GAT-3 is unknown. The goal of this research is to characterize the functional consequence of the SLC6A1 and SLC6A11 microdeletion related to 3p-syndrome and a possible rescue with a pharmacochaperoning approach using 4-phenylbutyrate (PBA). 3H radiolabeling was used to measure GABA uptake and transporter expression to evaluate the impact of the microdeletion using mouse cortical astrocytes and HEK293T cell lines expressing recombinant GAT-1 and GAT-3 transporters. Transfected cells were treated with Cl-966 [50μM], SNAP5114 [30μM] to determine the specific GAT uptake activity. Cells were treated with PBA to determine the chaperone's effect on GABA uptake as a potential treatment option. Preliminary data confirmed that the loss of a half gene dose due to the microdeletion of SLC6A1 and SLC6A11 resulted in reduced GABA uptake. Pharmacochaperoning approach with PBA [2mM] increases the GABA uptake in both wildtype and microdeletion conditions. Preliminary patient data shows improvement in seizure activity and neurodevelopmental delay following PBA treatment. The observed reduction in GABA reuptake resulting from haploinsufficient copies of SLC6A1 and SLC6A11 would account for the observed phenotype of seizure activity and neurodevelopmental delay. Given that these symptoms are prominent features of point mutations in SLC6A1 alone, this study suggests that the proximal microdeletion of both SLC6A1 and SLC6A11 is likely to contribute to a great extent, perhaps causative for the observed phenotype.

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ADULT GRANULOSA CELL TUMOR: MUTATION DETECTION OF FOXL2 C134W

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Adult-type granulosa cell tumors (AGCTs) account for approximately 90% of malignant ovarian-sex cord stromal tumors (SCSTs) and represent 2-5% of ovarian cancers [1]. Metastasis and aggressive recurrence is associated with a poor prognosis with 80% of patients succumbing to the disease [2]. Current scientific literature identifies FOXL2 p.C134W mutation in at least 95% of AGCTs of the ovary [1]. Currently the only diagnostic assay available for this requires extraction of DNA from tissues with subsequent sequencing. Very few laboratories offer this assay and thus a more accessible assay for determining mutation status is needed. The purpose of this study is to determine the utility of a mutation specific probe to use as a diagnostic BaseScope assay to detect ovarian AGCTs. 69 ovarian tumors including 41 AGCTs and 28 non-AGCTs were identified in the pathology database at Stanford hospital. Non-AGCT cases were used as negative controls and included 15 benign non-AGCT SCST and 13 epithelial tumors. BaseScope-ISH assays were used to detect the mutation status of FOXL2 C134W in tissue microarrays and a subset of whole sections following guidelines (BaseScopeTM Detection Reagent Kit-RED User Manual) provided by the supplier. Samples were scored as “positive” or “negative” for FOXL2 C134W mutation status and calculations for sensitivity and specificity were performed. Based on this study, BaseScope-ISH assay demonstrates 97.6% sensitivity and 100% specificity. The positive results were notably stronger in intensity in those samples <10 years old. Weak positive signals were generally associated with samples that were >10 years old. This could be attributable to degradation of the sample over time. Nevertheless, this study suggests that the BaseScope-ISH assay with a mutation specific FOXL2 probe is an affordable and efficient tool in the diagnosis of AGCT.

INHALABLE CURCUMIN FOR THE DETECTION OF AMYLOID BETA DEPOSITS IN THE RETINA

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Alzheimer’s disease (AD) is one of the few illnesses that remains to have no effective methods for diagnosis and treatment. This raises a huge concern as the incidence of AD continues to rise. The pathogenesis of AD is still unknown; however, the cytopathology hallmarks of AD are the extracellular amyloid beta (Abeta) and the intracellular neurofibrillary tangles, which lead ultimately to profound neuronal toxicity and tissue atrophy. The formation of Abeta plaques have been shown to be the underlying mechanism in AD, thus, detecting the pathology of Abeta at the early stage, is crucial for the treatment of AD as well as evaluating the response to therapy. Detection of AD remains a challenge to the early diagnosis in the affected population. In this project, we plan to validate the temporal and spatial distribution of Abeta in the brain versus the one in the retina. Toward the goal, we employed the aerosolized method on 5XFAD mice with the newly synthesized curcumin analog developed in our laboratory. After nebulization, animals went through cardiac perfusion, the brain and ocular tissues were collected and stained for anti-Abeta antibodies before data corroboration. Moreover, Imaging fluorescent signals associated with Abeta deposits in the eye is simpler than performing extensive work in the deep tissue of the brain. This research mitigates the efforts to design probes that must cross the blood-brain barrier. Further, the robust inhalation process combined
with retinal imaging can be employed for screening large population allowing us to obtain more robust and efficient data.

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THE USE OF SILVER DIAMINE FLUORIDE IN DENTAL PATIENTS
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Silver diamine fluoride prevents and arrest caries, decreases dentinal hypersensitivity. Silver diamine fluoride occludes dentinal tubules, produces fluorohydroxyapatite and inhibits biofilm adhesion. Silver diamine fluoride has been around for years but has not been exposed much to other parts of the world until now. Silver diamine fluoride is safe, effective, efficient, equitable and timely. Systemic reviews of clinical trials confirm the effectiveness of SDF as a caries-arresting agent for both teeth and roots. No caries removal is necessary to arrest the caries process, so the use of SDF is appropriate when other means are not available or feasible. SDF is recommended for caries control and as part of a comprehensive caries management program, where individuals needs and risk are being considered.

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INTESTINAL PLAGL2 OVEREXPRESSION INHIBITS COLON TUMOROID PROLIFERATION
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Hypothesis: PLAGL2 inactivation and altered regulation of downstream pathways may provide novel therapies for colorectal cancer by inhibiting tumorigenesis. Specific Aims: To discover if tumorigenesis driven by mutations in Pten, Trp53, Smad4 and Apc is enhanced by the upregulation of PLAGL2. Methods: Through the use of the CRISPR somatic mutagenesis model that we already have in our lab and which is both inducible (tet-on) and multiplexed for targeting multiple genes simultaneously, mutations of Pten, Trp53, Smad4, and Apc will be generated. Mice that have received doxycycline and tamoxifen to activate CRISPR mutagenesis and to turn on transgenic PLAGL2 expression are in the lab and have already been treated with tamoxifen and tetracycline to induce tumors. These mice will be used by me to do the following experiments: Mice will be examined for tumorigenesis (colon tumor number, size and metastasis) using icCas9N;PPAS;Vil- LCL-PLAGL2 mice with and without tamoxifen treatment, in addition to comparing to dox/ tamoxifen-treated icCas9N;PPAS. Transgenic PLAGL2 O/E will be visualized by anti-HA immunohistochemistry (IHC) and tumor progression compared between tissue regions/domains with and without PLAGL2 O/E. Tumors will also be assessed for stem cell marker expression by IHC and by qRT-PCR. Anticipated Results: Mutations that interrupt tumor suppressor genes (Pten, Trp53, and Apc) functionality will be more abundant when PLAGL2 is upregulated. As a result of the overexpression of PLAGL2, mice with Pten, Trp53, Smad4 and Apc mutations will have increased pro-tumorigenic activity compared to mice with these mutations but no overexpression of PLAGL2. Significance of this Research Value of the Training Experience: Colorectal cancer(CRC) is the third most commonly diagnosed cancer in the United States. This research has the potential to be a foundation for therapeutic effects for patients diagnosed with CRC. The inactivation of PLAGL2 could be a source of radiation or pharmacological therapy. This experience will allow me to cultivate my understanding of DNA sequencing, stem cells,
tumorigenesis, gene regulation, and advanced biological lab techniques. It is my hope that my research can translate to a clinical setting and improve the prognosis for patients diagnosed with CRC.

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PIERRE-ROBIN SEQUENCE INTERVENTION
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Pierre-Robin Sequence is a rare congenital birth defect that affects 1:8,500-14,000 people. Both isolated and associated cases exist. Associated cases are seen with Stickler syndrome, 22q deletion and most taught Treacher Collins syndrome. There are three sequential physical attributes that occur, Micrognathia, Glossoptosis and Upper Airway Obstruction. All three affect the development and placement of a patient's dentition, in return causing malocclusion. The objective of our research was to demonstrate that with the use of early pediatric orthodontic treatment and orthognathic surgery, there can be a correction of malocclusion and improvement of life in individuals with Pierre-Robin Sequence. The successful use of orthognathic surgery combined with orthodontic treatment has been seen in various studies. This systemic review will demonstrate the success that pediatric orthognathic and orthodontic intervention has on patients diagnosed with Pierre-Robin Sequence.

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SYNERGISTIC INHIBITION OF KDM5B AND SKP2 ON PROSTATE CANCER MALIGNANCY
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Prostate cancer (PCa) is the second-leading cause of cancer mortalities in the United States and is the most commonly diagnosed malignancy in African American men. Despite the fact that androgen deprivation therapy is the first-line option to initial responses, most PCa patients invariably develop castration-resistant prostate cancer (CRPC). Therefore, the novel and effective treatment strategies are needed. The goal of this study was to evaluate the combination treatment of small molecule inhibitors, SZL-P1-41, a SKP2 target and PBIT, a KDM5B target on PCa growth and progression; as well as to delineate the underlying mechanisms of suppressing CRPC. Literature reports that S-Phase Kinase Associated Protein 2 (SKP2) is upregulated in PCa and Lysine-specific demethylase 5B (KDM5B) serves as a histone demethylase with a crucial role in cancers. Studies showed that KDM5B is increased in human PCa and KDM5B knockout decreases carcinogenic properties of PCa cells. We previously reported that SKP2 loss partially decreases the growth of prostate tumors and that KDM5B levels are reversely regulated by SKP2 in PCa cells. However, mechanisms of KDM5B and SKP2 interplay on PCa malignancy is unknown. We hypothesize that combination of PBIT and SZL-P1-41 treatment will enhance anti-cancer effects on PCa progression by inducing cellular senescence and apoptosis. Here, we showed that inhibition of KDM5B and SKP2 decreased the proliferation of PCa cells, and KDM5B KO cells were more vulnerable to SKP2 inhibition. More importantly, a combined inhibition of KDM5B and SKP2 significantly blocked malignant transformation of PCa cells. Mechanistically, combined treatments resulted in a decrease in AKT signaling and an induction of cellular senescence and apoptosis. Taken together, our results show that combined
inhibition of KDM5B and SKP2 is more efficacious in inhibiting proliferation and growth in CRPC cells, and this regimen would be an ideal therapeutic approach for treating CRPC.

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EFFECTS OF HYPOXIA ON COGNITIVE FUNCTION AND ANXIETY LEVELS IN RATS
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Background: Hypoxia is defined as a deficiency in amount of oxygen reaching the tissues. Effects of hypoxia can be seen at high altitudes, due to the low barometric pressure. Airmen and Guardians participate in military operations at high altitudes. If low atmospheric oxygen at these high altitudes leads to a reduction in both physical and cognitive performances, it could jeopardize operation and safety critical tasks, decreasing the effectiveness of our military. Therefore, the military would greatly benefit from assessing the effects of hypoxia on behavior as well as developing targeted therapies that would aim to accelerate adaptation to hypoxic environments. These techniques can eventually be applied to human trials to focus on improving learning, memory and attention in Airmen and Guardians at high altitudes. Methods: Rats will undergo two tests to assess cognitive function when exposed to acute hypoxia conditions: Passive Avoidance Task (PAT) and Novel Object Recognition (NOR). NOR and PAT habituation will occur after the acclimation period, followed by Training 24hrs later, and testing 24hrs after that. During test day, acute hypoxia exposure occurs by the rats being placed in a closed environment set to 8% oxygen for 4 hours total. Elevated Zero Maze (EZM) is a test used to examine a rat’s level of anxiety or stress. Rats are placed in an elevated circular platform with closed arms and open arms. More time spent in the closed arms versus the open arms as well as decreased locomotion is associated with increased anxiety. Results: No statistically significant difference is seen on the three behavioral tests. However, the results are all trending in the way we would expect if hypoxia was causing a cognitive deficit. Conclusion: Although no statistical significance is seen, the results show trends that we would expect to see with hypoxia causing a cognitive deficit. Future work would include changing hypoxia parameters in order to see a significant difference compared to control animals. The trends going the way we expect would lead to future studies possibly just increasing the amount of time spent in hypoxia exposure.

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SUBCLINICAL SIGNS OF EMOTIONAL DISTURBANCE FOLLOWING SPORT-RELATED CONCUSSION
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Introduction: Adolescent athletes who sustain a sport-related concussion (SRC), are often affected by both physical and emotional symptoms (i.e., headache, sleep disturbance, cognitive problems, depression, anxiety, anger, lability). Due to these symptoms athletes are often removed from their sport, classes, and
other activities to facilitate recovery. During this time, athletes can experience additional emotional distress due to missing out on a significant source of socialization and physical activity. Although emotional changes are thought to be temporary, approximately 10% of athletes receive a new or worsening psychological diagnosis. **Objective:** To better understand the subclinical emotional impacts of SRC. We hypothesize that the emotional and psychological impact of SRC is greater than previously reported, perhaps due to the stigma surrounding mental health among athletes. **Methods:** Phone call interviews were conducted with athletes ages 12-24 diagnosed by a multi-disciplinary concussion center with a SRC between 11/2017-04/2022. Patients 18 and older were interviewed using a background questionnaire along with, PROMIS and DIAMOND surveys. For patients < 18 years old the interview was completed by their guardians. Patient guardians completed all surveys excluding the DIAMOND surveys, which are designed to be administered directly to the patient. To quantify the negative affect PROMIS questionnaires (anger, anxiety, depression, stress), the raw scores were converted into standardized T-scores. The proportion of the sample scoring above the 75th percentile was considered to have significant psychological symptoms. A binary regression was performed to examine if any variables such as, personal and family psychological histories, initial post-concussion symptom score, gender, and number of prior concussions were associated with long-term psychological outcomes. **Main Results:** A total of 96 participants were included, a majority were male (60.4%) and white (85.4%). Of the 96 participants, 36.5% demonstrated significant, subclinical psychological symptoms following concussion; and 31.7% scored ≥ 75th percentile on the Stress PROMIS measure. Personal and family histories, initial post-concussion symptom score, patient gender, and number of prior concussions not predictive of significant long-term psychological symptoms. **Conclusions:** Similar to current literature, around 10% of our sample met the criteria for diagnosis of MDD and GAD. On further examination of our sample, around 1/3 experience long-term psychological symptoms (i.e., stress, depression, anger, anxiety) at levels greater than 75% of the general population. Our data suggests that a greater number of adolescents, than previously reported, are suffering from significant long-term psychological symptoms post SRC. While most of these do not meet criteria for clinical diagnosis, approximately 1/3 of patients could benefit from more attention and resources in this area of recovery from SRC.

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**CPSF6 PROMOTES HIV-1 PREINTEGRATION COMPLEX FUNCTION**
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The human immunodeficiency virus (HIV-1) is the causative agent of the acquired immunodeficiency syndrome (AIDS). Infection by HIV-1 and progression to AIDS has resulted in the death of over 40 million people in the past 40 years and currently there is no cure following infection. During progression of HIV-1 replication in the host, the viral genome is incorporated irreversibly within the host genome in a process known as integration. This process is mediated by a viral replication complex composed of viral and host factors known as the pre-integration complex (PIC). The cleavage and polyadenylation factor subunit 6 (CPSF6) is a host protein associated with the PIC. Emerging evidence suggest that CPSF6 directs the integration of HIV-1 DNA into actively transcribing genes. However, the precise mechanism by which CPSF6 directs the PIC into these hotspots remains unclear. The goal of my thesis research is to define the exact role of CPSF6 on PIC function. We hypothesize that PIC-mediated viral DNA integration is dependent on CPSF6. To test this hypothesis, we have isolated PICs from acutely infected cells depleted of CPSF6. Integration activity measurements reveal that CPSF6 depletion reduces specific integration activity,
supporting that CPSF6 is required for optimal PIC function. Currently, we are investigating the mechanism by which CPSF6 regulates HIV-1 DNA integration by the PIC.

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FERRULE OR FAILURE – A CASE PRESENTATION
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Failed restorations are a major problem in dentistry and a concern of patients. Many failed crown restorations occur due to lack of ferrule. Ferrule is a circular band of tooth structure that is primarily dentin which is used to support the fabricated crown after the preparation of a tooth. In general, the ferrule of a tooth refers to the amount of tooth structure between the most apical portion of the buildup and the margin of the restoration. Optimally, a tooth needs two millimeters or more of ferrule on sound tooth structure to prevent lateral fatigue failure. Lateral fatigue resistance is the critical element in long term predictability of endodontically treated teeth. Lateral fatigue can result in fracture of the tooth. The abutment is resistant to fracture if it is prepared with a height of at least 1.5 -2.0 mm above the projected ferrule margin in the occlusal direction. This protects the cemented crown from fracturing along with the tooth preparation or dislodgment due mastication forces. An abutment on which a ferrule is cemented can fracture at any fracture plane at not just at the ferrule margin. For posterior teeth, a tooth preparation that doesn’t have ferrule can cause induce stress in the furcation or roots and can potentially cause fractures in those areas. In this case study, we will discuss the importance of ferrule and the negative consequences of not having proper ferrule on teeth prepared for a crown. This study focuses on a patient ultimately having teeth extracted due to over-preparation of teeth and inadequate ferrule.
No funding was received for this project.

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COMPARATIVE WHOLE-TRANSCRIPTOME ANALYSIS OF PRIMARY HUMAN CARDIAC MYOCYTES AND FIBROBLASTS DURING EARLY PHASE TRYPANOSOMA CRUZI INFECTION
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Chagas disease is caused by the parasite Trypanosoma cruzi. About 40% of infected individuals develop severe cardiovascular, neurological, or gastrointestinal pathologies. Host cells afflicted with T. cruzi infection undergo extensive changes in gene expression, but the mechanisms of these alterations are undefined. Understanding the interplay between protein-coding RNA (mRNA) and regulatory, small noncoding RNA (sncRNA) including microRNA (miRNA) and PIWI-interacting RNA (piRNA) is essential for characterizing disease processes. Our study aims examined the expression profiles of these classes of RNA during the early phase of infection in cardiac cells. We challenged primary human cardiac myocytes (PHCM) and fibroblasts (PHCF) with T. cruzi trypomastigotes, extracted RNA, and conducted
RNA-Seq small RNA-seq to evaluate changes in their expression profiles. Reads were aligned to the hg38 reference genome and sncRNA databases using Bowtie. Novel coding transcripts were predicted with Cufflinks. Piano and miRDeep2 were used to predict novel piRNAs and miRNAs, respectively. DEGseq and NOISeq were used to determine differentially expressed (DE) mRNAs, piRNAs, and miRNAs. DE scnRNAs were queried against human coding transcripts to predict regulatory targets using miRanda and TargetScan. Gene ontology analysis and transcription factor identification of the targets were using clusterProfiler and TRUSST, respectively. Our results identified 46 and 150 coding transcripts in PHCM and PHCF, respectively, which were predicted targets of DE sncRNA. Gene ontology analysis indicated enrichment in DNA binding processes for PHCM and cytokine signaling in PHCF. Transcription factor analysis identified 13 and 38 genes as regulators unique to PHCM and PHCF, respectively. Fourteen regulators shared between cell types. In summary, through in silico analysis, we identified processes and molecular mediators unique to and shared between PHCM and PHCF during early T. cruzi infection. Through further delineation of these two distinct expression profiles, major factors promoting infection and disease progression in host tissues can be ascertained.

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INVESTIGATING THE RELATIONSHIP BETWEEN THE LENGTH OF TIME SMOKING HOOKAH & ITS RISK FACTORS AMONG HEALTH CARE/PROFESSIONAL STUDENTS: IMPLICATIONS TO ORAL DISEASES


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Hookah smoking is wrongly perceived as a healthy alternative to cigarettes and is a growing fad. Studies show hookah can lead to periodontal disease, halitosis, and oral cancer. Objectives included: collect and analyze data that guide decision-making for hookah smoking; and determine risk factors that are associated with the length of time smoking hookah. IRB at Meharry Medical College, Nashville, TN., has approved the study. A self-assessment Redcap survey was completed for 120 dental student doctors (21-35 yrs. old, Male/Female), from Meharry Medical College, School of Dentistry. Of these, 78.4% were African American followed by Asian (13.7%) students. Methods included convenience surveying to evaluate patterns of hookah use, the frequency other substances were smoked, the perception of hookah, and potential risks that are associated. Data analysis was done via partial least squares regression. A positive correlation between the length of time smoking hookah and particular location (i.e., lounges) was noted. Researchers believed that these risk factors influenced the duration of students engaging in hookah smoking, which possibly led to detrimental long-term effects. It was revealed that students were aware of potentially harmful effects of hookah yet continued to engage in the activity. There was also a significant (p<0.05) difference noted among gender, race, location, and region. African Americans are the larger group of hookah smokers. Women have a higher percentage compared to men. Participants from southern states held a higher percentage compared to individuals from other regions of the United States. Most hookah smokers smoke in bars and lounges. The data collected from this study demonstrate the potential risk factors among health care professionals and the length of the time smoking, as well as their current knowledge and perception of hookah smoking. Future studies will focus on designing educational programs to reduce the frequency of hookah smoking.
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PREDICTIVE ABILITY OF THE AD8 AND MOCA TO DETERMINE COGNITIVE IMPAIRMENT IN A COMMUNITY POPULATION

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Background: Alzheimer’s Disease (AD) is a neurodegenerative disorder that has been associated with amyloid beta (Aβ), apolipoprotein E (APOE), and neurofibrillary tangles (tau). Aβ deposits and neurofibrillary tangles are considered the hallmarks of AD pathology, while APOE is a protein that presents in variation on receptors in the brain and determines the risk of an Alzheimer’s diagnosis. A most accurate diagnosis of AD can be done by viewing amyloid beta through PET imaging and/or collecting cerebrospinal fluid. The SEABIRD study recognizes these methods of diagnosis, but also uses novel blood biomarkers (blood plasma A 42/40) to diagnose to provide a cheaper, less invasive option. Many AD trials in the past have recruited participants from a specific population (Caucasian, highly educated, family history of AD). This study aims to provide generalizable results that properly reflect the demographic of the St. Louis population both in terms of education, ethnicity, and economic status. In a more representative population, SEABIRD uses simple and short cognitive assessments, Ascertain Dementia-8 Item Questionnaire (AD8) and Montreal Cognitive Assessment (MoCA).

Methods: 79 participants are recruited in the community and screened with the AD8 assessment to determine exclusion or inclusion based on cutoffs. After enrollment they complete a series of encounters: Initial Visit, Confirmatory Visit, CDR Scale Interview. Then data is collected and analyzed. Results: AD8 has a higher specificity and lower sensitivity whereas MoCA's statistical breakdown is reversed. AD8 and MoCA together neither have the highest specificity or sensitivity. Conclusion: The composite score that SEABIRD uses, MoCA and AD8 together, is found to have a better statistical analysis than either memory assessment separately. However, the specificity and sensitivity is not the best compared to the CDR.

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IMPOSTER SYNDROME PILOT STUDY IN VANDERBILT DERMATOLOGY RESIDENTS & FACULTY

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Imposter Syndrome (IS) is the feeling of insecurity and inadequacy in your profession despite having earned the necessary credentials¹. The highly competitive atmosphere and stressors of dermatology residency training and subsequent practice may be significant enough to manifest in some individuals as imposter syndrome². Here, we hope to shine a light on the presence of IS in dermatology residents and faculty at Vanderbilt University. The prevalence of IS has yet to be studied in dermatology faculty. However, one such study of dermatology residents found IS to be a “significant concern” in residents, with 89% of respondents having moderate to severe imposter syndrome tendencies². This leads us to the question if the
prevalence of IS changes throughout a dermatologist’s career. We hypothesize that IS will be prevalent within the cohort of dermatology residents and faculty, and IS will show a decreasing prevalence as time in practice progresses. An anonymous, cross-sectional survey was conducted from July to August 2022 through a Research Electronic Data Capture (REDCap) program with an estimated response rate of 17.6%. This survey used Dr. Leary’s Impostorism Scale\(^3\) ranging from 7, indicating no imposter syndrome, to 35, indicating the highest level of imposter syndrome. Results indicated an overall mean of 14.2 and a standard deviation of 4.58. Dermatology residents had an average IS score of 14.3, while dermatology faculty had an average score of 14- however, removing an outlier score lowers the faculty average to 10. The survey also collected data on demographics, past mental health diagnoses, previous mentorship, research publications, USMLE Step scores, years of clinical experience, and subspecialty training- however, no correlation was found. We can conclude that IS was prevalent within the cohort of Vanderbilt dermatology residents and faculty and IS does not necessarily decrease with time spent in practice, but we suspect that such a trend exists with removing the faculty outlier. Further research will be needed to understand why some faculty experience high levels of imposter syndrome and what we can do to combat those feelings.

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A COMMUNITY-ACADEMIC PARTNERSHIP TO IMPROVE HEALTH OUTCOMES: A PILOT FEASIBILITY STUDY OF AN INTEGRATED DIETARY INTERVENTION IN ADULTS WITH TYPE 2 DIABETES

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Objectives: Adopting healthy dietary practices is essential for patients’ success at controlling their diabetes. Yet, it remains one of the most challenging aspects of diabetes self-care for a large number of patients, particularly the disadvantaged low-income and racial/ethnic minority populations who carry a high burden of disease. The aim of this pilot study was to evaluate the feasibility and impact of an integrated dietary intervention to improve nutrition literacy and influence dietary patterns among non-Hispanic Blacks with type 2 diabetes. Research Methods: Participants (N = 15; 70% females) were recruited from Saint James Missionary Baptist Church in Nashville, Tennessee and enrolled in a 12-week dietary intervention, using a single-subject reversal design. The intervention’s core features included using MyPlate, and weekly pre- and post-prandial blood glucose testing. Participants’ knowledge of MyPlate, nutrition behaviors, self-efficacy and perceived study impact were assessed. Results: Participants’ ages ranged from 55 to 75 years, A1C, 6.5 to 10%, and BMI, 31 to 40 kg/m\(^2\) with 80% reported having one or more chronic health conditions. There were improvements in participants’ knowledge of MyPlate (from 40% to 70%), nutrition literacy, and food choices and portions. Most participants ranked making healthy food choices a high/essential priority of their self-care behaviors. Participants reported that the pre- and post-prandial blood glucose testing increased their awareness about what they ate, helped them identify the high glycemic foods, and adjust their meals. Conclusions: Our preliminary findings show that integrating paired glucose testing with MyPlate was feasible. Most participants found the intervention very useful and very relevant to their diabetes self-care. Future studies are needed to evaluate the impact of this intervention in a larger cohort and assess the long-term sustainability of participants’ dietary changes. Acknowledgments: This study was funded by the Vanderbilt Center for Diabetes Translation Research – CDTR (VUMC38820). Other supports include U54MD007586.
COMMUNITY-ENGAGED QUALITATIVE RESEARCH TO UNDERSTAND THE EXPERIENCES OF AFRICAN AMERICAN WOMEN CLOSELY RELATED TO BREAST CANCER PATIENTS

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Objective: Meharry Medical College Center for Women’s Health Research and the Sister’s Network Nashville, a support group for African American breast cancer survivors, partnered to increase local attention to the devastating impact that breast cancer has in the African American community. The partnership focuses on understanding women's experiences closely related to breast cancer patients. Research Methods: (1) Understand how the relationship between the breast cancer patient and close relative is impacted after the diagnosis. (2) Compare lifestyle choices that are linked to breast cancer risk, (3) examine the challenges and barriers of breast cancer prevention among women at increased risk for breast cancer (4) Examine attitudes about genetic testing among women at increased risk for breast cancer, (5) Summarize breast cancer preventive behavior (mammogram) and breast cancer knowledge. Women closely related to breast cancer patients or survivors were recruited to participate in focus groups. Members from Sisters Network Nashville were trained to assist with recruitment, data collection, and analysis. The team conducted four focus groups and two individual interviews with women who wanted to participate but couldn't attend the focus groups. Participants were encouraged to share their unique experiences after learning about their family member's diagnoses. All sessions were conducted and recorded via Zoom. Audio recordings were transcribed and shared with the research team for analysis. In order to analyze the transcripts, members of the research team reviewed each one independently to identify a coding scheme. The next steps will require the team to work together to summarize themes. Results: Preliminary analysis has identified several essential issues among participants including the need for knowledgeable physicians and support groups, breast cancer education, information about genetic testing, and information for caregivers. Conclusion: As the qualitative analysis continues, we will use the findings to develop an innovative intervention for women who are at increased risk for breast cancer.

This study was funded by Meharry Medical College Enhancing Virology Training (ENVIT) Program.

MRI CORRELATES OF NEUROCOGNITIVE FUNCTIONING IN MOVEMENT DISORDERS

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Parkinson’s Disease (PD) is a progressive neurodegenerative movement disorder that encompasses neuropsychological symptoms. Symptoms of both motor and cognitive deficits are secondary to the depletion of dopaminergic neurons in the brain. Therefore, analyzing variables of neuroanatomical morphology, such as cortical gray matter volume and deep nuclei volume, can be used to characterize PD more completely. Such variables can also be compared with neurocognitive test performance and clinical movement assessment scores to elucidate a correlation with results of neuroimaging. Therefore, we hypothesize that neuroanatomical abnormalities will have corresponding changes in neurocognitive test performance and movement disorder assessment scores. Using electronic medical records of PD patients, we retrospectively collected demographic and neurocognitive data from Robert Wood Johnson Medical
School Neurosurgery department and Robert Wood Johnson Barnabas Health hospital systems. Neuroimaging records were segmented, normalized, and smoothed using Statistical Parametric Mapping (SPM12) software. Group level analysis of gray matter densities was compared between 45 controls subjects with no history of a movement disorder and 45 PD subjects using Voxel-Based Morphometry (VBM) to generate statistical maps brain regions with statistically significant differences in tissue volume. Significance was determined by $p<0.001$ and a threshold of 50 voxels. SPM results were based on two contrasts: CN-PD (decreased gray matter volume in the PD group compared to controls) and PD-CN (increased gray matter volume in the PD group compared to controls). Peak regions of difference in the CN-PD group were observed in the putamen, globus pallidus, entorhinal area, parahippocampal gyrus, middle frontal gyrus, and cerebellar cortex. Conversely, in the PD-CN group, increased gray matter volumes were observed in the brain stem, thalamus proper, supplementary motor cortex, and middle cingulate gyrus. Based on the results, we concluded that PD and related movement disorders are associated with significant reductions in gray matter in regions of the BG, hippocampal formation, cerebellar cortex, and primary motor cortex, which are regions involved with motor initiation, regulation, and learning. Also, significant increases in gray matter of PD subjects were found in the thalamus, temporal gyrus, cingulate gyrus and supplementary motor cortex, involved in movement and processing of auditory information and emotions.

29 PERIODONTITIS AND CVD
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This study examined a link between periodontitis and cardiovascular disease. Data was collected on 40 individuals based on whether they had chronic periodontitis, were otherwise healthy, and showed a higher serum concentration of emerging cardiovascular risk markers such as Interleukin 6 (IL-6) and C-Reactive Protein (CRP). The serum levels were measured on an initial visit and again 3 months post periodontal therapy. The results of the test were inconclusive. Limited evidence is available to prove a direct causal relationship. Further clinical and investigative experiments are needed.

30 MANAGING ODONTOGENIC INFECTIONS ON HIGH RISK MRONJ PATIENTS: A CASE REPORT
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**Background:** For oncologic patients taking IV bisphosphonates, there is a 1.6-14.8% risk of developing medication related osteonecrosis of the jaw (MRONJ) after tooth extraction. In view of this, dental surgery should be avoided. However, in the case that circumstances require surgical intervention, collaborative and appropriate treatment planning is critical. **Case presentation:** A 51-year-old African American male undergoing bisphosphonate treatment for prostate cancer presented to the dental clinic with unilateral facial swelling. One year prior, the patient visited a dental office with the chief complaint of right sided facial swelling and was treated with two courses of antibiotic therapy. Patient reported a significant reduction in facial swelling, however, symptoms persisted. With concerns about a potential need for more aggressive
dental treatment, the patient’s physician issued a drug holiday three months prior to the patient’s visit to our clinic. Extraoral and intraoral examination indicated right sided facial paralysis secondary to a motor vehicle accident, gingival hyperplasia with erythema, multiple residual roots tips, periapical radiolucency on the mandibular right first molar, and widened periodontal ligament space at mesial aspect of the maxillary right second molar. The patient was sent home with a broad-spectrum antibiotic and medical consultation was sent to his physician to prepare for surgical extractions. **Conclusion:** Further studies will assess the treatment effect and if this approach could be a useful pre-treatment approach for managing MRONJ.

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**THE ABSENCE OF MEDICAL GUIDELINES FOR INCARCERATED YOUTH AND PREGNANT WOMEN WITH CHRONIC DISEASES ASSOCIATED WITH NEAR-TERM PREVENTABLE DEATHS: A SCOPING REVIEW**

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The right of the incarcerated population to have access to adequate healthcare is protected by the 8th Amendment of the U.S. Constitution. Despite this, 69% of incarcerated youth in correctional facilities have an unmet medical need. 60% of pregnancies in incarcerated women report having at least one obstetric problem, nearly quadruple the national percent of 16.2%. This gap in access to healthcare calls into question the availability of guidelines to provide a standard of care for these vulnerable populations. The primary objective is to review the availability of evidence based medical guidelines for incarcerated youth and pregnant women. This review specifically highlights the absence in available guidelines for the management of individuals with chronic health conditions associated with preventable death, such as asthma, cystic fibrosis, diabetes mellitus, epilepsy, and sickle cell disease. A scoping review was done to gather existing guidelines for healthcare of incarcerated youth and pregnant women. Nineteen relevant medical/healthcare organizations were identified and the respective websites were searched for available guidelines using the search term “incarcerated”. Few medical guidelines are available for incarcerated youth and pregnant women. Of the 19 organizations reviewed, only 7 have existing healthcare guidelines for incarcerated youth and 4 organizations have guidelines for incarcerated pregnant women. The NCCHC has the most comprehensive list of guidelines, but these guidelines fail to outline protocol for management of chronic health conditions that lead to near-term preventable deaths in youth and pregnant women. The time for this project limited the available research findings for this project. This project was also limited to available guidelines in the United States. Further reviews can investigate available guidelines in other countries. Medical guidelines should be created to prevent deaths in youth and pregnant women in correctional facilities. With a published set of guidelines for management of individuals with chronic health conditions, correctional facilities are able to be held accountable to an established standard of care.

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ESTABLISHING REPRODUCIBLE MANUAL AND AUTOMATIC METHODS FOR IMAGE NOISE ASSESSMENT IN CHEST CT EXAMINATIONS

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Optimizing image quality with the least amount of potentially harmful radiation is necessary to produce the best results for the analyzing radiologist and patient involved. The global noise (GN) algorithm has previously been assessed as a method for automatic noise measurement in head and abdominal CT examinations. However, the lung heterogeneity and difference in density from other soft tissue organs leaves a gap in objective assessment of noise in chest CT examinations. Because of the tissue heterogeneity inherent in the lung, it is unclear whether a reproducible metric of image noise is possible manually or automatically. Therefore, this investigation includes assessing whether small homogeneous image regions in the lung between vasculature and bronchioles may be utilized for reproducible image noise measurements manually and/or automatically. An image dataset of 62 total chest CT examinations of 31 patients (16 women, 15 men) with non-small cell lung cancer was used to evaluate the reproducibility of manual measurements between two observers and automatic measurements using the GN algorithm. An instruction set was created specifying that four regions of interest (ROI) sized at four pixels were placed in each lung at the image slice closest to where the inferior vena cava is first defined going superior to inferior on CT imaging. The average of the medians between each observer was taken for each image as the ground truth. The GN algorithm was preliminarily tuned to chest CT specifications and was used on the same dataset to be compared with the reference noise values. Our results indicated that there is a correlation between observer 1 and observer 2 noise measurements ($R^2=0.52$), and a relatively strong correlation between the automatic noise measurements and the average of observer 1 and 2’s noise measurements ($R^2=0.66$). Limitations will be addressed in the future by including more observers and analyzing an image set with a lower radiation dose. A reproducible manual method of noise measurement in the lung is possible with a relatively strong correlation. The GN algorithm can also automatically measure noise in the lung with a relatively strong correlation to ground truth measurements along with measuring noise more consistently.

Support: The University of Texas MD Anderson Cancer Center Department of Imaging Physics

LOSS OF MITOCHONDRIAL FUS1/TUSC2 IN BRAIN IMPAIRS NEUROBEHAVIORAL ACTIVITY

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Mild cognitive impairment (MCI) occurs on a continuum from normal cognition to Alzheimer’s disease/dementia, in a sex-dependent fashion. Incidences of MCI/AD are generally reported to be higher in women than men. The underlying mechanisms driving the development of this form of cognitive impairment remain elusive. One crucial component of memory impairment is dysregulation of mitochondrial calcium ($\text{miCa}^{2+}$) in the brain. Disturbance of calcium affects the homeostatic state of the neuroimmune system, including the health of microglia and neurons. Our group has found that Fus1 protein serves as a $\text{Ca}^{2+}$ handling protein in cells. Fus1 protein is encoded by nuclear DNA, resides in mitochondria, and assists in $\text{Ca}^{2+}$ uptake and extrusion via the Mitochondrial Calcium Uniporter (MCU) and mitochondrial
sodium-calcium exchanger (mNCX), respectively. Fus1 deficiency results in Ca\(^{2+}\) dysregulation and increased oxidative stress. The goal of this study is to elucidate the role of Fus1 in the central nervous system (CNS). We examined the role of Fus1 in memory by using a systemic knock out (KO) of the gene in mice. Mice 4 months of age were subjected to behavioral tasks including Y-maze and OFT. Fus1 deficiency impaired short-term spatial memory in males but not in females as assessed with Y-maze test (\(p<0.05\)). Fus1 KO females show an increased trend in locomotor activity as compared to KO males in OFT (\(p<0.05\)). We measured the impact of Fus1 loss on the ratio of nonactivated and activated microglia in the brain. It is suggested that changes in microglial functions are involved in the onset and progression of MCI/AD. We also found increased MCU protein expression in the hippocampus of Fus1 KO mice, which may provide a clue to the molecular mechanisms of Fus1 loss in brain. Overall Fus1 may prove to be a crucial regulator in neurodegeneration.

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A NOVEL MEDICALLY ACTIONABLE ATP1A3 VARIANT FROM A GENOMIC MEDICINE PROGRAM IN AN UNDERSERVED POPULATION

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Genomic medicine implementation has not benefited underrepresented populations to the same degree. Making exome sequencing widely available has the possibility to close the disparity gap and make genomic medicine available to all. The objective of our research was to assess whether whole-exome sequencing (WES) can provide a genetic diagnosis for families in underserved populations and change their perception of genomics. We hypothesize that whole exome sequencing is a powerful tool for diagnosis in underserved populations and will enhance the medical care and the perception of genomics in individuals in an underserved population. Here, we report the case of a 7-year-old male with hypotonia, global developmental delay, strabismus, seizures, and previous suspected Mitochondrial Myopathy. This proband comes from an underrepresented minority and was denied WES by his public insurance. By enrolling him in The Texome Project, he was able to have exome sequencing done at no cost to him. Sequencing of DNA from cheek cells of the proband revealed a heterozygous de novo pathogenic variant in the ATP1A3 gene on chromosome 19. His single nucleotide variant (SNV) is linked with Alternating Hemiplegia of Childhood 2 (OMIM: #614820), a rare autosomal dominant disorder. This gene was then analyzed in OMIM, gnomAD, HGNC, and MARRVEL while the variant was compared to normal sequences in ClinVar, VEP, and UCSC Genome Browser. The limitations of this study include travel restrictions and internet access for some patients enrolled. Based on the data from this study, we concluded that WES can be a diagnostic tool for families from underserved populations. Future plans include longitudinal follow up for this patient over 2 years, along with functional studies for newly discovered genes, bioinformatic analysis of genes not originally called by exome, and continued enrollment of new patients into the study.
CHRONIC HYPERGLYCEMIA IMPAIRS HUMAN ISLET FUNCTION
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Objective / Hypothesis: β-cell mass and/or function are critical determinants of all forms of diabetes. Our understanding of how human α and β cells respond to and are impacted by chronic hyperglycemia is incomplete. Glucotoxicity refers to the concept that chronic hyperglycemia can impair insulin secretion. We hypothesize that chronic hyperglycemia reduces the expression of key islet-enriched transcription factors, leading to impaired insulin secretion. Approach: Our group crossed the immunocompromised NOD.Cg-Prkdcs¹ldIl2rgımıwSz (NSG) background mice with glucagon knockout (GK0) and RIP-human diphtheria toxin receptor transgenic (DTR) mice (GK0/DTR) then transplanted human pancreatic islet cells into the kidney capsule of the selected mice. Blood glucose measurements were taken at multiple time periods. We also collected blood for function assay and removed the kidney with grafts and pancreases for immunocytochemistry during sacrifice. Results: Diphtheria toxin treatment ablates mouse beta cells and leads to increased blood glucose. The severe hyperglycemia caused by the Diphtheria Toxin treatment impairs insulin secretion by transplanted human islets. Human islet grafts in the DT treated mice had decreased levels of MAFB expression in beta cells. There was no significant change in expression of MAFA, ARX, and NKX6.1 between the control and DT-treated groups. Summary / Conclusion: The data suggests decreased expression of a key islet-enriched transcription factor, MAFB, may be responsible for the impaired insulin secretion resulting from chronic hyperglycemia. Future directions include repeating the study utilizing additional donors to confirm conclusionary points. Also, measuring other transcription factors which include but are not limited to, NKX2.2 and PDX. Lastly, the alpha cells should be analyzed along with their secretions, function, and environmental response.

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EFFECT OF CD300A SIGNALING ON CYTOKINE PRODUCTION BY EBV (+) POST-
TRANSPLANT LYMPHOPROLIFERATIVE DISORDER
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Epstein Barr virus is an ever-present virus in the human population; however, infection with EBV is usually asymptomatic. Immunosuppressed transplant patients are susceptible to EBV (+) transformed B cell lymphomas and post-transplant proliferative disorders (PTLDs). PTLD can occur following solid organ and hematopoietic stem cell transplantation. The main driver of PTLD is the Epstein-Barr Virus (EBV) through multiple mechanisms. The majority of PTLDs are of B cell origin but some can also be of T or NK cell origin. Depending on their activation status, B cells express different sets of immunomodulatory receptors on their surface. An example is CD300a, a Type 1 transmembrane regulatory immune receptor expressed

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in specific subsets of human B cells such as the memory B cells. CD300a is a receptor expressed on EBV (+) B cell PTLD and it delivers an inhibitory signal in B cells upon binding to an agonistic ligand, hence, CD300a stimulation will likely induce changes in the cytokine profile of EBV (+) B cell PTLDs. In B cell PTLD, EBV-infected B cell are transformed, associated with selective expression of latent viral proteins, and they proliferate autonomously. In early studies, it is shown that EBV-infected B cell lymphomas produce cytokines such as human IL-10. Dysregulation of these key cytokines secreting signal transduction nodes via activation or inhibitory receptors such as CD300a could play an important part in the pathogenesis of EBV positive PTLD. CD300a is significantly upregulated on EBV (+) B cell PTLDs compared to EBV (-) PTLDs. We investigated the effect of CD300a signaling on cytokine production by EBV (+) B cell lymphomas in PTLD. EBV (+) B cell lines with high CD300a surface expression were treated with an agonistic anti-CD300a mAb and their cytokine profile accessed. Using Luminex assay, the cytokine profile showed that a slightly higher range of cytokines were expressed in CD300a treated with agonistic anti-CD300 mAb when compared to CD300a treated with an isotype antibody. Furthermore, cells cultured for 72hrs released more cytokines than 48hrs incubation. These results will suggest new therapeutic strategies targeting CD300a by providing a better understanding of its role in EBV (+) PTLD pathogenesis.

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EPCAM CHARACTERIZATION BY RNA ISH/IF OF EPITHELIOID MESOTHELIOMA EFFUSION SAMPLES
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Epithelial cell adhesion molecule (EpCAM) is a major epithelial origin tumor biomarker that is frequently used to distinguish epithelial tumor cells from mesothelial cells in clinics (overexpressed in epithelial cancers and present at lower levels on normal epithelial cells). However, an unexpected mesothelioma case showed up exhibiting a strong and diffuse EpCAM staining under immunohistochemistry (IHC). We thus screened all mesothelioma cases at Stanford Health Care from 2010 - 2021 and identified 16 more representative malignant cases with or without reported EpCAM IHC staining for further characterization. Previously, we have examined these 17 cases by IHC and some cases by immunofluorescence (IF) targeting EpCAM and identified EpCAM positivity by both methodologies in a subset of cases. The EpCAM expression was varied in both intensity of staining and fraction of tumor cells that stained positively. We wondered if the observed EpCAM positivity was correlated with RNA expression of EpCAM and thus sought to examine RNA expression of EpCAM in selected cases employing RNAscope assay. RNAscope is an RNA in situ hybridization (ISH) technique that allows visualization of single RNA molecules in a patient samples. In this study, we performed additional EpCAM IF on select cases and RNA ISH testing on five cases exhibiting varied levels of EpCAM IHC/IF positivity. We detected EpCAM RNA in 3 of the 5 cases, correlating well with the prior IHC/IF findings. Further we quantified the number of EpCAM RNA signals (RNA-probe) per cell for selected cases and found a strong expression of EpCAM RNA in those positive cases.
IMPOSTER PHENOMENON AMONG VANDERBILT UNIVERSITY PLASTIC SURGERY RESIDENTS AND FACULTY

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HYPOTHESIS: Imposter phenomenon (IP) will be detected among Vanderbilt University’s plastic surgery residents and/or faculty with moderate to severe intensity. METHODS: An anonymous cross-sectional survey was distributed to Vanderbilt University’s plastic surgery residents and faculty members using REDCap. It consisted of the Impostorism Scale by Dr. Mark Leary with additional demographic questions including biological sex, age, United States Medical Licensing Exam (USMLE) STEP 1 and 2 scores, number of years in practice, and level of menteeship. Risk factors for the prevalence of IP were conducted for demographic factors using descriptive statistics. RESULTS: With a response rate of 30%, IP was detected within the study’s population, but not to the severity hypothesized. On average, respondents reported that each impostorism characteristic was not characteristic of them or slightly characteristic, with none reporting that any item was extremely characteristic. The average respondent represented a biological male in their 4th decade of life with greater than a semi-decade of experience in practice. The average respondent scored between 232 and 241 on their USMLE STEP exams on a scoring scale of 1 to 300. CONCLUSIONS: Previous studies of IP have heterogeneous conclusions. A closely related study among general surgery residents demonstrated a high prevalence of IP. Our study demonstrates lack of or slight feelings of impostorism within Vanderbilt University’s plastic surgery department. The responses among residents paralleled the faculty responses. Future comparisons could assess the severity of IP among residents within different post-graduate years. The majority of respondents were biologically male which may suggest that males experience low levels of IP but would require further assessment. Most respondents also have a consistent mentor and have practiced for almost a decade which may also account for the low intensity of IP. The cross-sectional survey design limited the avoidance of selection bias and prevented assessment of causal variables. Our findings may not be generalizable to specialties outside of plastic surgery. Despite limitations, this study is an introduction into the assessment of IP in the plastic surgery community. We hope to extend our survey to other plastic surgery residencies, and assess a wider range of demographic characteristics and potential gender differences.

IMPROVING REPLANT PERFUSION MONITORING WITH A PSQI NURSING EDUCATION PROJECT

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Postoperative monitoring of replantation, revascularization (RR) and free flap procedures is extremely important to the success of these surgeries. Any change in perfusion to the replanted or revascularized parts must be recognized quickly, and failure to do so can result in patient morbidity or loss of the part. The most significant predictor of RR and free flap salvage is early detection of compromise and prompt intervention. Nurses are integral to postoperative care of these procedures as they provide bedside minute-to-minute care and can detect subtle changes to potentially save the part. Careful monitoring can sometimes obviate the need to go back to the operating room or the use of the intensive care unit. Nursing turnover and shortages have been extremely high since the beginning of the Covid-19 pandemic, meaning that there may be
variability in experience of nursing staff. Our goal of this study was to identify any knowledge gaps that nurses at a level 1 trauma center may have in the postoperative monitoring of RR and free flap patients, and the efficacy of a video lecture based educational module. This was a pre- and post-intervention study. Nursing staff were recruited from Barnes Jewish Hospital, located in St. Louis, MO. 28 nurses completed the pre-test and 18 completed the post-test. The pre-test survey tested nurse participant’s baseline knowledge of postoperative care of RR and free flap patients. Directly after completing the pre-test, participants were instructed to watch a 15-minute educational video. After completion of the educational video, participants were instructed to complete the post-test. Knowledge of postoperative care of RR/flaps increased significantly between pre-test and post-test. Nursing experience had no significant effect on pre-test scores; How often nurses took care of a RR/flap and type of floor worked on had a significant effect on pre-test scores. Our results show that this educational module has the potential to improve patient care through increased recognition of RR/flap failure if implemented as required training in hospitals. This may be particularly useful in hospital settings with less experienced staff considering recent nursing turnover and shortages.

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IN VITRO INACTIVATION OF EV ASSOCIATED RNAs IN COLORECTAL CANCER CELLS
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Normal and diseased cells secrete extracellular vesicles from the plasma membrane and late endosomal compartments, and these vesicles contain proteins, including diverse RNA binding proteins, lipids, and RNAs, including mRNAs, miRNAs, and other noncoding RNAs. The RNAs carried in EVs can affect gene expression and the phenotype of recipient cells, potentially linked to cancer and other diseases. Although there are many studies on EV-secreted RNAs and their role on recipient cells, it is difficult to distinguish the function of RNAs from other functional cargoes (proteins, DNA, etc.), and it would be beneficial to know which cargo type is responsible for the functional effects of EVs. Previous studies have used a few approaches, including knockdown of miRNA biogenesis pathways and anti-miRNA overexpression, but these either require prior knowledge of the functional effects of the miRNAs involved or fail to inactivate all RNA. In general, RNAs are present in the cell as RNA-RNA binding protein (RBP) complexes, so one approach to RNA inactivation could be by crosslinking the RNA to bound RNA binding proteins with UV irradiation. In order to achieve this, we are treating donor cells with 4-thiouridine (4-SU), purifying the EVs of the donor cells and treating them to recipient cells. 4-thiouridine is a photoreactive nucleoside analog that after incorporation into the nascent RNA transcript can aid in crosslinking RNA to interacting RBPs. Initially, the approach is to treat EVs purified from 4-SU treated parental DKO-1 colon cancer cells, UV irradiate the purified EVs and transfer them to non-treated DKs-8 colon cancer recipient cells, checking the effect on recipient cells by luciferase assay. These isogenic KRAS cells have shown differential enrichment of miRNAs dependent on KRAS status. We hope to expand this practice testing siRNA, tRNA, and also exploring different assays and cell lines.

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Porphyromonas gingivalis (Pg), a periodontitis-causing pathogen, can spread throughout the body and cause chronic inflammation in the gastrointestinal (GI) tract. Diabetes, a significant risk factor for periodontitis, can exacerbate GI dysfunction in Pg infected patients. Altered nitric oxide (NO) synthesis due to defective nitric oxide synthases (NOS) has been associated with GI motility disorders. Loss of Nrf2 (Nuclear factor (erythroid-derived 2)-like 2) led to reduced nNOSα mediated gastric motility and emptying. We investigated the therapeutic potential of cinnamaldehyde (CNM) on NO mediated GI motility dysfunction in periodontitis-infected and diabetic mice. Adult female C57BL/6J mice were randomly assigned into seven groups (n=8). Mice were orally infected with Pg and were fed standard chow (ND) or high-fat diet (HFD) for 24 weeks. Groups of HFD or ND mice with or without Pg infection were given CNM (50mg/kg, b.w) three times a week. Body weight and blood glucose levels were monitored and recorded. Serum and gastric tissues were collected at the end. Our data demonstrate that mice with Pg infection and HFD-induced T2D significantly (p< 0.05) increased in their body weights and blood glucose levels. These groups showed impaired nitrergic (neurons produce nitric oxide in GI) relaxation and delayed gastric emptying (6.2±1.8%) compared to control groups (71.7±3.2%). Supplementation of CNM restored the impaired nitrergic relaxation and attenuated delayed gastric emptying (in Pg (68.5±2.4%) and HFD-induced T2D (59.5±3.4%) groups. Supplementation of CNM altered gastric protein expression of BH4 (Cofactor of nNOS) biosynthesis enzyme GCH-1, nNOSα protein, and Nrf2. Nrf2 activation restores nitrergic-mediated gastric motility and emptying by counteracting oxidative stress in periodontitis or diabetes-induced GI disorders. Studies are needed to investigate CNM as a therapeutic target for patients susceptible to periodontal disease, diabetes, and delayed gastric motility.

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made per 100,000 eligible women in urban vs. rural counties using a t-test. To classify urban vs. rural status of counties, we used the National Center of Health Statistics classification. Counties were classified in a binary fashion: rural (score of 5-6) or urban (score of 1-4). Eligible women were aged 40-64 with incomes less than 250% of the poverty line. Because population data were not available for all years reviewed, years where information was missing used population data from 2019. Analysis confirmed that screenings in rural areas were significantly higher than those in urban areas (p=0.04619) but diagnoses were not (p=0.59931). The TBCSP has continued to increase the number of screening services provided annually and offers increased screening services in rural counties when compared to urban counties. Breast cancer is often diagnosed in women from rural communities at later stages than those from urban areas, leading to disparate outcomes. The results indicate that the TBCSP is providing services to bridge this gap. Women in vulnerable populations still have disparate outcomes when prognostic factors are equalized. It is important to follow these efforts with plans address other root causes of these disparities.

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PTHRP BIOLOGICAL DOMAINS REGULATE BREAST CANCER BONE COLONIZATION

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Breast cancer cells frequently metastasize to bone, where they may proliferate or enter a dormant state. Parathyroid hormone-related protein (PTHRP) expressed by breast cancer cells promotes tumor outgrowth in bone by increasing bone resorption through receptor activator of NFκB ligand (RANKL) and stimulating tumor cell exit from dormancy. PTHRp has multiple biological domains that determine its autocrine, paracrine, and intracrine functions, but the role of the PTHRp nuclear localization signal (NLS) and C-terminus is not well understood. To assess the role of PTHrP biological domains in breast cancer bone colonization, we expressed full-length secreted PTHrP, PTHrP with deletion of the NLS, or PTHrP with deletion of the NLS and C-terminus in human MCF7 breast cancer cells, which normally lay dormant in bone. MCF7 cells expressing these proteins, termed FLSEC, DNLS, and DNLS+CTERM mutant cell lines, respectively, were inoculated into athymic nude mice by intracardiac injection to facilitate bone colonization. Osteolytic lesion area and number (by radiography), and tumor burden in the bone marrow (by flow cytometry), were significantly higher in mice inoculated with DNLS (5.9-fold, p<0.05) and DNLS+CTERM (4.19-fold, p<0.05) mutant cell lines compared to control MCF7 cells. To determine whether the increase in osteolysis and tumor burden was due to increased bone resorption, we performed qPCR on homogenized bone for osteoclast markers Acp5, Ctsk, Tnfsf11, and Tnfrsf11b, which were modestly upregulated in mice inoculated with the DNLS mutant cell line; however, the ratio of Tnfsf11 (gene for RANKL) to Tnfrsf11b (gene for RANKL decoy receptor osteoprotegerin (OPG)) was significantly elevated in bones from mice inoculated with DNLS mutant cells (3.798-fold, p<0.05), suggesting an increase in bone resorption. These data suggest that PTHrP modulates bone colonization through domain-specific mechanisms. We aim to further clarify the role of PTHrP biological domains by assessing bone colonization when only the C-terminus is deleted.
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A NOVEL ROLE OF CINNAMALDEHYDE IN THE PROTECTION AGAINST P. GINGIVALIS INDUCED ENDOTHELIAL DYSFUNCTION
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Objectives: Cardiovascular disease is still the leading cause of mortality worldwide. Vascular endothelial dysfunction is viewed as the initial step in most cardiovascular diseases. Periodontal diseases have been reported to have a multidirectional association with metabolic disorders. Many studies have indicated that periodontal pathogens, especially Porphyromonas gingivalis, are closely correlated with vascular endothelial homeostasis, but the underlying mechanism behind it is still elusive. We sought to investigate the correlation between periodontitis, diabetes, and vascular endothelial dysfunction in an HFD-fed obese mice that is orally infected with P. gingivalis. Further, the protective effect of cinnamaldehyde, was compared between Pg infection and high-fat diet (HFD)-induced dyslipidemia and vascular endothelium dysfunction. Experimental Methods: Mice were orally infected with \( Pg \) and were fed on standard chow (ND) or on high-fat diet (HFD) for a period of 24 weeks. Groups of HFD or ND mice were supplemented with CNM three times a week for 24 weeks. Serum and (mesenteric & aortic) specimens were collected at the end of the experimental period. Results: The results show that Pg infection on ND mice induces obesity, insulin resistance and impaired vascular relaxation. CNM Supplementation significantly regulated weight gain, plasma glucose, insulin level, liver, and attenuated vascular relaxation in both \( Pg \) infection and on HFD groups. Our results also showed that supplementation of CNM activates endothelial Nrf2/eNOS signaling cascades. Conclusion: Our results show that the therapeutic values of cinnamaldehyde explored in the study will highlight its ability in preventing vascular inflammation, oxidative stress in the onset of vascular dysfunction. Further research is needed to support the hypothesis, and CNM as a possible treatment for patients susceptible to periodontal disease.

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SACCULAR STAGE LUNG INJURY PERTURBS THE ALVEOLAR SCAFFOLD
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Saccular-stage lung injury results in permanent deficits in respiratory structure and function. Neonates born during this stage are at highest risk for bronchopulmonary dysplasia (BPD). The molecular mechanisms underlying saccular-stage vulnerability are not well-defined, a knowledge gap foundational to the lack of curative BPD therapies. To understand the irreversibility of BPD, we require a refined, mechanistic understanding of the normal saccular to alveolar transition and alveologenesis. Within the alveolus there are two types of epithelial cells: alveolar type I and II cells. Our lab discovered that AT1 cells express genes involved in assembling the extracellular matrix (ECM) and basement membrane (BM). We hypothesized that lung injury during the saccular stage leads to decreased AT1 expression of type IV collagen, a critical component for the formation of the alveolar BM. Traditionally, lung histology and the alveolar surface has been studied by 2D thin sections presenting limitations in our understanding of this 3D network. To study
this matrix assembly in 3D, we made precision cut lung slices (PCLS) from the injured and non-injured lungs of neonatal mice at postnatal day 5 and developed a new system of immunostaining and RNA in situ hybridization with tissue clearing, allowing for greater depth of imaging to measure the expression of specific components of the alveolar BM versus non-injured lungs. In addition to cultivating a new tissue clearing protocol, we found that injured lungs have decreased AT1 expression of isoforms of type IV collagen (COL4a5), with likely compensatory increase in endothelial expression of COL4A1. We have integrated this data with single-cell RNA sequencing atlases of normal lung development and saccular stage injury in mice and in single-cell sequencing data from human infants who died with and without exposure to mechanical ventilation. We find that saccular-stage lung injury is associated with a loss of the AT1 contribution to the alveolar BM, a biologic rationale for the long-term respiratory impairment observed in infants born prematurely. Future work is needed to characterize the biochemical and physiologic implications of the altered expression of BM type IV collagen in injury and to determine the cellular mechanisms driving this association.

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LITERATURE REVIEW ON THE EFFECT OF TOPOISOMERASE IIA ON ORAL SQUAMOUS CELL CARCINOMA IN RELATION TO NRF2 AND NITRIC OXIDE EXPRESSION

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Oral Squamous Cell Carcinoma (OSCC) is the most prominent cancer found in the oral cavity. Epidemiological studies suggest environmental and genetic factors play a role in the onset of this malignancy. Common environmental factors of OSCC include tobacco and alcohol, viral and fungal infections, and immunosuppression. Current studies suggest topoisomerase IIa is the main biological contributor in the progression of OSCC. Human Topoisomerase IIa is a vital enzyme altering DNA topology during cell division. It functions by cleaving portions of double-stranded DNA to prevent topological strain. Nitric oxide (NO) is an endogenous oxidant altering cellular and protein functions via nitrosation. Nuclear factor (erythroid-derived 2)-like 2 (Nrf2) is a transcription factor encoded by NFE2L2 that induces antioxidant responses. Two factors, NO and Nrf2, regulate topoisomerase IIa and influence the progression of OSCC. However, research has not been compiled for Nrf2 in relation to its function on topoisomerase IIa. This literature review focused on understanding the effect of topoisomerase IIa, Nrf2, and NO on OSCC. An advanced search of peer-reviewed literature from 2013 to 2022 was made using PubMed. Initial resources were selected based on keywords: Topoisomerase, cancer, oral cancer, Nrf2, and NO. A broad examination of abstracts was then conducted to identify the most relevant studies. The total publications included: topoisomerase alone (23,563), topoisomerase + cancer (11,037), topoisomerases + oral cancer (316), topoisomerases + cancer + Nrf2 (9), topoisomerases + oral cancer + Nrf2 (0), topoisomerases + NO (58), topoisomerases + NO + oral cancer (1). After several article reviews, we have concluded that topoisomerase is a key enzyme in cancerous cells due to its role in regulating DNA replication. This raised the question of the roles of Nrf2 and NO with topoisomerase in their effect on altering the progress of OSCC.

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Prostate cancer risk in African American men has increased over time. The question trying to be answered was how meat and dairy correlate to a potential risk of prostate cancer development based on serum fatty acid levels in African American men. This question will use diet and compare it to specific serum fatty acids levels to see if there is an association between the two that can be linked back to contributing to the development of prostate cancer. The goal of this study is to determine these associations to suggest potential dietary modifications that can be beneficial for African American men to start doing now to potentially diminish their risk of developing prostate cancer. The hypothesis of this study is an increased annual consumption of red meat, pork, and dairy positively correlates to an increase total serum omega-6 fatty acids which is associated with an increased risk of developing prostate cancer. Target population is African American men 40 and older in Nashville, TN and Washington, D.C. The cases were found in cancer registries and the controls were matched with normal DRE’s (digital rectal exams) and within a 5-year age range. The serum fatty acid levels were processed in the Kennedy Krieger Lab in Baltimore, MD. Annual food consumption was accessed by standardized food frequency intake form through survey by interview. The data was analyzed through SPSS by using different distributions of data through Chi-squared testing. From analysis, total omega-6, saturated, and total fatty acids have close to no association with meat or dairy. Total serum omega-3 fatty acids are negatively associated with meat or dairy. It was also found that individuals who ate more poultry annually, generally had lower levels of omega-3, so they ate less fish annually. Based on these findings, dietary modification to reduce intake of red meat, pork, and cheese could be beneficial for African American men. The study was limited by cases sample size and the cases had already had treatment and modifications, so for future research finding cases that are newly diagnosed and a larger population of them will aid in these limitations.

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Participants are paid $40. **Samples:** English Speaking African Americans aged 18-70yrs old with Hypertension or Hypertension, Diabetes, and CKD who have had at least one doctor’s visit. **Data Analysis:** Each patient’s change in SBP from baseline to three months/six months is measured and each group’s average change is obtained. Favorable changes present as a high negative value. A twotailed T-Test between the control and intervention groups for both phenotypes will be conducted to assess if the differences are significant. The p-value for the test is 0.05. **Limitations:** The study is still on-going. The purpose of this abstract is to present the current findings from one of the participating sites. Additionally, this abstract does not consider the secondary aims of the study. **Conclusions:** Within the increased risk phenotype, the control group improved more in 3 months, but the intervention group improved more in 6 months. Within the normal risk phenotype, the intervention improved more in 3 months and 6 months. While the data show differences, the T-tests proved these are not statistically significant. It is likely that the standard deviation values influence significance. As the study continues to progress to its target of enrolling 5,000 participants, it will have increased power and these differences might become significant.

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**DOES ANESTHETIC AGENTS & TECHNIQUE INFLUENCE CANCER OUTCOMES?**

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Cancer remains a leading cause of death worldwide, and surgery remains to be a primary mode of cure to combat tumorigenesis and prevent metastasis. Unsuccessful attempts to prevent or treat metastatic disease accounts for over 90% of cancer related deaths. Over 60% of patients will undergo surgical resection of their cancer, in most cases requiring anesthesia. The objective of the literature discusses the current evidence of anesthesia and techniques and its role in cancer progression or prevention, as well as suggesting it’s potential beneficial or detrimental influence on patient outcomes. There has been increasing reports that volatile anesthetics, such as sevoflurane or isoflurane may be associated with worse cancer progression when compared to patients being treated with intravenous anesthetics such as propofol. In addition, cancer cells rely on a host of modulating factors to thrive in an environment. Studies have shown volatile anesthetics exposed to metastatic cell lines can downregulate Bcl-2 expression, inhibiting apoptosis, and stimulate migration and expression via HIF1-alpha and PI3K-AKT signaling. Cell lines exposed to propofol in contrast, induced apoptosis via inhibiting mTOR activity and downregulating p53, an anti-apoptotic gene. These early studies, although having limitations, deserve further investigation. The further studies ultimately may alter treatments and anesthetic agents in an attempt for better outcomes for cancer patients. There are several factors which were identified, including cancer type, stage of cancer, surgical technique and co-treatment with other therapeutics which all suggest the rationale behind much of the results remain widely multifactorial, and various preclinical and post treatment studies will be imperative to hopefully include these findings in a higher level, comprehensive meta-analysis.

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INTERFERON-γ STIMULATES THE PHOSPHORYLATION AND NUCLEAR LOCALIZATION OF CITED1, A PUTATIVE REGULATOR OF MACROPHAGE M1 POLARIZATION

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Macrophages are innate phagocytic cells that adopt dynamic polarization states in response to their changing environment. For example, exposure to bacterial lipopolysaccharide (LPS) or interferon-gamma (IFNγ) promote M1 polarization, a proinflammatory state. M1-polarized macrophages are critical for fighting viral and bacterial infections. Therefore, it is important to understand how the response to M1-polarizing stimuli is regulated. We show that IFNγ treatment of M0 macrophages increases expression of the transcriptional co-regulator CITED1, which is closely related to CITED2, a known inhibitor of M1-associated gene expression. As the function of CITED1 is affected by phosphorylation and changes in subcellular localization in other cell types, we examined how these were affected by IFNγ stimulation in macrophages using a combination of confocal microscopy and biochemical assays. Exogenous CITED1 proteins from macrophages stimulated with IFNγ exhibited decreased electrophoretic mobility indicative of post-translational modification. Phosphorylation as the modification was confirmed by treating proteins with λ protein phosphatase and observing a mobility shift. Additionally, through expression of fluorescently-tagged CITED1, we found that IFNγ increased nuclear localization of CITED1. Future experiments should investigate the locations and functional impact of CITED1 phosphorylation, which will help resolve the role of CITED1 in macrophage polarization.

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HISTOLOGICAL CHARACTERIZATION OF A NEW MOUSE MODEL TO STUDY KNEE ARTHROFIBROSIS

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As a complication of total knee arthroplasties or of local knee injuries, arthrofibrosis causes severe pain and decreased range of motion in affected patients. To date, little is known about the molecular pathways and mechanisms leading to arthrofibrosis. To reduce the knowledge gap, a Mayo Clinic-established rabbit model of arthrofibrosis is commonly used by investigators. As mouse models are significantly more time and cost effective, developing a mouse model for arthrofibrosis is of great interest. In our new model, mice undergo a knee procedure to induce a contracture where some experimental knees receive an intra-articular injury. The contralateral knee is used as control. Subsequently, experimental knees are immobilized for either 4 weeks or 8 weeks, followed by a remobilization period of 0 weeks, 2 weeks, or 4 weeks after suture removal. The collected biomechanical data measuring the knee passive extension angle (PEA) demonstrated mean PEAs of 141°, 72°, and 79° after 0, 2, and 4 weeks of remobilization (n=6 per group), respectively demonstrating knee stiffness after immobilization in the experimental knee. To evaluate fibrotic tissue development at the cellular and extracellular level, histological sections from control and stiff
knees were previously prepared. Pico Sirus Red (PSR) and antibodies against established fibrotic markers such as collagen, MMP13, αSMA, Vimentin and CD68 were selected and slides were stained using well established protocols to assess for potential fibrotic tissue development. Our confocal microscopy analyses revealed that all antibodies except for CD68 selectively bound in our specimens. Furthermore, sequential staining with PSR enabled us to costain for specific proteins and types I and III collagens. Future work will assess co-localization of further pro-fibrotic markers to complete the characterization of this new mouse model. Successful establishment of our arthrofibrotic mouse model will significantly expand the analytical capabilities in arthrofibrosis research as it will allow the investigation of genetic risk factors for arthrofibrosis by coupling this surgical model with other genetically engineered mouse models. This will promote a more thorough investigation of molecular pathways and therapeutic strategies as well as greatly reduce the experimental time and costs. **Ethical Considerations:** All experimental procedures involving laboratory mice were reviewed and approved by the Institutional Animal Care and Use Committee of the Mayo Clinic.

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**PREDICTING FUNCTIONAL RECOVERY OUTCOMES OF STROKE PATIENTS USING DEEP LEARNING AND MAGNETIC RESONANCE IMAGING**

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A stroke is characterized as the lack of blood flow to the brain due to an either an embolus (ischemic, most common) or a damaged blood vessel (hemorrhagic). It is the 5th leading cause of death in the U.S. with about 795,000 occurring every year; many survivors present with disability or deficits that affect overall life quality. In determining effective treatment strategies for stroke, timing and accurate patient outcome predictions are vital. Machine learning (artificial intelligence), clinical images (CT, MRI, etc.), and other competing predictive methods have previously been coupled in stroke research for diagnosis to predict post-stroke recovery outcomes in a dichotomous fashion (good neurological outcome, bad neurological outcome). These outcomes are often measured by the modified Rankin scale score (mRS); a 6-point scale accessing functional recovery of stroke patients. A binary convolutional neural network (CNN) was trained using CT images of 2,283 stroke patients at baseline to predict mRS score in both an ordinal and dichotomous fashion. The performance metrics of the model were measured by the % of perfect mRS predictions, % of predictions within ±1 point, and the % of predictions of a “good neurological outcome” (mRS ≤2). After training, the model showed 33% exact mRS predictions, 67% accuracy within 1 point, and 72% predictive accuracy for good neurological outcome. We hypothesize that using deep learning to extract important features from stroke lesions from 158 baseline and 1 to 7-day post-stroke diffusion weighted images (DWI) coupled with clinical and demographic features will enhance predictive ability of patient functional recovery outcomes (measured by mRS score) at 90 days post-stroke. If successful, this model will be a viable tool for clinicians to utilize in assessment of stroke prognosis and treatment decisions.
LENGTH OF STAY AFTER TOTAL JOINT ARTHROPLASTY POST COVID-19

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Background: Length of stay (LOS) after total joint arthroplasty (TJA) of the hip and knee is an important marker of the quality of surgical care. In the past several decades, there has been a gradual reduction in the length of stay following total joint arthroplasty. This decrease has been attributed to many factors, including perioperative optimization of patient co-morbidities, patient education, and early rehabilitation. Earlier discharge offers benefits for both the patient and the healthcare system by accelerating patient mobilization and autonomy and reducing costs. Recently, the SARS-CoV-2 pandemic has brought a new motivating factor for reduced hospital duration with elective procedures. Methodology: This was a retrospective review of patients who underwent TJA from April 2020 to March 2021. Additionally, a comparative group of patients who underwent TJA from Jan 1, 2019, to Dec 31, 2019, were assessed. Data collection was performed by chart review. Our inclusion criteria included all adult patients (18-99 years old) who underwent primary, elective Total Hip Arthroplasty (THA), or Total Knee arthroplasty (TKA) during the specified periods. Exclusion criteria included arthroplasty due to trauma, revision surgery due to any cause, and any vulnerable groups, such as pregnant females or prisoners or if they are younger than 18 years old. Results: We reviewed the charts of 283 patients. 135 of them underwent TKA and 148 of them underwent THA. The average age of the cohort was 63.7 years old. There was a noticeable decrease in the length of stay of patients post-Covid when compared to pre-Covid patients. This was true for patients who underwent both THA and TKA. The average LOS for patients undergoing THA between Jan 1, 2019, and Dec 31, 2019, was 2.7 days while the average for patients between April 1, 2020, to March 31, 2021, was 1.7 days. There was a similar decrease seen in patients who received TKAs. The average LOS for patients undergoing TKA between Jan 1, 2019, to Dec 31, 2019, was 3.3 days while patients who received a TKA between April 1, 2020, and March 31, 2021, had an average LOS of 1.9 days. Conclusion: In the patients observed the LOS after undergoing TJA has decreased since the spread of SARS-CoV-2 began. This could be due to increased motivation to free space in the hospital and get patients to a place where they are less likely to be infected. A possible area of future research is seeing how this decreased LOS affects patient outcomes.

ROLE OF RACE, ETHNICITY, AND TRAVEL DISTANCE IN ACUTE MYELOID LEUKEMIA PROGNOSIS

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Acute Myeloid Leukemia (AML) is the most common acute type of leukemia, with 20,000 new cases and 11,000 deaths each year2. There has been extensive study of the clonal hematopoietic progenitor and stem cells of the bone marrow that give rise to AML2, and factors that are often investigated include mutations, such as internal tandem duplication of FLT3, which accounts for approximately 30% of all AML cases3,4, and chromosomal abnormalities. However, there have been fewer investigations into other contributing factors, not necessarily genetic, that may influence the prognosis and clinical course of AML, such as race, ethnicity, initial lab values, and distance from the patient’s home to the treatment location. This study investigated whether any of these less frequently studied variables is correlated with improved patient...
survival. Using the patient information provided at the time of diagnosis from the Stanford Cancer Center, survival analyses were run in RStudio. In addition, patients were geocoded by address into their corresponding Census tracts (limited only to California residents as they comprise much of the patient population) to include Census data in the survival analyses. Although univariate analyses did not show any statistical significance, except for age at diagnosis, multivariate analysis did show that when controlling for age at diagnosis and median income of the patient’s census tract, differences in survival between Black and White patients were drastically reduced. The findings indicate that median income is likely a mediating factor for survival. Full mediation analysis needs to be performed to confirm this suspicion. This information can be useful in evaluating survival in other malignancies and developing public health interventions.

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ADIPOCYTE SIZE AND DENSITY IN PEDIATRIC ACUTE LEUKEMIA

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Studies have shown that adipocytes (fat cells) in adult Acute Lymphoblastic Leukemia (ALL) can contribute to resistance to chemotherapy. Furthermore, adipocytes appear to act as a source of fatty acids for lymphoblastic leukemia cells. However, the role of the bone marrow microenvironment in leukemia changes with age and the role of adipocytes in pediatric leukemia cases is still unknown. This study investigates the proportion and size of adipocytes in pediatric B-ALL, T-ALL, and AML at diagnosis. We hypothesized that the number and size of adipocytes in the bone marrow would differ between pediatric ALL and AML, with possible decreased percentage and size of fat cells in ALL due to their potential role as a source of fatty acids for the leukemic cells. Using the image analysis software, Cell Profiler, the H&E-stained leukemia sample slides were analyzed to identify the individual fat cells in each image. We then calculated the percentage of each image composed of adipocytes as well as the median size (area) of individual adipocytes in each image. Lastly, a two-tailed, two-sample T-test compared the results of ALL samples versus AML samples. In this study, the median percentage area of adipocytes in ALL cases was 16 %, while the median percentage in AML cases was 10%. This difference was not statistically significant but approached statistical significance (p=0.06). On the other hand, the median adipocyte size in ALL was 326 square microns versus 665 square microns in AML, with a highly statistically significant p-value of 0.001. The observed results in this study convey that adipocytes in ALL are significantly smaller than those in AML, compatible with a possible role in providing fatty acid to lymphoblastic or myeloblastic leukemic cells. Complementary lipidomic testing in the lab of Dr. Kasowski will further assess differences in lipid metabolism between pediatric ALL and AML.
THE CHANGE IN RACIAL AND GENDER DIVERSITY FOR INTERVIEWED AND MATCHED ORTHOPAEDIC SURGERY RESIDENCY APPLICANTS BEFORE AND AFTER ENGAGEMENT WITH NTH DIMENSIONS

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Introduction: Residency programs who recruit physicians from a variety of backgrounds have the opportunity to improve health outcomes and provide a sense of security to patients who rarely experience care from someone who looks like them. Programs such as Nth Dimensions connect underrepresented minority and female medical students with orthopaedic surgeons early in their medical careers to increase their exposure to the field. While Nth Dimensions has been successful in helping these students match into orthopaedic surgery residency programs, the impact of this program on an individual residency program has not been described. Methods: This retrospective study examined applicant data for a single orthopaedic surgery residency program at an ACGME-accredited institution in the midwestern United States. Racial and gender data were extracted for the past 6 years (2017-2022), including 3 years before and 3 years since the institution’s partnership with Nth dimensions. For each application year, the percentage of each race category and gender category as defined on the applicants’ Electronic Residency Application Service (ERAS) applications was determined.

Results: The percentage of white applicants showed a small decrease throughout the study, with 64% in 2017 and 58% in 2022, while the biggest increases in other groups were seen in both the Asian (14% to 19%) and Black (4% to 9%) applicant groups. The percentage of interviewed white applicants also started at 66% and decreased to 54% by 2022, whereas the Asian (10% to 18%) and black (6% to 16%) interviewed groups slightly increased over time. The percentage of matched white applicants to the program decreased from 63% in 2017 to 57% in 2022, compared to the Asian matched applicants moving from 13% in 2017 to 29% in 2022 and the black matched applicants transitioning from 0% in 2017 to 14% in 2022. The percentage of female applicants showed a small, steady increase over the course of the study, with 18% female applicants in 2017 and 26% in 2022. The percentage of interviewed female applicants fluctuated but was similar from the beginning of the study (37% in 2017) to the end (40% in 2022). Matched female applicants changed from 0% in 2017 to 29% in 2022. Conclusion: Over the course of this study, the racial and gender diversity of interviewed and matched applicants at a single midwestern orthopaedic surgery residency program increased, with the largest change seen in matching more female applicants. Since a partnership with Nth Dimensions was initiated during this timeframe, it may have been a catalyst for this increased diversity, along with other factors such as changes in department leadership and implementation of virtual interviews.

PATTERN OF BREASTFEEDING BY EDUCATIONAL STATUS AMONG MINORITY MOTHERS IN NASHVILLE

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The purpose of this study is to determine if a difference exists in breastfeeding patterns and knowledge amongst minority women in Davidson County based on education status. Furthermore, the hypothesis is minority women in Davidson County with higher educational backgrounds will breastfeed at higher rates than minority women in Davidson County with little to no education. The aims of this study were to investigate the demographic factors associated with breastfeeding patterns amongst minority mothers and
investigate the relationship between education and breastfeeding patterns amongst minority mothers in Davidson County. The target population used in this study was pregnant minority women in Davidson County, however the study population was minority women enrolled in the breastfeeding promotional program at Meharry Medical College. Participants were surveyed from Matthew Walker Clinic, the OB/Gyn Clinic in Nashville General Hospital and local community health fairs. The design used for this study was Cross-sectional and data was collected from surveys administered at time of enrollment in the breastfeeding program. Afterwards data was analyzed using the Statistical Package for Social Sciences (SPSS). Age, employment status, and household income were statistically significant amongst study population of women separated by educational level. However, marital status was not statistically significant once separated by educational level. Knowledge of the term exclusive breastfeeding was significantly higher among women with a college education or higher. Limitations included having a small study size, which does not allow for in-depth sub-group analysis. Also, findings cannot be generalized because there was no random selection in participants due to self-selection bias. Efforts should be made to include more women in the Nashville area to improve sample size and generalizability. In conclusion, women exhibited statistically significance differences in all but one demographic, however when it came to listing contraindications, there was no statistical difference amongst educational levels. This demonstrates a lack of knowledge related to breastfeeding across various education levels that needs to be addressed to promote breastfeeding. Primary data research reported in this publication was supported by an administrative supplement from the National Institute on Minority Health and Health Disparities of the National Institutes of Health (RCMI).

UPPER EXTREMITY INJURIES RELATED TO DOG LEASHES, HARNESSSES, AND COLLARS

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INTRODUCION: Dog ownership has many health benefits, with improvements in both physical and mental health noted among pet owners. Increased physical activity and reduction in feelings of social isolation are likely responsible for some of these benefits. Recently, dog and pet ownership has markedly increased – with an increase from 67% to 70% of households reporting pet ownership observed during the first year of the COVID pandemic; however, research on the incidence and epidemiology of dog-related musculoskeletal injuries is quite limited, or frequently focuses on injuries caused by dog bites. Since some of the health benefits are related to increased physical activity from walking dogs, it is important to understand the risks associated with devices often used while walking dogs – such as leashes, harnesses, and collars. The purpose of this study was to investigate and characterize upper extremity musculoskeletal injuries related to dog leashes, harnesses, and collars. METHODS: We performed a retrospective review of all the patients presenting with acral upper extremity injuries relating to dog leashes or collars at a tertiary care referral center from 2005-2022. Patients were identified through a combination of chart review, current procedural terminology (CPT) codes, and International Classification of Disease (ICD) codes. Demographic data including age, gender, body mass index (BMI), and past medical history were collected. Dog size, injury mechanism, injury patterns, and treatment were all recorded and assessed. RESULTS: 30 cases were included. 3 patients were male, 27 were female. Mean patient age was 58 years (range, 21 to 80) and mean BMI was 25.1 (range, 19.0 to 38.3). There were 21 fractures (70.0%) and 9 soft-tissue injuries (30.0%). Treatment included surgery (N=14, 46.7%), immobilization (N=11, 36.7%), immediate motion (N=3, 10.0%), corticosteroid injection (N=1, 3.3%), and pain management (N=1, 3.3%). The most frequent injury sites were the wrist (N=14, 46.7%) and the hand (N=13, 43.3%). Injuries occurred from falling (N=14, 46.7%) or were related to the leash being wrapped around the arm, wrists, or finger (N=10, 30%).
Among the 22 patients with a fracture, 15 (68.1%) had a history of osteopenia or osteoporosis. Additionally, 14 patients were injured by what they described as a large dog. CONCLUSION: Dogs may cause musculoskeletal injuries by both direct and indirect mechanisms. Fractures were more likely than soft tissue injuries, and the hand and wrist were the most common injury locations. In this series, women were significantly more likely to be injured than men. These injuries frequently required surgical intervention, and an overwhelming number of these patients had a prior diagnosis of osteoporosis or osteopenia. The injury most often was the result of the leash, collar, or harness being wrapped around the hand or wrist improperly – causing a rotational moment around the upper extremity. While this study is small and limited to one geographic area of the country, it does highlight characteristics of patients who are at risk for injury from a dog leash, collar or harness and emphasizes the importance of proper training and use of this equipment. It also highlights the importance of counseling patients with metabolic bone pathology about the risks of walking dogs and proper leash use. Going forward, patients with known osteoporosis and osteopenia should be counseled about the risks of upper extremity injury.

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“OH MY MRONJ” DENTAL MANAGEMENT OF OSTEONECROSIS OF THE JAW
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The term osteomyelitis can be used to indicate inflammation of bone. Unresolved this can progress further into a condition named osteonecrosis. In the mandible and maxilla, most cases are related to a microbial infection that reaches the bone through nonvital teeth, periodontal lesions, or traumatic injuries. This, coupled with the patient’s host resistance factors, determines the clinical presentation, and the extent of the inflammatory process and its progression. Conventional radiography, culture, and bone biopsy can be used for identification of this lesion.

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OVERPRESCRIBING ANTIBIOTICS
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Overprescribing antibiotics has been a major concern in the dental field. Some of the most common antibiotics being prescribed today are Amoxicillin and Clindamycin. Within my first couple of months working as a dental resident, antibiotics are regularly prescribed after extractions and some root canal treatments. The debate I have daily is should antibiotics be given to prevent an infection, or should they only be prescribed if an infection is present. Prescribing antibiotics to prevent infections leads to antimicrobial resistance. If the body forms resistance to these antibiotics given only to prevent infections, will they have the same affect if the infection is present. It is important to take precautions to prevent infections from happening, but should the protocols be altered. Research studies advocated that dental surgeons should only prescribe antibiotics to control systemic infections and not for mere inflammation.

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Problem Statement: Clinicians performing implant placement procedures along with sinus augmentations in the posterior maxilla should be aware of the anatomy of the maxillary sinus to avoid sinus membrane perforations. Background on the state of science: Numerous sinus augmentation techniques have been introduced aiming to improve the success rate of the dental implants placed in the augmented sinus. Approach: Knowledge of the anatomy allows the clinician to better perform the sinus augmentation techniques, which will provide enough bone height and better primary stability during the placement of the dental implant, which restores aesthetics and functionality to the patient. Discussion & Conclusion: This is a Literature review topic on the maxillary sinus anatomy, most common radiographic pathologic conditions, and Maxillary Sinus Augmentation techniques. An understanding of the anatomy and pathological disorders of the maxillary sinus is an indispensable resource when completing sinus augmentation procedures and handling procedure complications. Knowledge of anatomy of maxillary sinus guides us not only in proper preoperative treatment planning but also helps us to avoid the possible complications that may arise during sinus augmentation procedure. This topic attracts a rising number of publications with most of them reporting results that suggest, the patients with atrophic maxillae requiring implant treatment can benefit considerably from the use of sinus augmentation. This article explains the basic techniques, namely, direct and indirect techniques used for maxillary sinus elevation and augmentation.

The current standard of care for tumors, surgery and chemotherapy, have known adverse effects and have led to a desire to identify highly efficient and effective cancer therapeutics that leverage the host immune system. Within the innate immune system, a subset of cells, called natural killer (NK) cells, play a key role in host defense and homeostasis. These cells can distinguish self and non-self cells within a host through an important set of inhibitory receptors that recognize surface molecules called major histocompatibility complex class I (MHC I), which are normally present on all host cells. When a cell exhibits any irregular display of MHC I molecules, especially during states of viral infection or cellular mutation, NK cells can “see” these cells and target them for destruction. Recent advancements in cancer immunotherapy have shown the potential for NK cells to function as a possible treatment option for solid tumors. Of great interest, is the upregulation of a specific non-classical MHC I molecule on tumor cells called human leukocyte antigen G (HLA-G). HLA-G is normally expressed in fetal derived placental cells but not other normal tissues. Interestingly, HLA-G is significantly upregulated in many different solid tumor types. Since this potentially provides a broad tumor-specific target, we have designed a strategy that involves the design of a modified chimeric antigen receptor (CAR) which we will use to direct NK cell killing. This CAR will have an extracellular domain composed of KIR2DL4, an NK cell inhibitory receptor that recognizes HLA-G, and a cytoplasmic domain which leads to NK cell activation upon crosslinking. To conduct this study, NKM192 cells were transduced with the aforementioned CAR construct via lentiviral transduction.
Following the transduction process, the resultant population was sorted via flow cytometry. The peak population of cells successfully transduced, 0.33%, was determined to be insufficient to carry out the killing assay. The results of this study highlight the need for future research to be conducted regarding a more efficient method for transducing NK cells. Continued studies involving the optimization of this technique will significantly advance the field of cancer immunotherapy.

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COMPLICATIONS FOLLOWING LOCAL ANESTHESIA: HEMATOMA
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An important part of dental procedures includes the administration of local anesthesia. In dentistry, a high incidence of hematomas occurs following PSA ad IAN nerve blocks more than any other blocks or infiltration techniques. Hematoma is defined as a collection of blood outside of blood vessels following an injury to a blood vessel. This complication happens when there is an accidental nick of a blood vessel with the needle and it progresses to a clinical manifestation of facial edema. The objective of my research is to present and discuss a case in which a 20-year-old woman developed a hematoma following a PSA nerve block. The patient experienced mild pain associated with her facial swelling. After 3 weeks, the edema resolved completely, and the hematoma color faded away. This patient was prescribed analgesics. However, antibiotics are sometimes utilized if necessary. Complications like hematomas occur rarely, but it is vital to know how to prevent, recognize, and manage your patients when they do occur.

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ANALYSIS OF COMPLICATIONS AND OUTCOMES FOLLOWING INPATIENT MANDIBULAR FRACTURE TREATMENT
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The mandible is the most common site of maxillofacial fractures. A possible link between risk factors other than sex and complications following outpatient treatment of mandibular fractures has not been thoroughly analyzed. The goal of this study is to evaluate the complication rate of mandibular fractures in several risk factor groups to investigate if there is a link between preoperative risk factors and likelihood of developing a complication. The data analyzed is taken from the Nationwide Ambulatory Surgery Sample (NASS) database from 2016-2019. Our hypothesis is that patients with a preoperative risk factor will have a higher complication rate than those without. The significant findings of this investigation could have direct implications on patient management, treatment, and outcomes of mandibular fractures. Vanderbilt University Medical Center (VUMC) owns data from the NASS database. Using this database, we identified 21,240 mandibular patient encounters. Mandibular fractures were identified by searching for ICD-10 codes pertaining to outpatient for mandibular fracture and cross referencing this with the CPT codes for the
surgical operation. Data points for complications were obtained by an ICD-10 code query to establish the incidence of complications. Data was stratified by patient demographic and diagnoses then descriptive and univariate analysis were run to evaluate the statistical and clinical significance of any correlations between risk factors and complications. We found that the most prevalent risk factor was nicotine use. Odds ratios assessing the odds of a patient developing any complication were calculated. Of the 7 risk factors that were evaluated HTN, T2DM, Obesity and COPD had an odds ratio (OR) that was statistically significant. Statistics were conducted using SPSS version 28.0 (IBM Corp., Armonk, NY). A limitation of the study is that the NASS database only includes data pertaining to outpatients and their procedures. Additionally, this study is limited because the NASS database does not reveal the mechanism of injury which could be important when considering risk factors that were included in this study. Next steps in this project would be to run multivariate analysis for statistical significance. In the future it could prove impactful to investigate complication rates in inpatient procedures.

Support
This project is approved by the IRB as it meets 45 CFR 46.104 (d) category (4) ii for Exempt Review (Protocol 22162). These conclusions are those of the authors and should not be continued as the official position of Meharry Medical College or Vanderbilt University Medical Center.

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PUBLIC Misperceptions of Ulnar Collateral Ligament Injury
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Purpose: The purpose of this study is to identify misperceptions within the general baseball community regarding Ulnar Collateral Ligament (UCL) injury and subsequent repair which has famously been coined ‘Tommy John’ surgery. Methods: A survey was constructed to gather the individual’s perception on UCL characteristics, risk factors for UCL injury, surgical indications for repair, and surgical outcomes. Surveys were distributed electronically to baseball programs in the Middle-Tennessee area and to baseball-focused online forums. Surveys were completed by 318 respondents composed of 33 high school athletes, 22 collegiate athletes, 3 professional athletes, 30 coaches, 14 parents of athletes, and 220 former athletes or fans. Responses were collected using RedCap. Results: UCL characteristics: 78% of high school athletes, 96% of collegiate athletes, 91% of coaches, 73% of parents, and 91% of former athletes and fans were able to identify the UCL as a ligament. Risk Factors: 95% of High school athletes, 100% of collegiate athletes, 88% of coaches, 93% of parents, and 91% of former athletes and fans were able to successfully identify overuse and fatigue as a risk factor for injury. Surgical Indications: 14% of High school athletes, 4.3% of collegiate athletes, 9% of coaches, 0% of parents, and 6% of former athletes and fans believed the desire to increase throwing velocity was an indication for Tommy John surgery. Surgical Outcomes: 43% of High school athletes, 26% of collegiate athletes, 27% of coaches, 33% of parents, and 37% of former athletes and fans indicated Tommy John surgery would increase throwing velocity. Data Analysis: Conclusion: Survey responses indicate misperceptions of UCL injury and Tommy John surgery exist within the baseball community. Misperceptions may be more prominent among younger athletes. Significance: The incidence of Tommy John surgery has increased in recent years. Identification of misperceptions and subsequent education of younger athletes may help lower the incidence of elbow injuries in youth athletes.
Endometriosis is a gynecologic disease that affects 5-10% of reproductive-aged women worldwide. The etiology of endometriosis remains unknown, however researchers have demonstrated progesterone’s anti-inflammatory properties and its ability to regulate the estrogen dependent effects of endometrium proliferation. Progestin-based therapy is the first line treatment to regulate endometriosis, yet one third of patients lack relief due to progesterone-resistance. Although previous research has been able to identify a scoring system to predict a woman’s response to progestin-based therapy, methods to determine progesterone resistance are limited to invasive surgery. The objective of this study was to identify potential biomarkers of progesterone-resistant endometriosis using RT-PCR. We utilized leukocytes isolated from the buffy coat layer of blood samples taken from ten women with endometriosis, five with documented response to progestin based therapy and five whom lack a response. PCR primers for PGRMC2, androgen receptor, and aromatase were ordered from Keck DNA Sequencing Facility and validated using endometrial cysts cells, immortalized human endometrial stromal cells, and T47D breast cancer cell line cDNA. RT-PCR was performed to determine gene expression using the cDNA samples extracted from the buffy coat layer. Statistical analysis using a t-test on GraphPad Prism software demonstrated that there was insignificant differences between these biomarkers. These results are inconsistent with the hypothesis that differential expression of these biomarkers could predict response to progestin based therapy. A small sample size, mentor absence, and the inability to communicate with a former researcher responsible for the initial cDNA extraction of samples all pose as limitations of this study. While this project failed to demonstrate a significance between these particular biomarkers, it can be concluded that further research is needed with a larger sample size to increase the power of the study. Additional research may lead to significance of additional biomarkers not addressed in this project.

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To provide oral health care for patients who often have nowhere else to turn, Meharians have served the Community Clinic of Shelbyville & Bedford County since 2003. 1,209 patients have received free oral health care through these dental clinics. Patients travel from miles away and line up hours in advance and often exceed clinic capacity, underscoring the substantial unmet need for oral health care and oral health literacy. An investigation assessing the sociodemographic and oral health behaviors of 92 patients that received care at the Community Clinic of Shelbyville & Bedford County in Shelbyville, TN was conducted to: (1) determine the bidirectional relationship of patients living in rural areas with Diabetes Mellitus (DM), primarily type 1 diabetes, and periodontal diseases (PD) and to (2) analyze the type of oral health behaviors
and comorbidities that may be associated with these complex chronic disease while highlighting the importance of oral health education and improving access to oral health. A limited data set collected at the Community Clinic of Shelbyville & Bedford County was used. The study observed a significant association between dental floss usage, diabetes, periodontal disease, and access to care. This study will help Tennessee policy makers and grant distributors to improve the oral health care gap by developing intervention programs that target rural groups experiencing the highest incidence of DM and PD with a focus on limited access to dental care and dental literacy.

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SOCIAL DETERMINANTS OF HEALTH CHARACTERISTICS IN PATIENTS TREATED WITH CARDIOTOXIC CANCER THERAPY
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Research Questions: What are the individual-level social determinants of health (SDOH) characteristics of breast and prostate cancer patients prior to potentially cardiotoxic cancer therapy? How are the individual SDOH associated with risk of cardiac dysfunction? Hypothesis: There are significant differences in the individual SDOH in breast and prostate cancer patients prior to the initiation of potentially cardiotoxic therapy that vary according to self-identified race. These differences are associated with risk of subsequent cardiac dysfunction. Procedures/Methods: Participants are enrolled in a longitudinal prospective observational cohort study from the University of Pennsylvania Abramson Cancer Center. Inclusion criteria for the Penn Cardiotoxicity of Cancer Therapy (CCT2 NCT05078190) study includes female sex, ≥18 years, diagnosed with breast cancer undergoing treatment consisting of either doxorubicin and/or HER2+ targeted therapies. For the Penn Prostate Cardiotoxicity study (PCT NCT05096338), inclusion criteria are male sex, ≥18 years, diagnosed with prostate cancer and a treatment plan consisting of androgen deprivation therapy (ADT) for ≥6 months in duration. Comprehensive individual level social determinants of health (SDOH) data are collected from participants prior to cancer therapy initiation. Categorical variables are summarized with count (%); continuous variables are summarized with median and interquartile ranges. Fisher’s exact test was used for categorical variable comparison; two-sample Wilcoxon test was used for continuous variables. A p value <0.05 denotes statistical significance. Data Analysis: 48 CCT2 and 49 PCT participants were enrolled between October 2021 and July 2022. Across both cohorts, BI/AA participants experienced significantly greater Medicaid participation, greater discrimination, greater feelings of disparate health care quality, worse employment status and lower annual family income as compared to White participants (all p<0.05). Educational attainment and health literacy were also worse in the PCT cohort. Limitations: As the study is ongoing, associations with cardiovascular outcomes cannot yet be determined. Moreover, SDOH characterization analysis was restricted to White or BI/AA participants because the proportion of patients across other races/ethnicities is smaller. Conclusion: Early findings indicate there are significant differences in multiple areas of individual SDOH. Ongoing work is needed to determine the associations between SDOH, cancer-therapy related cardiac dysfunction and major adverse cardiovascular events.
Despite the amount of individuals with insurance coverage increasing in the Tri-County Charleston Metropolitan area (Tri-County Area) in South Carolina, the number of premature deaths increased between the years of 2015 to 2020. Supported by credible published data, this fact alone was used to justify the merit for investigating possible correlations that could explicate this trend and the relationship between the reason for the lack of access to healthcare services and race/ethnicity. The aims of this project were to evaluate and compare both the 2016 and 2019 Community Health Needs Assessment Reports done by the charity organization, Trident United Way (TUW), in conjunction with their partners the Medical University of South Carolina and Roper St. Francis Hospital. An assessment was conducted concerning self-reported social determinants of access to healthcare services of both those who were insured and uninsured in the year of 2019 and identification of the social determinants that show a significant effect on access to healthcare services on the minority populations in the Tri-County Area. This was done by utilizing CHNA reports to develop a descriptive analysis of the most recent report published by TUW. Data analysis included bivariate associations to properly assess correlations and discussions of the associations of variables that show statistical significance. It was discovered that the majority of reasons for the lack of access to healthcare services listed by participants proved to hold statistical significance. The significance different reasons held varied within different races/ethnicities. Further research, with a community-based collaborative approach to address these conditions with more accuracy and precision, will be conducted to support these findings.

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SAFETY AND EFFICACY OF THE KONO-S ANASTOMOSIS IN CROHN’S DISEASE PATIENTS
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The cumulative risk of surgical intervention in patients with Crohn’s disease (CD) within 10 years of diagnosis is estimated at 50%, with high rates of anastomotic recurrence and stenosis necessitating repeat surgery.[1-3] After resection, the recurrence rate at the anastomotic site ranges from 35 to 85% during the first year, with surgical recurrence as high as 50% at 20 years.[1-3] In 2003, Kono and colleagues at the
Asahikawa Medical University Hospital in Japan introduced to clinical practice a handsewn functional end-to-end anastomosis intended to reduce the risk of anastomotic and surgical recurrence in patients with CD compared with the conventional side-to-side anastomosis. The objective of this study was to compare the short and long-term outcomes, complication rates, and surveillance endoscopic findings between the Kono-S procedure and the side-to-side functional end anastomosis in patients with CD. Patients who underwent Kono-S anastomosis at BUMC experienced lower rates of minor postoperative complications (p<0.001) and similar rates of major postoperative complications (p=0.54) compared to historical patients who underwent conventional anastomosis. 1 patient (n=34) required reoperation due to anastomotic leak. 44.2% patients received follow-up colonoscopy with a median Rutgeerts score of i1. Thus far, these results support the safety of the Kono-S anastomosis as compared to conventional anastomosis. Patients involved in this research are at varying levels of follow-up (median follow-up 9 months), and data concerning endoscopic and surgical recurrence is still being collected. Conclusions drawn at this point should be considered preliminary, especially as findings are analyzed against historical cohorts. These data from BUMC plan to be included in a multicenter longitudinal study in collaboration with the University of Chicago, University of Washington, and University of North Carolina.

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STAPHYLOCOCCUS AUREUS BIOFILM VIRULENCE FACTORS FOR ANTIBIOTIC RESISTANCE

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Staphylococcus aureus, a common and generally harmless bacteria can become a dangerous when colonizing certain niches in the human body, causing a variety of invasive infections. A disease of interest caused by S. aureus is osteomyelitis, an invasive infection of the bone requiring prolonged antibiotics treatment. Prognosis of osteomyelitis is good when treated early and aggressively. If treatment is delayed, more serious complications can arise. How does S. aureus biofilm production increase survival within bone, especially in the setting of antibiotic treatment? The purpose of our experiment was to determine which specific virulence factors contribute to antibiotic tolerance observed with S. aureus biofilm formation and what proper steps can be taken to increase the efficacy of antibiotic treatment in a delayed treatment situation. Hypothesis: What specific virulence factors contribute to antibiotic tolerance observed with S. aureus biofilm formation? To test biofilm antibiotic susceptibility, we compared WT and mutant strains of S. aureus in a control group and antibiotic treatment group. The genes of interests include Coagulase A, von Willebrand binding protein and Sortase A.

1. Each strain is cultured in human plasma coated wells in the presence or absences of bone slices, then allowed 24 hours for each sample to produce a biofilm.
2. Each sample is then treated (100ug/mL of PBS or Vancomycin) and again allowed time to incubate.
3. Following the treatment and incubation, the samples are then isolated and placed onto an agar plate at different dilutions to quantify bacterial recovery, thus allowing us to determine how the different strains biofilms tolerate different treatments.
4. Data is compared and analyzed for any significant differences among the treatment groups and strains.

For now, the data is inconclusive, and we cannot say with evidence that the experimental genes solely influence antibiotic resistance and there may be some redundancies in the S. aureus genome. Limitations include having only 8 weeks to complete this research, including many 24-hour incubation steps. Protocols
and methods are still being optimized. Future research includes experimenting with more genes of interest, more variations in length of treatment time and pre-antibiotic bacterial growth time.

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EARLY HUMAN IMMUNODEFICIENCY VIRUS TYPE-1 INFECTION

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Human apolipoprotein B mRNA -editing enzyme, catalytic polypeptide -like 3G (APOBEC3G, A3G), is a host restriction factor that plays a vital role in antiviral innate immunity. During human immunodeficiency virus type 1 (HIV-1) replication, A3G restricts viral replication by inducing C to U mutation in newly synthesized cDNA and lethal G to A hypermutations in the viral genome. Human uracil DNA Glycosylase (hUNG) is a critical DNA repair enzyme, which protects host DNA integrity by catalyzing the excision from DNA of uracil nucleobases resulting from misincorporation or spontaneous cytosine deamination that carries out an important function in preventing mutagenesis. It has been reported that UNG initiates the degradation of HIV-1 cDNA, which then triggers the base excision repair (BER) pathway and removal of uracil from DNA (uracilation). This prevents viral integration suggesting a uracil-mediated HIV-1 restriction pathway. However, it is unclear regarding the interplay between A3G and hUNG during HIV-1 replication. We hypothesize that hUNG coordinates A3G to restrict HIV-1 replication. In this study, human A3G and UNG knockout T-cells (Δ3G-UNG) were established to confirm the antiretroviral activity in a single-round viral replication system. The knockout cell lines were confirmed via genomic sequencing and Western blot. We showed that both Δ3G and ΔUNG T cell lines were more susceptible to HIV-1 infection than their parental cell line, suggesting that both cellular A3G and hUNG play a role in inhibiting HIV early replication. This study will lay a foundation for revealing a novel antiviral mechanism of A3G and provide more insight into the interplay between A3G and hUNG. It will shed light on future HIV gene therapy studies.

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ADVERSE CHILDHOOD EXPERIENCES (ACES) AND ITS RELATIONSHIP TO CHILD DEVELOPMENT

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Adverse Childhood Experiences (ACEs) are any traumatic events that occur in childhood that increase the risk of developing diseases later in life. This research project investigated how children who experience
ACEs may be at risk for developmental delay or currently delayed. It was hypothesized that children who screen positive for at least one adverse childhood event, will be at risk for experiencing one or more forms of developmental delay with social-emotional being the most common. This research project was a retrospective cohort study in which a query was run of Northeast Valley pediatric patients to screen for individuals who met the following inclusion criteria: zero to five years old, an ACE screening score of at least one, and at least at risk for developmental delay in one category of the Ages and Stages Questionnaire (ASQ). In total, ninety patients met the criteria and their ASQ scores were then evaluated to determine what categories these children were at risk or developmentally delayed in. The most common delays were determined at initial and recent screening, followed by patients being stratified into age groups (0-12 months, 13-24 months, 25-36 months). Finally, a screening referral algorithm was generated for children six to eleven to expand Northeast Valley’s ACEs Screening population and provide proper resources for children experiencing these adversities. It was found that gross motor was the most common form of development at risk for being delayed or delayed at initial screening and communication was the most common form at their most recent screening. At their most recent screening, the following developmental delays were the most common amongst different ages groups: 0 to 12 months: Gross Motor, Fine Motor, and Personal Social; 13 to 24 months: Communication; 25 to 36 months: Fine motor. The odds of children with at least one ACE and one area of development at risk for being delayed are 3.0 and those with at least one ACE and one area of delayed development are 2.37. This project shows that children who experience ACEs have a significantly higher chance of experiencing developmental delay. In the future, we hope to implement a resiliency screener to understand how well children with ACEs cope with these adversities. Project limitations include human calculation error and small sample size for children 0-12 months old.

This project was funded by National Medical Fellowship Primary Care Leadership Program and Northeast Valley Health Corporation.

A PILOT STUDY EVALUATING A MUSIC MINDFULNESS PROGRAM FOR PEOPLE OF AFRICAN DESCENT

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Many people of African descent in America—especially the most marginal—suffer from mental health problems and would benefit from timely access to appropriate forms of care. Barriers such as lack of representation in providers and lack of cultural competency often prevent individuals of African descent from accessing adequate mental health care. There is a well-documented lack of cultural competency in mental health services and subsequent treatment options. Individuals of African descent suffering from mental health problems may benefit from music mindfulness. Mindfulness is a dynamic self-exploration process which pays attention to the body, feelings, mind, and mind objects with nonjudgmental awareness in each moment. Music has been used as a healing force throughout history, and there is increasing recognition of the benefits of music for health and well-being. We hypothesize that participants engaging in the music mindfulness program will have significant decreases in perceived stress scores and increases in social connectedness scores. Eligible participants were individuals of African descent ages 18-65 in the United States of America with symptoms of stress, anxiety, and/or depression. Flyers and video detailing the Music Mindfulness Study were distributed via email and social media posts. Participants completed a screening survey (PHQ-9 and GAD-7). 70 participants were screened, and there were 15 final participants who participated in daily 10-minute guided music sessions hosted on Wistia, over the course of eight weeks.
A designated time each week was chosen for participants to participate in an optional 1-hour long mindfulness session with instructors. The average time spent meditating was significantly increased from 22.5 minutes a week to 1 hour a week, and participants reported improvement in their stress, anxiety, and/or depression. Study limitations included lack of male participants, lack of follow-up with participants due to loss of contact and interest and limiting parameters such as age and low PHQ-9/GAD-7. Virtual music mindfulness programs could improve engagement of individuals of African descent in mindfulness research and positively impact perceived stress and social connectedness. A follow-up study will compare music-guided mindfulness sessions vs. non-musical guided mindfulness vs. TAU.

**IDENTIFYING UPREGULATED MIDASIN PROTEIN EXPRESSION WITH CONTRIBUTION TO GROWTH AND METASTASIS OF LETROZOLE SENSITIVE AND RESISTANT BREAST CANCER**

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Breast cancer cell lines can be categorized based on hormone-dependency. T47D-Aromatase (Arom) is a breast cancer cell line that contains estrogen receptors (ER), progesterone receptors (PR) and human epidermal growth factor 2 signaling. AC-1 is another breast cancer cell line that requires estrogen for growth. The AC-1 cell line was created by the Brodie Lab from MCF-7 (another breast cancer cell line) with an aromatase gene. Aromatase is used to convert testosterone into estrogen. The aromatase gene that is present allows the cells to be sensitive to the aromatase inhibitor (AI), letrozole. When AC-1 cells become resistant and no longer responds to letrozole they are now classified as LTLT-Ca (long-term letrozole treated cultured) cells. Thus, LTLT-Ca and other similar cell lines like MDA-231, T47D Arom-Letrozole Resistant (LR) are all breast cancer cells that are hormone-independent and do not require estrogen for growth. MDA-231 is a cell line that lacks estrogen receptors, progesterone receptors, and human epidermal growth factor receptors 2 amplification. It is highly aggressive, invasive and a poorly differentiated triple-negative breast cancer cell line. These cell lines contain low levels of aromatase, thus creates a challenge for treatments with aromatase inhibitors like letrozole. Due to their AI-resistance, these cancer cell lines are said to exhibit proliferative growth with increased demand for protein synthesis through alterations of their ribosomal framework. In addition, the Tilghman lab identified these cell lines to exhibit the overexpression of a novel chaperone protein, midasin. Normally, protein synthesis is a tightly regulated process that promotes normal cell growth and development. Ribosomes are fundamental macromolecular machines that are essential for transcription, translation, modification and processing of macromolecules such as rRNA and proteins. The goal of the study is to test the working hypothesis that elevated midasin expression poises nascent 60S ribosomal subunit for nuclear export, increased protein synthesis, motility and metastasis of AI-resistant cells. Our approach is to screen the different breast cancer cell lines for midasin protein expression in cultured adherently (2D) cells and in suspension (3D [mammospheres]) cells in relation to help understand and analyze nascent 60S ribosomal subunit localization, import/ export, translation as well as the biology in AI-sensitive and AI-resistant breast cancer cells. Later, these cells will undergo protein extraction and Western Blot for protein analysis. Preliminary data and studies strongly support the hypothesis and as such the Tilghman lab does not foresee any major problems with regard to completing the project. Consequently, additional mechanisms in relation to AI-resistance and metastasis of cancer cells can help to reestablish sensitivity to resistant tumors and remove the necessity for cytotoxic chemotherapy. This can positively impact current and upcoming projects to use and find other mechanisms to explore other alternative solutions for other drug-resistant forms of breast cancer.
DIVERSITY IN ORAL MAXILLOFACIAL RESIDENCY: A RACIAL AND GENDER BREAKDOWN

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Background: Developing and training providers that reflect the diverse population of today, has the potential to limit health disparities. Studies suggest that those of underrepresented backgrounds are more likely to seek providers of similar background, resulting in reduction of health disparities. This provides a unique opportunity for the development and training of qualified providers of underrepresented backgrounds that may serve in a capacity to limit health disparities. Our purpose of this study is to review the racial and gender breakdown of oral and maxillofacial surgery (OMS) residents within the United States (US) and compare these numbers to the racial and gender breakdown within the US population. We hypothesize that there will be a significant disparity among OMS residents in the United States, regarding racial/ethnic backgrounds and women being underrepresented. Materials and Methods: Raw data was analyzed from American Dental Association based on data submitted by the American Association of Oral and Maxillofacial Surgeons. Data from Association of American Medical Colleges was referenced, along with the US Census. Data was compared to Aziz study from 2010 to note any change. Results: The number of African Americans (AAs) and Hispanic OMS residents in the US to not reflect the population compared to counterparts. Hispanic residents along with women, showed increase over time. The number of AAs residents did not achieve higher than 1% increase. The number of white residents decreased, due to a growing number of other races. Conclusion: The racial and gender demographic among American OMS residents does not represent the growing racial or gender demographic of the United States. OMSs play a unique role in the bridge between medicine and dentistry. This provides a great opportunity to develop and train providers of underrepresented backgrounds, that may help reduce health disparities throughout the US.

TARGETING SIALIC ACID EXPRESSION WITH THE USE OF BACTERIAL ADHESIN PROTEINS

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Adhesins are a family of proteins that are found on the surface of streptococci bacteria and help mediate attachment to host cells. These adhesive proteins were first characterized as virulence factors for a life-threatening cardiovascular infection called infective endocarditis. Due to their wide range of selectivity for carbohydrates (mainly sialoglycans), we predict that certain sequence mutations may drive the adhesins to preferentially bind the ligand of our choosing. In past work, we have successfully mutated adhesins to bind a single sialoglycan, thus allowing us to begin creating a library of adhesins to work as sialoglycan probes. In addition to being host receptors for bacterial and viral infection, as well as participating in crucial autoimmune functions such as identification of "self", sialoglycans are thought to be particularly good cancer biomarkers. Here we have solved the crystal structure of the mutated adhesin UB10712. After mutagenesis, it is though that this adhesin will preferentially bind Sialyl Lewis X, an alpha 2,3-linked sialoglycan that has been found to be overexpressed in breast, bladder, colorectal, and esophageal cancers and is correlated with poor prognosis. This is the first step in our end goal of creating a library of adhesin
probes that can be developed into a diagnostic kit that would bind to and identify certain cancer cells that are overexpressing sialoglycans.

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MODELING LUNG ALVEOLAR REGENERATION FOLLOWING RECURRENT INJURY
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Idiopathic Pulmonary Fibrosis (IPF) is a progressive lung disease that affects less than 200,000 older adults in the US, leading to death from respiratory failure or lung transplant in most patients within 3-5 years of diagnosis. Importantly, there are several shortcomings of currently used preclinical animal models, and none of the models have been shown to reproduce the pathology seen in humans with IPF. Thus, indicating there is a definite need for novel models that better align with disease mechanisms observed in humans. Injury to and dysfunction of the lung alveolar epithelium has been increasingly recognized as a central feature of IPF. AT1 cells cover 95% of the alveolar surface area. In IPF, there is profound loss of AECs, and the prevailing hypothesis of disease pathogenesis posits that recurrent injury leads to cellular dysregulation and ineffective alveolar repair which causes reduced lung function over time. We hypothesized that recurrent ablation of alveolar epithelial cells using a novel transgenic mouse model leads to persistent AEC apoptosis, AT2 proliferation, and incomplete AT1 maturation leading to the development of lung fibrosis. We generated AgerDTA mice (which express a cre-recombinase specifically in AT1 cells; in the presence of tamoxifen, this leads to induced expression of diphtheria toxin and triggers apoptosis) and exposed these mice to repeated cycles of tamoxifen through a time course out to 24 weeks. A second model, Sftpc-CreER/Ager-CreER-DTA mice was established to conditionally delete both AT1 cells and AT2 cells. Lung remodeling was quantified by morphometric analysis of hematoxylin and eosin-stained sections. From 8 to 24 weeks, there was a significant difference in mean-linear intercept (MLI), with MLI increasing from weeks 8 to 12, then decreasing by 20 and 24 weeks. Four days after tamoxifen exposure, Sftpc-CreER/Ager-CreER-DTA had increased MLI compared to Ager-DTA mice evaluated at 8 weeks. Together, these data indicate that recurrent ablation of AECs leads to dynamic changes in lung structure, but overt fibrosis is not apparent at 24 weeks. Future studies will be required to determine whether recurrent AEC ablation leads to fibrosis and investigate the mechanisms mediating ongoing repair in the setting of repeated injury.

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ROLE OF CEREBRAL VASCULATURE IN THE GENETICS OF DOWN’S SYNDROME AND ALZHEIMER DISEASE
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Down Syndrome (Trisomy 21) is associated with Alzheimer Disease due to the amyloid precursor protein (APP) gene being located on chromosome 21 which is responsible for the production of beta amyloid, insoluble sticky proteins that cluster together forming plaques that impact proper signaling in the brain and weaken blood vessel walls and can result in hemorrhage. Although age of onset and progression of
symptoms differ, by the 5th decade most patients with DS have developed AD pathologies of cerebral beta amyloid and tau. Down Syndrome patients compared to the general population have low prevalence of traditional cerebral risk factors, so understanding the role of cerebral vascular disease by analyzing neuroimaging markers like white matter hyperintensities in DS patients will determine if cerebral vascular disease plays a central role in AD pathogenesis. This research project analyzed white matter hyperintensities (WMH) in patients with Down Syndrome (DS) to determine the role cerebral vascular disease plays in the progression of Alzheimer Disease (AD). Subjects included 39 controls and 164 individuals with Down Syndrome. Of the individuals with Down Syndrome, 39 were amyloid positive and 15 were symptomatic, which is defined as the presence of mild cognitive impairment (MCI) or dementia. Through FMRIB Software Library (FSL), brain images were segmented and extracted, and then registered linearly (FLIRT) and nonlinearly (FNIRT) to orient the 3D images into the same space (1). With the deep learning tool Triplanar U-Net ensemble network (TrUE-Net), periventricular and deep WMH were automized and WMH volumes were determined in order to form a frequency overlap. DS asymptomatic amyloid - WMH were significantly different from the control (p=0.0006). The correlation with amyloid centiloid and WMH was significant only as a full group and not the groups individually (r=0.38, p=3.9e-05). The frequency overlap shows that the greatest area of overlap is in the frontal periventricular which does not resemble typical AD presentation. An increase in posterior periventricular overlap is seen in preclinical and symptomatic DS. In conclusion, the findings in this cohort may relate more to cardiovascular changes that are elevated in this population.

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EFFECTS OF FLAVORANTS AND SWEETENERS ON ORAL NICOTINE PREFERENCE IN ADULT RATS
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Introduction: Nicotine is the primary addictive component in tobacco products (1); however, additional flavors have become a concern with the growing popularity in e-cigarettes and smokeless tobacco products (2,3). The flavor additives have characterizing odors and they may mask the aversively bitter taste of nicotine (4). Tobacco products are also often paired with odorless additives with intense sensory effects, such as sweeteners saccharin and sucrose (5). However, the literature is limited on the interactive effects of flavors, sweeteners, and nicotine. Specific Aims: We aimed to investigate whether the combination of flavors and sweeteners will increase oral nicotine intake of rats more than flavors and sweeteners alone.

Methods: Animals: Adult female and male Sprague Dawley rats (n=8-10; Charles River Lab) were used. Chemicals: (−)-Nicotine (10μg/ml), ethyl maltol, cinnamaldehyde, sucrose, saccharine, and quinine (Sigma-Aldrich, St. Louis, MO) solutions were prepared fresh daily by in water and pH was adjusted to ~7.0. All doses were expressed as the free base of the drug. Multiple bottle choice test: The rats were deprived of water for 4 hours, then they were given 4 tubes containing water or test solutions for an hour duration. The volume of consumption for each tube was recorded and the preference for each was calculated at the end of an hour. Statistical analysis: The data were analyzed using the GraphPad 9.0 (La Jolla, CA) and expressed as the mean ± S.E.M. One-way ANOVA, followed by the Bonferroni post hoc was used. The p<0.05 was considered significant. Discussion and Limitations: Although female rats drank more from sucrose and saccharine solutions, preferences to the test solutions were similar. However, male rats significantly preferred saccharin more than quinine and water. This result indicates male rats were able to differentiate the sweetness and bitterness of the test solutions. Future experiments will include larger sample sizes of rats to see if results become more significant at an alpha value of .05. Higher saccharin and sucrose concentration will reveal the interactive effects of sweeteners and flavors on nicotine choice behavior. Our work represents a model to study impact of flavors and sweeteners on oral nicotine intake and preference.
EFFECTS OF EDUCATION, INCOME, GENDER, AND AGE ON INTENTION TO GET THE COVID-19 VACCINE

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Background: Blacks are more likely to be adversely affected by COVID-19.¹ Studies, which consider all races simultaneously, have shown that those with higher education and income and those that are older are more accepting of the COVID-19 vaccine.²,³ This study looks at the association between education, income, gender, and age with intention to get vaccinated against COVID-19 among Black adults. The hypothesis is that Blacks with higher education, income, and age will report greater intention to get vaccinated against COVID-19 than Blacks with lower education, income, and age. Methods: This study used data from the Community Engagement Alliance Against COVID-19 Disparities (CEAL) study. CEAL included pre- and post-surveys to explore COVID-19 vaccine hesitancy among Blacks and Hispanics.⁴ The pre-survey included self-reported demographics.⁴ The 1064 subjects in this study were Black, aged 18 or older, and did not receive any COVID-19 vaccine. The primary outcome is intention to receive a COVID-19 vaccine within the next 30 days.⁴ Frequencies and descriptive statistics were used to describe participant characteristics. Unadjusted models were performed for each predictor to access their relationship with the outcome in univariate logistic regression analyses. Finally, multiple logistic regression was used to include all significant predictors in the model. Results: Subjects with a bachelor’s degree or higher were over three times as likely to intend to get vaccinated in the next 30 days than subjects with less than a bachelor’s degree. Subjects at least 30 years old were two times more likely to have intentions to get vaccinated in the next 30 days than subjects younger than 30. Lastly, those who made at least $50,000 annually were one and a half times more likely to intend to get vaccinated in the next 30 days than those making less than that. Results for gender were not significant. Discussion: It is important that public health officials, healthcare workers, and policy makers remain aware of this disparity. Solutions to increasing COVID-19 vaccine uptake among the Black population should be tailored to this finding. That additional demographic factors were not collected is a limitation but is not expected to significantly affect results.

INVESTIGATING POTENTIAL SHARED GENETIC ARCHITECTURE BETWEEN BLOOD PRESSURE AND UTERINE FIBROIDS

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Hypertension (HTN) affects more than one-billion people and is a major risk factor for cardiovascular diseases - which are the leading causes of death world-wide. Hypertension is characterized as having systolic blood pressure (SBP) $\geq 130$ mmHg and diastolic blood pressure (DBP) $\geq 80$ mmHg. Hypertension is also a risk factor for uterine fibroids (UF), a condition that affects millions of women. Uterine fibroids are benign, muscular tumors that form in and around the uterus. The presence of UF is often linked to heavy and painful menstruation, pregnancy complications, and infertilely in women of childbearing age. However, many cases are asymptomatic and remain undiagnosed. More information is needed to elucidate the pleiotropy of HTN in UF. Little is known about the underlying genetic risk of UF in individuals with HTN and the shared genetic architecture among HTN and UF. Large-scale genome-wide association studies (GWAS) have been conducted on individuals who have HTN and UF and much more information can be extracted from these studies that the discovery of causal SNPs and variants. Linkage disequilibrium score regression (LDSC) is a method that examines linkage disequilibrium and test statistics to estimate genetic correlation between two traits using summary statistics from GWAS studies. We estimated heritability and genetic correlation of SBP and UF and DBP and UF with LDSC. From the LDSC output, we determined that there is significant genetic covariance and correlation between DBP and UF as well as between SBP and UF. In addition, heritability estimates indicate that a portion of phenotypic variance of UF is significantly explained by SBP and DBP. Results from this preliminary analysis suggests that there is possible shared genetic architecture among blood pressure traits and uterine fibroids. Further analysis is required to characterize the potential shared architecture among DBP, SBP, and UF.

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VIEWS ON ACUPUNCTURE FOR PAIN CRISSES IN PEDIATRIC PATIENTS WITH SICKLE CELL DISEASE AND THEIR GUARDIANS

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The most common complication of sickle cell disease (SCD) is a vaso-occlusive crisis (VOC), in which sickled blood cells packed tightly together block the flow of blood through a vessel. These painful events are treated with opioids and non-steroidal inflammatory drugs. Despite these medications, these crises cause significant morbidity and prolonged hospital stays. Acupuncture is a potential adjunctive therapy for VOCs; however, patients’ and guardians’ perspectives and opinions of these therapies are unknown. This gap in knowledge prompted our current research. We performed a cross-sectional survey to assess patients’ and guardians’ views on using acupuncture as an adjunctive treatment modality for VOCs. We also performed a medical record review to assess patients’ demographic characteristics and disease morbidity. We hypothesized that pediatric patients with SCD and their guardians would be amenable to acupuncture as an adjunctive therapy during a VOC. The survey was administered to pediatric patients with SCD between the ages of 8-17 years of age and to guardians of patients 6 months - 17 years of age with SCD who presented to the Children’s Hospital of Philadelphia (CHOP) Hematology Clinic for care. We hypothesized that pediatric patients with SCD and their guardians would be amenable to acupuncture as an adjunctive therapy during a VOC. We also performed a medical record review to assess patients’ demographic characteristics and disease morbidity. We performed descriptive statistics to analyze the data. We enrolled 15 pediatric patients and 19 guardians into this study. 60% and 77.8% of the surveyed patients and guardians were open to using acupuncture for future pain treatment, respectively. 89% and 81% of patients and guardians were amenable to receiving acupuncture in the emergency department and/or hospital setting, respectively. Our study is limited by its small sample size. In addition, this data represents only a single institution. Further studies are needed to determine whether this finding is generalizable to other patient populations. However, despite this limitation, our data demonstrated that the majority of pediatric patients with SCD and their guardians were amenable to
acupuncture as an adjunctive therapy for VOCs. This study contributes key acceptability data needed for future randomized controlled trials evaluating the efficacy of acupuncture as an adjunctive therapy for VOCs.

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HYPOXIA STIMULATES APOLIPOPROTEIN L1 (APOL1) EXPRESSION IN HUMAN KIDNEY PODOCYTES

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Hypoxia is a state that develops during inadequate oxygen supply to tissues and cells, resulting in changes in cellular function, metabolism, and structure. Evidence shows that renal tissue hypoxia is a key element in the pathogenesis of kidney diseases, including end-stage renal disease (ESRD). Renal tissue hypoxia accelerates kidney disease and, in turn, kidney disease intensifies renal tissue hypoxia. Another factor associated with the development of ESRD is having two copies of genetic risk variants G1 and/or G2 of the APOL1 gene. The objective of this research was to determine if there is a relationship between APOL1 expression and hypoxia in human kidney podocytes, the key cells in maintaining the filtration barrier of the kidney. Differentiated human conditionally immortalized AB8/13 glomerular podocytes were exposed to Roxadustat, a drug used to treat anemia associated with chronic kidney disease. Changes in the expression of APOL1 mRNA and protein were analyzed by RT-qPCR and immunoblotting. We found that Roxadustat stimulates APOL1 expression in podocytes, and this upregulation requires expression of hypoxia-inducible factor HIF-1α. We have also shown that in addition to Roxadustat-induced hypoxia, cells cultured in a hypoxic chamber (1% oxygen) express increased levels of endogenous APOL1 in glomerular and urine-derived podocytes. Previous work from our lab showed that APOL1 expression is mediated by activation of the cGAS/IFI16-STING pathway in podocytes stimulated with dsDNA. Our observations suggest that in hypoxia, a STING-independent pathway that involves nuclear IFI16 and a protein arginine methylase 5 (PRMT5) is critical for HIF-1α-induced APOL1 expression in human differentiated podocytes. We postulate that in hypoxia, IFI16, PRMT5 and HIF-1α form a nuclear complex that binds to the hypoxia response element (HRE) in the APOL1 promoter and induces transcription of the gene. We propose that persistent hypoxic stress exacerbates the pathological effects of APOL1 risk variants in glomerular podocytes.

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Trypanosoma cruzi, the etiological agent of Chagas Disease, causes severe morbidity, mortality, and economic burden worldwide. Though originally endemic to Central and South America, globalization has led to increased parasite presence in most industrialized countries. About 40% of infected individuals will develop cardiovascular, neurological, and/or gastrointestinal pathologies. Cardiomyopathies induced by chronic parasite infection include hypertrophy and fibrosis, accompanied by significant changes in the extracellular matrix (ECM) deposition and composition. Accumulating evidence suggests that the parasite induces alterations in host gene expression profiles in order to facilitate infection and pathogenesis. The role of regulatory gene expression machinery during T. cruzi infection, particularly small noncoding RNAs has yet to be elucidated. In this study, we aim to evaluate dysregulation of a class of snRNAs called piRNAs during early phase of T. cruzi infection in primary human cardiac fibroblasts by RNAseq. We found about 26,496,863 clean reads (92.72%) which mapped to the human reference genome. During parasite challenge, about 441 unique piRNAs were differentially expressed. In silico analysis showed that some of these piRNAs were computationally predicted to target and potentially regulate expression of genes including SMAD2, EGR1, ICAM1, CX3CL1, and CXCR2, which have been implicated in parasite infection, pathogenesis, and various cardiomyopathies. We validated the expression of these selected piRNAs and their targets during early parasite infection phase by stem loop qPCR and RT-qPCR, respectively. Further evaluation of the function of these individual piRNAs in gene regulation and expression will enhance our understanding of early molecular mechanisms contributing to infection and pathogenesis. Our findings here suggest that piRNAs play important role in infectious disease pathogenesis, and can serve as potential biomarkers and therapeutic targets.

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A PATERNAL FISH OIL DIET PRECONCEPTION MODULATES THE GUT MICROBIOME AND ATTENUATES NECROTIZING ENTEROCOLITIS IN NEONATAL MICE

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Epidemiology and animal studies suggest that a paternal history of toxicant exposure contributes to the developmental origins of health and disease. Using a mouse model, our laboratory previously reported that a paternal history of in utero exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) increased his offspring’s risk of developing necrotizing enterocolitis (NEC). Among human infants, the risk of NEC is increased in association with formula feeding. Our studies in mice also revealed an increased risk of this disease in formula supplemented pups. Our murine studies revealed that intervening with a paternal fish oil diet preconception eliminated the TCDD-associated outcomes that are risk factors for NEC (e.g., intrauterine growth restriction, delayed postnatal growth, and preterm birth). However, the efficacy of a paternal fish oil diet in eliminating the risk of disease development in his offspring was not investigated. Herein, reproductive-age male mice previously exposed to TCDD in utero were weaned to a standard or fish oil diet for one full cycle of spermatogenesis, then mated to age-matched unexposed females. Their offspring were randomized to a strict maternal milk diet or a supplemental formula diet from postnatal days 7–10. Offspring colon contents and intestines were collected to determine the onset of gut dysbiosis and NEC. We found that a paternal fish oil diet preconception reduced his offspring’s risk of toxicant-driven NEC, which was associated with a decrease in the relative abundance of the Firmicutes phylum, but an increase in the relative abundance of the Negativicutes class.

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CHARACTERIZING SF3B1 TUMORIGENICITY IN BREAST TISSUE

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Mutations within spliceosome proteins play a significant role in cancer development. Mutations in the SF3B1 gene, a common mutation in most cancers, can lead to cryptic 3’ splicing of immature RNA. Previous studies have shown dysregulation of protein expression can be due to cryptic mis-splicing. However, a lot remains unknown about mutations in SF3B1 within certain microenvironments. Gene editing was utilized to mutate the SF3B1 gene to have the K700E mutation within the human breast cancer MCF-7 cell line and sequenced to confirm successful incorporation. Following this process, the mutant SF3B1 (mSF3B1) MCF-7 cells were utilized to observe the mutation’s effect on tumorigenicity. Studying these aspects is done with the intention of discovering or improving cancer therapies. Every malignant
cancer expresses a distinct combination of hallmarks that allow its mutated cells to survive, travel, and replicate throughout the body. Dysregulation in proliferation is one distinct hallmark of cancer. This study utilized cell quantification to measure changes in proliferation between the mSF3B1 mutant cells and the Parental MCF-7 (MCF7P) cell line. Actively proliferating cells were quantified at 0 and 3 days. Our studies found the MCF7P wells grew at a significantly faster rate the mutants. This confirmed similar proliferation patterns observed in the nontumorigenic breast epithelial MCF-10A mSF3B1 knock-in cells. To determine if differences in proliferation were due to the mutation’s ability to reprogram metabolic pathways, a starvation media was introduced, depriving the cells of serine and glycine (-SG). After day 1 and 4, the samples showed significant differences in growth between the two medias and cell types. A wound assay was performed to determine differences in migration rates. Two 6-well plates incubated with limited media for 0, 24, and 48 hours yielded no significant outcomes. Following these experiments, it can be concluded that knock-in mSF3B1 MCF-7 cells possess a general tumorigenicity as well as a mutant-specific dependency on serine.

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HEALTH RELATED QUALITIES OF LIFE IN SCHOOL AGED CHILDREN WITH BRONCHOPULMONARY DYSPLASIA

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Introduction: Almost half of all school-aged children with Bronchopulmonary Dysplasia (BPD) suffer from asthma-like symptoms and lung function deficits. Previous studies have found that health related qualities of life (HRQL) in children with asthma decrease with poorer lung function. This study aims to determine HRQL status of school aged children with BPD using the standardized Patient Reported Outcomes Measurement Information System (PROMIS) suite of HRQL instruments. We hypothesized that school-aged children with BPD will have greater impairment of HRQL in comparison to the reference population of healthy children through the PROMIS assessments. Methods: The Indoor Air Quality and Respiratory Morbidity in School Aged Children with BPD (Aero-BPD) Study is an ongoing observational study of the effect of home environmental exposures on respiratory health in school aged children with BPD. HRQL is assessed at enrollment by three PROMIS forms, Parent Proxy Scale - Global Health 7, Parent Proxy Psychological Stress Experiences - Short Form, and the Parent Proxy Profile - Profile-25. PROMIS data presented descriptively and tested for significant deviation from the standardized T-Score references for normative populations of children. Results: In total, 89 subjects were included in this analysis. The mean age was 9 (+/- 2) years and 46% female. 52% of our population identified as White, Non-Hispanic, and 72% had a parent with highest level of education being a college degree or higher. Mean days on respiratory support was 101 (+/- 42). Across all domains, school-aged children with BPD reported similar or slightly better outcomes than the reference population. Statistically significant findings of better anxiety (p = 0.04), depression (p<0.0001), fatigue (p<0.0001), and pain (p<0.0001) scores were specifically found; there was no difference in psychological stress experiences (p = 0.93), global health (p = 0.79), relationships (p = 0.87), and mobility (p = 0.73) domains in comparison to the healthy controls. Conclusions: Children with BPD may have similar or better HRQL compared to peers without chronic disease. Once validated, these findings may offer reassurance to parents and providers caring for children with BPD.
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PALATE ENCOMPASSING MALIGNANT MELANOMA: A SURGICAL INTERVENTION

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Melanomas are an unpredictable, aggressive neoplasms that can metastasize to distant sites. Melanomas are the fifth most common form of cancer, accounting for 1.7% of all cancers. Melanomas are also the most common type of skin cancer. Based on morphological features, there are four types of cutaneous melanoma: superficial spreading melanoma, lentigo maligna melanoma, acral lentiginous melanoma, and nodular melanoma. Early treatment and diagnosis can lower the morbidity and mortality rate of the tumor. Melanomas begin as superficial nodule of the epidermis and will transform into an expansile tumor. In this case presentation, the patient is a 27-year-old male presenting with a palatal lesion that appears necrotic and is non-painful. Patient was taken to the operating room for an incisional biopsy. Frozen sections of the palatal lesion were taken and sent for diagnosis. The pathologist determined that the specimen was malignant cutaneous melanoma. First line treatment of melanomas is surgical excision. Early intervention of the melanoma will lower the morbidity rate. Late intervention of the melanoma will require radiation therapy to reduce the size and metastasis prognosis. Using radiation therapy as an adjuvant to lymphadenectomy prevents local and regional recurrence.

No funding was received for this project.

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COHORT TO AUGMENT THE UNDERSTANDING OF SARCOMA SURVIVORSHIP ACROSS THE LIFESPAN (CAUSAL)

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Research Question: We are constructing a cohort of sarcoma survivors to test the hypothesis that disease and treatment result in adverse health outcomes in sarcoma survivors, which may be mitigated by a healthy lifestyle. Methods: Participants are identified through medical records review and enrolled during clinic visits or via phone. Medical records and surveys will be used to collect data on treatment, physical, functional and psychological health, lifestyle behaviors and environmental exposures. Surveys collected at baseline and subsequent time points dependent on the phase of treatment. Enrollees will also wear a Fitbit for 12 weeks, and the data will be collected on physical activity, sedentary behavior, and sleep. Samples: Eligible participants are those diagnosed with a sarcoma ≥ 10 years of age, treated in the Vanderbilt Sarcoma Program from 2016-2025, alive, and with or without evidence of disease. Data Analysis: It is too
early in the study for data analysis. The plan will be to conduct statistical analyses once the appropriate sample size has been reached. Bivariate data analysis includes t-test (continuous) and chi-square test (categorical). Regression models will be used to evaluate and estimate the association between the outcomes and disease, treatment, sociodemographic, and lifestyle contributors. Models will include potential confounders such as race, sex, age, ang diagnosis and other covariates when evaluating a specific contributor. **Limitations:** Limitations include single institution enrollment. Study progress has been limited by staff availability to approach all potential participants as well as identification of all potential participants. **Conclusions:** The study is too early in its course to have definitive conclusions. We report some data on the first 130 participants. This reveals that current enrollees have a wide range of sarcoma diagnoses, with an even distribution between sexes and more who are older and white. Some participants have reported a family history of cancer, which trends more towards maternal. A wide range of symptoms have been noted on the symptom survey including fatigue, pain, and difficulty sleeping. Enrollees report some engagement in regular and varied physical activities, which include yard work, resistance training, running, and sports.

**Support:** This research is funded by 1UG3CA260318-01 from the National Cancer Institute.

**TRYPANOSOMA CRUZI DYSREGULATES PIRNAS COMPUTATIONALLY PREDICTED TO TARGET SMAD2 AND EGR1 DURING EARLY PHASES OF INFECTION OF PRIMARY HUMAN CARDIAC FIBROBLASTS**

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*Trypanosoma cruzi*, the etiological agent of Chagas Disease, causes severe morbidity, mortality, and economic burden worldwide. Due to globalization, international travel, and immigration, the parasite is now present in all industrialized countries. About 30-40% of chronically infected patients will develop cardiovascular, neurological, and/or gastrointestinal pathologies. Chronic Chagas Cardiomyopathy, the most common clinical manifestation, leads to cardiac enlargement and fibrosis, which is caused by alterations in gene and protein expression of profibrotic molecules. Accumulating evidence suggests that parasite infection induces alterations in host gene expression profiles, facilitating infection and pathogenesis. However, the role of regulatory gene expression machinery during *T. cruzi* infection has yet to be elucidated. **We postulate that during the early phase of infection, *Trypanosoma cruzi* dysregulates small noncoding RNAs and their targets in primary human cardiac fibroblasts (PHCF).**

Previous bioinformatic analysis showed that *T. cruzi* dysregulates sncRNAs and their targets. *In silico* analysis determined that 441 distinct piRNAs were differentially expressed over the course of early parasite challenge. Of these, piR16828 and piR17716 were computationally predicted to target SMAD2, while npiR167 was predicted to target EGR1. In order to validate the piRNA and transcript expression, we performed stem-loop and regular RT-qPCR, respectively. We evaluated the levels of p-SMAD2 (S465/467), SMAD2, and EGR1 in parasite challenged cells compared to controls during the early phase of *T. cruzi* challenge. We observed that the parasite induced significant alterations in piRNA and target transcript expression. Immunoblotting assays showed significant increase in pSMAD2 at 1 hour compared to control. Interestingly, SMAD2 and EGR1 protein expression did not fluctuate significantly during parasite
challenge. Further studies are needed to validate piRNA function during parasite challenge. These findings are the first to implicate piRNA dysregulation in early *T. cruzi* pathogenesis.

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IMPLICATIONS OF RECENT COVID-19 INFECTIONS IN POSTOPERATIVE VENOUS THROMBOEMBOLISM: AN ANALYSIS OF STANDARD PLASTIC SURGERY PROCEDURES

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Purpose: The Caprini risk assessment model (CRAM) was established in 1991 in to assess the venous thromboembolism (VTE) risk in surgical patients. The metrics are considered independent contributors of increased VTE risk following surgery, such as age, surgery duration, disease history, BMI, and many more. The Caprini score is used to determine whether patients need continued anticoagulation after surgeries. COVID-19 has been strongly associated with a myriad of multisystem sequelae including but not limited to myocarditis, dyspnea, nausea and vomiting, pulmonary hemorrhage, and thrombotic complications. COVID-19 magnifies thrombosis, fibrinolysis, vasodilation, and other interrelated symptoms that contribute to postoperative VTE. Due to its recent emergence, COVID-19 is not currently a risk factor under the CRAM. This study will seek to analyze patients with recent histories of COVID-19 and their postoperative VTE incidence compared to matched controls. The question we’re trying to provide data for is whether COVID-19 is an independent risk factor for postoperative VTE. Our hypothesis is that COVID-19 is a significant risk factor for bleeding coagulopathy, and the CRAM should be modified to include COVID-19 as an independent variable.

Methods: A retrospective chart review was performed on patients receiving panniculectomies, abdominoplasties, breast reductions, and deep inferior epigastric perforator flap breast reconstructions from July 2020 – July 2022. Using EPIC (EHR of Vanderbilt University Medical Center), these routine plastic surgery reconstructive procedures were identified by their appropriate CPT codes. We used an ICD-10 diagnosis for deep vein thrombosis or pulmonary embolism for candidate inclusion. To determine which patients would be in the COVID-19 group, we first reviewed the charts for history of COVID-19 infection. Additionally, given the possibility COVID-19 wasn’t documented in their medical records, patients were called directly to inquire about known previous infections. Patients were asked three questions over the phone: 1. Have you ever had COVID-19? 2. If so, approximately when? 3. What was your Caprini score prior to your surgery? Once Covid-19 histories were assessed, we split the patients into groups: infection more than 3 months prior to surgery, infection 1-3 months prior to surgery, infection 1 week to 1 month prior to surgery, and infection up to 1 month following surgery. The incidence of thromboembolic events was then compared.

Results: The data collection from this study is ongoing. All results and conclusions will be updated accordingly.* Limitations: This study presents with a few limitations. The candidates were predominately female, due to the nature of the procedures examined. To eliminate for possible confounding variables, we collected Caprini scores preoperatively to establish a baseline. Another limitation of our study was the reliability of patient COVID-19 histories. COVID-19 inclusion for patients contacted by telephone compared to medical records presents with reporting bias. A final limitation of the study is relying on chart review process to capture all patients. Conclusions: The data collection from this study is ongoing. All results and conclusions will be updated accordingly.*

Funding: No funding was received for this study.
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IMPACT OF ROTATOR CUFF MUSCLE ATROPHY ON CLINICAL OUTCOMES AFTER TOTAL SHOULDER ARTHROPLASTY FOR GLENOHUMERAL OSTEOARTHRITIS

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Introduction: Anatomic total shoulder arthroplasty (ATSA) has proven to be a successful treatment for glenohumeral osteoarthritis (GHOA). Nonetheless, it is uncertain if there is a correlation between pre-operative rotator cuff muscle atrophy on post clinical outcomes in patients who get an ATSA. The purpose of this study is to evaluate if there is a correlation between pre-operative rotator cuff muscle volume and clinical outcomes following ATSA for GHOA.

Methods: In this study, 198 shoulders underwent ATSA for GHOA with a minimum of 2 years follow up identified by a maintained prospective registry. Each rotator cuff muscle was assessed and measured on a standardized preoperative magnetic resonance image (MRI), using OsiriX image analysis, to generate an area of total muscle volume. The pre and postoperative patient reported clinical outcomes are the American Shoulder and Elbow standardized shoulder assessment (ASES), Single Assessment Numerical Evaluation (SANE), range of motion (ROM), and pain level. The above outcomes were assessed for correlations with preoperative rotator cuff muscle volume.

Results: A total of 198 patients with a mean age of 62.0 ± 7.3 years, underwent ATSA for GHOA with a minimum follow up of 2 years. MRIs were evaluated for a quantitative measurement of muscle atrophy. A univariate analysis did not show any significant findings when evaluating for supraspinatus, teres minor, and infraspinatus muscle volume in relation to clinical outcomes. There was a negative correlation in subscapularis muscle volume and its impact on postoperative internal rotation ($R = -0.142$, $P = 0.046$).

Furthermore, the size ratio of the posterior cuff to subscapularis muscle volume demonstrated a negative correlation for change in SANE scores ($R = -0.141$, $P = 0.047$), external rotation ($R = -0.149$, $P = 0.036$), and internal rotation ($R = -0.190$, $P = 0.007$). Nonetheless, there were no correlations between size ratio and other clinical outcomes.

Conclusion: Preoperative rotator cuff muscle volume does not have an obvious correlation on clinical outcomes. Limitations were no formal control, no postoperative MRIs, and all the surgeries were done by one single surgeon.

Funding: There was no funding for this research.

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HSV2 RECURRENCES BASED ON THE TIME OF THE YEAR

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Hypothesis: Based on a sample size of 7 HSV positive subjects does HSV2 recurrences occur more heavily in Mar-September (spring/summer) vs October-February (fall/winter)? Significance: The CDC estimated that there were approximately 572,000 new genital herpes infections in the United States in a single year. Nationwide, 11.9% of persons between the age of 14 to 49 years have HSV-2 infection. HSV-2 infection is more common among women than among men. The percentages of those infected during 2015-2016 were 15.9% among 14 to 49 year olds. HSV-2 infection is more common among non-Hispanic blacks (34.6%) than among non-Hispanic whites (8.1%). A previous evaluation found that these differences, exist even among persons with similar numbers of lifetime sexual partners. Most infected persons may be unaware of their infection and in the United States, an estimated 87.4% of 14 to 49 year olds infected with HSV-2 have never received a clinical diagnosis by their physician. Approach: The study design will allow
for 7 subjects that are 18 years old or greater with a confirmed HSV diagnosis to participate. In order to keep track of all recurrences, subjects will be requested daily to enter symptoms and recurrences into electronic diaries. At the onset of a new genital HSV-2 recurrence, the first day with lesions reported will prompt a notification to the site and the subject, to arrange a telephone call. Subjects will then collect anogenital lesion swabs at each recurrence. The duration of study will be approximately 12 months from enrollment for each subject. Results/Discussion: HSV2 recurrences occur more heavily in Mar-September (spring/summer) vs October-February (fall/winter). There were 9 recurrences in Mar-September (spring/summer) vs 5 recurrences in October-February (fall/winter). More data will be collected for August 2022, September 2022, and October 2022. Impact and/or Innovation: This study will allow generating real-world evidence on recurrence patterns for a small sample size of patients for one year. This data could support new research to study HSV2 and recurrences more closely to provide new medicine for the treatment and prevention of HSV2.

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95 PEDIATRIC DENTISTS’ READINESS TO DIAGNOSE AND MANAGE TRAUMATIC DENTAL INJURIES BASED ON PEDIATRIC DENTISTRY RESIDENCY TRAINING
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Research shows that presence of oral disease and conditions, such as traumatic dental injuries (TDIs) can undermine self-perception, confidence and social interactions. Although TDIs are a serious injury, they are fairly common especially in children and young adults. 25% of all school-age children experience dental trauma and 33% of adults have experienced trauma to the permanent dentition with the majority of injuries occurring before age 19. While the injury alone can be traumatizing for children, treatment can also have the potential to lead to PTSD and dental anxiety. The World Health Organization (WHO) states that “Health is a state of complete physical, mental, and social well-being and not merely the absence of disease and infirmity”. From this definition, it can be noted that after a child experiences a TDI, their state of health can be challenged in a variety of ways. Research has shown that TDIs can negatively impact a patient’s oral-health-related-quality of life (OHRQoL). The goal of this research is to investigate and assess clinical preparedness of pediatric dentists to diagnose, treat, and manage TDIs in infants, children, adolescents and patients with special health care needs. These results will help American Academy of Pediatric Dentistry (AAPD) Program Directors better understand pediatric dentistry providers’ ability to treat and manage traumatic dental injuries and make suggestions to pediatric dentistry residency programs throughout the US and Canada on how to increase provider preparedness in the management of these injuries. Conclusions: Upon receipt of completed surveys, statistical data analysis will be performed. From this analysis we can better understand the adequacy of AAPD members’ pediatric residency training in diagnosing and/or managing TDIs.

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DOES TRANSPORTATION ASSISTANCE IMPROVE CLINICAL RESEARCH PARTICIPATION?  
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Retention of patients in research studies, especially those with historically marginalized identities, is a  
significant challenge. Lack of transportation is one of the most common barriers. We examined the  
association between transportation assistance and attendance at study visits, and whether attendance  
differed when transportation was provided by taxi service compared to Uber Health. This was a secondary  
analysis of a prospective cohort study of patients with singleton pregnancies. Participants completed  
multiple research ultrasound visits outside of prenatal care, and were informed transportation assistance  
was available at enrollment. We identified patients who requested transportation assistance for their  
research ultrasound visits and identified controls (1:2 ratio) that did not request assistance matched on age,  
race, and insurance type. We reviewed visit logs and recorded whether each visit was attended (compared  
to cancelled/no show). For transportation assistance, taxis were used for 18 months followed by a switch to  
Uber Health for the last 8 months of the study. Conditional logistic regressions adjusting for federal poverty  
level examined the association between transportation assistance and mode of transportation with  
attendance at a study visit. Transportation assistance was requested by 57/1,184 (4.8%) participants in the  
cohort (Table 1). After adjusting for federal poverty level, visits with transportation assistance were nearly  
three times more likely to be attended (aOR 3.16, 95%CI: 1.76-5.68), and visits with Uber Health were five  
times more likely to be attended than taxi (aOR 5.06, 95% CI: 1.50-16.98, Table 2). Transportation  
assistance is associated with improved study visit attendance among low-income pregnant patients,  
however, not all transportation modes are equal. Uber Health may increase attendance by facilitating real- 
time tracking, flexible pick-up locations, and non-English speaking accommodations. Budgeting and  
operationalizing transportation assistance for studies may improve engagement in research.

PROTECTIVE EFFECTS OF INTERLEUKIN 37 ON HUMAN CORNEAL EPITHELIUM  
FROM INFLAMMATION  
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Research question: If we can reduce the expression, we hope that it can also decrease total inflammatory  
properties in clinical settings. I propose that IL-37 has protective and anti-inflammatory function in human  
corneal epithelium cells. With this information we can further understand ocular inflammatory regulation  
and a step closer in offering new and innovate ways to treat the consequential diseases of ocular  
inflammation. Procedure/methods: Excised corneal limbal regions were cut into twelve and cultured in  
wells for fourteen days, until confluent. Those limbal cell were then split into five groups, two tissue  
cultures per group, and treated with either SHEM media (UT), 5ng/mL of TNFa, 5ng/mL of TNFa plus  
5ng/mL of IL-37, 5ng/mL of TNFa plus 10ng/mL of IL-37, 5ng/mL of TNFa plus 50ng/mL of IL-37 for  
four hours. Afterwards the cells are spun down and their RNA is extracted and transcribed to cDNA. The  
cDNA of each tissue culture is then ran through Real Time PCR for comparative expression of TNFa, IL-  
1B, IL-6, IL-8, MMP3, MMP9 and MMP13. Samples: There were four donated corneas that were split  
further into five groups each with two pieces of limbal tissue per group ( UT, 5ng/mL of TNFa, 5ng/mL of  
TNFa plus 5ng/mL of IL-37, 5ng/mL of TNFa plus 10ng/mL of IL-37, 5ng/mL of TNFa plus 50ng/mL of
IL-37). They were allowed to grow to confluency for 14 days and then treated for 4 hours with their respective solution. After, they were cells are lysed and their RNA is extracted. The RNA is transcribed to cDNA and used in RT-PCR for gene expression of TNFa, IL-1B, IL-6, IL-8, MMP3, MMP6 and MMP13. **Data analysis:** The RT-PCR was ran with 10 samples, duplicates of each group, and 8 primers, GAPDH as control and the 8 genes of interests. They were ran in QuantStudio under comparative measures. The results are in the graphs below. This allows to properly measure the levels of RNA expression and compare the differences in each treatment group. **Limitations:** Due to the pandemic and restraints of the hospitals we work in conjunction with, it was difficult obtaining enough corneas throughout my program. This caused for us to have a small sample size and lead to less significant findings than what there would seem to appear. **Conclusion:** In conclusion, inflammatory cytokine gene expression was able to be suppressed in the presence of IL-37 in limbal cells. The expression was best seen in the group treated with 5ng/mL. This may be important in treatment dosage but needs to be further studied to understand the effects of higher concentrations of IL-37 of human corneal epithelial cells. Along with looking at concentrations more closely we would also be interested in expression with longer treatment times, greater than 4 hours. Lastly, we want to move forward and look at protein expression using wither ELISA or western blotting and see what the effects are there too.

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CESSATION OF CROSS SEX HORMONE THERAPY PRIOR TO GENDER AFFIRMING SURGERY

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The transgender and non-gender conforming population compromises approximately 0.6% of the United States population and 1.4% of the population worldwide and is gradually increasing. Within this population, many of them desire to receive gender affirming surgery (GAS) to improve their quality of life and to better align with their respective gender causing it to now become a more common practice. Although there have been many innovations and improvements in GAS, there are still many risks that have not been identified or researched. The perioperative stage typically consists of CSHT, cross-sex hormone therapy, such as estrogen and testosterone. These hormones pose their own risks including thrombosis, dyslipidemia, as well as an increased risk for MI and ischemic stroke. This paper aims to obtain a consensus on whether or not hormone therapy should be stopped prior to gender affirming surgery. In this particular study, a contact list will be made consisting of gender affirming surgeons using the database WPath. A survey encompassing multiple questions regarding perioperative care and hormone therapy prior to surgery will be sent out. After this, the responses will be recorded and analyzed and a consensus among the experts will be made. This study has possible limitations. One of the limitations include the sample size and population. The sample selected for this study focused solely on gender affirming surgeons causing the sample size to be restricted. Due to the specificity of the physicians selected, the consensus provided will be a more narrow scope of transgender healthcare. The next step for the future will be to expand the study to include endocrinologists and psychiatrists to provide different perspectives. This will aim to improve the health outcomes of an already medically disadvantaged population.
THE EFFECTS OF SYMTUZA ® ON BODY WEIGHT IN AFRICAN AMERICAN AND NON-AFRICAN AMERICAN POPULATIONS

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Antiretroviral therapy (ART) has decreased plasma RNA viral load and HIV-1 transmission while improving quality of life and immune function. However, some people living with HIV-1 rarely adhere to ART or switch from using ART due to a large pill burden and/or its side effects. ART, most commonly with treatments consisting an integrase inhibitor (INI), causes weight gain which may lead to non-AIDS-related comorbidities. SYMTUZA ®, a once daily medication consisting of Darunavir/Cobicistat/Emtricitabine/Tenofovir Alafenamide (D/C/F/TF) may be a treatment option that reduces significant weight gain in HIV-1 patients. This may be of significance for African American populations since there is a higher prevalence of obesity in comparison to European American populations.

To establish whether SYMTUZA ® has an impact on weight gain, especially in African American populations, I will gather participant data from the ReSTART study and put them into the African American or non-African American group with each group containing 6 participants. Each participant is placed on SYMTUZA ® after not being on ART for at least 12 weeks. Participants’ body weight, HIV viral load, CD4 count, and comprehensive metabolic panel will be studied over 48 weeks. Measurements will be analyzed at weeks 4, 12, 24, and 48. Conducting research comparing the effects of SYMTUZA ® on body weight in African American and non-African American populations may give insight on if racial background/ethnicity plays a role in weight gain with an ART without an INI component. The hypothesis is that persons taking SYMTUZA ® will have lower than a 10% increase in weight gain over 48 weeks and that African Americans will have a higher increase in percent change of body weight than non-African Americans over 48 weeks. Results show that participants taking SYMTUZA ® had lower than a 10% increase in weight gain from screening till week 48, and the African American group had a higher increase in weight gain over 48 weeks in comparison to the non-African American Group (p<0.001). Having a small sample size and little diversity among/within groups could have limited results. In the future, increasing the number of participants in each group, including more racial groups, and having sex more evenly distributed within groups could help decrease limitations.

BREASTFEEDING SUPPORT FOR WORKING MOTHERS RESIDING IN DAVIDSON COUNTY, TENNESSEE

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Background: Breastfeeding is highly suggested for most babies compared to alternative forms of nutrition. According to the American Academy of Pediatrics, it is recommended that babies six months of age and younger be exclusively breastfed. It is also suggested that breastfeeding is continued with complementary food for at least one year of age. These recommendations are placed because of the numerous benefits breastfeeding offers for the baby and mother. For example, breastfeeding reduces the risk of gastrointestinal and respiratory infections, sudden infant death syndrome, and respiratory allergies. Additionally, mothers who breastfeed have a lower risk of breast cancer, ovarian cancer, and type 2 diabetes. It is also beneficial to an employer for a woman to breastfeed her infant. This is because breastfed babies are less likely to become sick which can equate to less days a woman has to take off work due to illness for her or her baby. Reaching breastfeeding recommended milestones can be a challenge, especially for employed mothers. In recent years, there has been an increase in the number of women entering the workforce. More
specifically, there has been an increase in the proportion of women of childbearing ages entering the workforce. Consequently, there are times when women will become pregnant during their career and need to return to their job at some point after their baby is delivered. Some mothers might not even initiate breastfeeding because they suspect challenges while trying to juggle breastfeeding and working. Therefore, it is important for employers to create an environment conducive to breastfeeding so that it helps decrease those barriers for women. To improve the number of women breastfeeding, it is imperative for a mother to have a workplace that promotes and supports breastfeeding. The supportive environment can play a role in the initiation, duration, and positive attitude towards breastfeeding. I hypothesize that women will be more inclined to breastfeed if the employer offers a supportive breastfeeding environment. **Methods:** Cross sectional study design. 141 participants were recruited for the study at the OB/GYN clinics at the Mathew Walker building and Metro General Hospital and community health fairs. Recruitment methods included word of mouth and flyers. All participants signed a consent form. Participants completed a survey by interview conducted by trained interviewers. Survey questions included demographic information, breastfeeding knowledge, breastfeeding attitude, and breastfeeding practice. **Samples:** Target population is African American women of Davidson, County, Tennessee. The study population includes women of Davidson, County, Tennessee at least 5 months pregnant. **Data Analysis:** Secondary analysis using Statistical Package for Social Sciences. **Limitations:** The small sample size does not allow for subgroup analysis. The findings cannot be generalized due to self-selection bias. **Conclusions:** This study has shown that for this population, breastfeeding rates are not correlated with employment status. Most of the population did not have a plan to use formula or breastfeed regardless of their employment status. Additionally, breastfeeding support within the workplace is low and more breastfeeding support is needed. This could be a focus for further research.

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“IS MASK MOUTH REAL?” EXAMINING THE RELATIONSHIP BETWEEN MASK WEARING HABITS AND SELF-REPORTED HALITOSIS SYMPTOMS IN A PROFESSIONAL SCHOOL SETTING

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In the aftermath of the COVID-19 pandemic, mask mandates were enacted in nearly every city in the United States and worldwide. While wearing masks reduce the risk of contracting and spreading the COVID-19 virus, prolonged can negatively impact both oral and systemic health. Dental and medical professionals are notably at higher risks of contracting the virus due to the proximity to patients, false negative pre-screening results, and long hours on duty. The objectives of this research project to (1) identify whether a correlation exists between mask wearing habits and self-reported halitosis and (2) identify associated extraoral, intraoral, and gingival symptoms. An online survey was used to collect information about mask-wearing habits and self-reported oral symptoms among a population of students, residents, faculty, and staff at Meharry Medical College. Participant identifiers such as DOB, gender, highest education level, and classification were collected anonymously and used to assess demographic data. Among those surveyed, majority of participants were female dental students who wore surgical and KN95 masks for an average of 5 to 12 hours daily, often wearing multiple masks at a time. Extraoral dryness was the most noted associated symptom with over a third of participants noting an increase in combination mouth and nose breathing
Most participants reported, however, no significant change in malodor or increased plaque accumulation within the past two years. Extended mask wearing has been associated with increased incidence of xerostomia and mouth breathing. These symptoms are a risk factor for tooth decay, sour breath, and periodontal disease. Oral hygiene is a sensitive topic for discussion and people may decline to report accurately their experiences attributing to the inconsistency seen in this study.

This project was supported by Meharry Medical College School of Dentistry, Department of Oral and Maxillofacial Surgery.

THE INVESTIGATION OF PRECOCIOUS PUBERTY IN AFRICAN AMERICAN GIRLS AND ITS RELATIONSHIP WITH COMORBIDITIES LATER IN LIFE

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The average age of pubertal onset has declined in African American girls over the past 50 years. Earlier or precocious puberty puts these women at an increased risk of diseases such as breast cancer, ovarian cancer, and endometrial cancer. Additionally, earlier puberty increases the risk of obesity, which is associated with cardiovascular diseases and type 2 diabetes, and this places African American women at a greater disadvantage for diseases that disproportionally affect them. Previous research has highlighted how exposure to environmental xenoestrogens and environmental factors are directly associated with precocious puberty in girls but has relied on research focused primarily on other ethnic groups with a small sample of African American girls. I propose that the lack of breastfeeding, obesity, genetics, xenoestrogens, and genetic mutations will lead to early or precocious puberty in African American girls. To investigate the factors, a comprehensive literature review was done by searching specific terms in PubMed. These terms include breastfeeding, infant formula, xenoestrogens, endocrine disruptors, obesity, genetics, early puberty, precocious puberty, African Americans, and girls. The relevant articles concerning this topic were read and analyzed. A conclusion was made based upon the results and study type to determine if the data given was conclusive enough to be associated with precocious puberty in African American girls. Although evidence was found supporting my hypothesis, more research should be done in regions within the United States densely populated with African Americans, since most of the prior research was done in states like California and New York with small samples of African American women. Further research will be able to provide more evidence to answer the question on the factors altering the onset of puberty and the disproportionate exposure to African Americans. Furthermore, to prevent some of these disparities, more support should be given to improve the prevalence of breastfeeding among African Americans, as well as focusing on ways to prevent obesity among all children. Lastly, more studies should focus on the exposure to endocrine disrupting chemicals in the United States and focus on how education could minimize the exposure to these chemicals. This work was done under the mentorship of Dr. Sakina Eltom. Tyler Wilson was sponsored by the Meharry Medical College Center of Excellence.
Squamous cell skin cancer is the second most common cancer in humans, yet molecular drivers of this cancer are not completely defined. Mutations in cancer relevant genes such as Tp53, CDKN2A, NOTCH family, and MAPK pathway, are common in cutaneous squamous cell carcinoma (cSCC) but are also tolerated in normal skin. This suggests that other factors must be involved in cSCC pathogenesis. The histone demethylase KDM6A has recently been established as a tumor suppressor and is mutated in 7% of squamous cell carcinomas; however, its expression patterns, including its subcellular localization to the nucleus, are altered compared to normal skin in roughly 50% of cases of squamous skin cancer. KDM6A is a ubiquitously expressed histone demethylase located on chromosome Xp11.2. Due to the absence of X inactivation, KDM6A is unequally expressed in males and females – potentially contributing to the cancer sex bias. This study aims to explore the correlation between KDM6A localization and expression patterns and the development of squamous cell carcinoma. We hypothesize that KDM6A dysregulation will be more prominent in more aggressive (less differentiated) cSCC. Furthermore, factors that cause DNA damage or promote cell cycle dysregulation in epithelial cells, may alter the expression and localization of KDM6A, causing increased cytoplasmic localization and decreased expression compared to normal. First, we will assess KDM6A expression using immunohistochemistry and subcellular localization using immunofluorescence in human keratinocytes with cSCC. Next, we will determine what factors trigger changes in the level and distribution of KDM6A expression in mouse epithelial cells. Then we will compare the patterns of KDM6A expression using immunofluorescence imaging in mouse skin that has been subjected to DNA damage using UV light or cell cycle promotion via cold wax depilation, to that of normal mouse epithelial tissue. Finally, we will assess KDM6A localization patterns in tumors generated from MLL4/Trp53 double knockout mice. The results suggest that an increase in cSCC grade (thus decreased differentiation), is correlated with increased cytoplasmic localization decreased expression of KDM6A. Furthermore, changes that disrupt mouse epithelial cells also result in increased cytoplasmic localization of KDM6A.

This project was supported by the Washington University School of Medicine in St. Louis Division of Dermatology and the Lilly Grant.
decreased populations of maternal B cells. In preparation for this project, homozygous B6 female mice were prenatally infected with *S. mansoni* or mock-infected and then mated to homozygous 4get males. First, pups were weaned and then either sacrificed for steady-state analysis or immunized with 1/10th of the human dose of diphtheria/tetanus toxoid. Spleen and femoral bone marrow cells were isolated for steady-state analysis. For post-immunization studies, mice were sacrificed 14 days post-immunization, and cells from the left popliteal lymph node were isolated for analysis. Following collection, flow cytometry panels were used to assess maternal B cell populations. Data from the offspring of infected mothers were compared to that of the offspring of uninfected (mock-infected) mothers. Data analysis illustrated a significant decline in both splenic and bone marrow maternal memory B cells from Naïve males of infected mothers. Post-immunization studies also demonstrated a downward trend in maternal memory B cells in mice from infected mothers. However, due to the limited number of males from infected mothers analyzed during the post-immunization experiment, additional data is necessary to fully draw conclusions about differences between males of infected mothers and uninfected mothers.

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**DISCUSSIONS OF FERTILITY IN END STAGE LIVER DISEASE**

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This study investigated if physicians counsel pre or post liver transplant patients on fertility during clinic visits. A single center retrospective analysis of all female liver transplant patients of reproductive age under the care of physicians at Yale New Haven Hospital in the past 10 years was performed. Data was obtained through an EPIC query followed by individual chart review using the following terms: tubal ligation, hysterectomy, fertility, baby, vaginal delivery, c section, birth control/contraception, conceive, post partum, miscarriage, and abortion. Descriptive statistics included means and standard deviations for continuous variables, and frequencies for categorical variables. Chi squared analysis was used to determine statistically significant differences. Patient sample included 48 female liver transplant patients of reproductive age under the care of physicians at YNHH. Mean age at transplant was 29.88 y, SD 8.91. 50% of patients are pre transplant, while the remaining 50% were post transplant at the time of documentation. Liver dx etiology of the patient sample included Alcoholic Cirrhosis (27.08%), Autoimmune Cirrhosis (16.67%), Primary Sclerosing cholangitis (10.42%), Metabolic disease (8.33%), HCV Cirrhosis (4.17%), and other causes (33.33%). The study found that a minority (45.83%) of patients received fertility counseling. The difference in proportion of white patients that received counseling (45%) and patients of Black (40%), Asian (100%), and other/unknown races (25%) was statistically significant (p < 0.05). There were also statistically significant differences between ethnicity and age. The rate of counseling increased by 97.17% from 2012-2016 (30.43%) compared to a rate of 60.00% in 2017-2022. Limitations to this study include the limited sample size and lack of documentation of physicians. Additionally the patient charts were likely incomplete due to out of network ob/gyn care. National data bases or medical records systems could be a possible solution to this limitation. This study was funded by the DICE office at Yale School of Medicine.
Introduction: When treating skin of color, special consideration must be given because of the greater tendency for injury and dyschromia from the very modalities used in treatment. The impact is not simply cosmetic. The patient’s psychological well-being and quality of life can be adversely affected. Chemical peels have been proven to be a safe and efficacious mode of treatment in patients with skin of color. Blended acid chemical peels that include additional lightening agents are beneficial to use in the treatment of hyperpigmentation. Depending on the composition of the acids and additional lightening agents in a blended chemical peel, there is the potential to target melasma in three ways: tyrosinase inhibition, inhibition of the transfer of melanin, and an increased rate of desquamation. Thus, this study aims to determine the efficacy of using a series of blended chemical peels that include additional lightening agents in the treatment of melasma in skin of color. Methods: A cohort study was executed using patients that have sought treatment for melasma. Participants were selected from the electronic health record of a private dermatology practice. A pre-treatment baseline was established by visually documenting the patient’s starting point with photographs and calculating the Melasma Area and Severity Index (MASI). After completion of the series of chemical peels, the Melasma Area and Severity Index was recalculated, and new photos were collected. The pre-treatment MASI and photographs were compared to the post-treatment MASI and photographs. A statistical analysis was performed using the MASI collected pre-treatment and post-treatment. Statistical significance was determined with a p-value of <0.05. Results: Although there was an overall reduction in the mean post-treatment MASI, which indicated improvement, the improvement wasn’t statistically significant (Mean at baseline=13.85, Mean after treatment=12.575, p=0.0702). A t-score was calculated via paired t-test using the pre and post treatment MASI. Conclusion: In our cohort, although the results are not statistically significant, a larger sample size with a greater power could potentially yield statistically significant results. It is also noted that patients treated with a blended acid chemical peel containing acids and lightening agents that target three or more mechanisms that regulate skin pigmentation yielded a greater reduction in the pre vs post treatment MASI. Further studies are required to measure the significance of the composition of blended acid chemical peels in the treatment of melasma in skin of color.
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