

Marshall University

34th Annual Health Sciences Research Day

Friday, October 28, 2022
Marshall University Medical Center

Schedule of Events

7:00 a.m. Registration opens for morning and afternoon participants. Registration will remain open throughout the day.

8:00 a.m. **Welcome & Opening Remarks**
Uma Sundaram, MD, Vice Dean & Research Day Chair
Avi Mukherjee, Provost, Marshall University

8:15 a.m. **Oral Session 1**
Chair: Monica Valentovic, PhD

| Time | Name | Abstract Title |
|-----------|------------------------|---|
| 8:15 a.m. | Ashley Cox | Cinnamaldehyde Induces Cellular Stress Responses in Human Proximal Tubule Epithelial Cells |
| 8:30 a.m. | Samuel Tetteh-Quarshie | A High-Fat Diet Has Sex-Specific Effects on Nicotine Vapor Self-Administration in Mice |
| 8:45 a.m. | Vivien Wellington | High fat diet induced obese adipose derived secretome stimulates villus Na-glutamine co-transport |
| 9:00 a.m. | Meredith Kesler | Western Diet Influences Megakaryopoiesis in a Mouse Model of Myelodysplastic Syndromes (MDS) |
| 9:15 a.m. | Vijaya L. Sundaram | Stimulation of Na-Glucose Co-Transport (Sglt1) Mediated by High Fat Diet-Induced Obese Adipose Derived Secretome in Intestinal Epithelial Cells |

9:30 a.m. **15-minute break**

9:45 a.m.

Oral Session 2

Chair: Jim Denvir, PhD

| Time | Name | Abstract Title |
|-------------|------------------|---|
| 9:45 a.m. | Xiaoling Wang | Assessment of Mortality among Patients having Colorectal Cancer and Atrial Fibrillation |
| 10:00 a.m. | Daniel Miller | Attention Deficit Hyperactivity Disorder (ADHD) and Co-existing Anxiety in the COVID-19 Era: A Comparison Study |
| 10:15 a.m. | Danielle Roth | A virtual sex education tool improved reproductive health knowledge among adolescent girls |
| 10:30 a.m. | Justin West | Trends in COVID-19 Testing in Rural Pediatric Populations at a Regional Testing Center |
| 10:45 a.m. | Shoshi Chowdhury | Clinical Outcomes in a Veteran Cohort with Moderate Acute COVID-19 Infection Treated with Monoclonal Antibodies or Antivirals |

11:00 a.m.

15-minute break

11:15 a.m.

Welcome and Introduction of Keynote Speaker

Uma Sundaram, MD, Vice Dean

Bobby Miller, MD, Interim Dean

11:30 a.m.

Keynote Lecture: *SLC26A3 (DRA): A Novel Therapeutic Target for Diarrheal Diseases & IBD*



Pradeep K. Dudeja, PhD

Professor of Physiology in Medicine, Digestive and Liver Diseases
University of Illinois at Chicago

Pradeep K. Dudeja, PhD, has been a Professor of Physiology, Digestive and Liver Diseases at the University of Illinois at Chicago since 2002. In this role, Dr. Dudeja is also the Director of Scholarly Activities for GI & Hepatology and also serves as the Director of the Intestinal Transport Group for both the University of Illinois Chicago and the Jesse Brown VA Medical Center.

Dr. Dudeja received his PhD in Biochemistry from the Postgraduate Institute of Medical Education in Chandigarh, India in 1983. He then joined the University of Chicago at Illinois as a Research Associate and worked his way through the research and then academic ranks until he became a full Professor with tenure in Department of Medicine, Section of Gastroenterology, in 2002. Dr. Dudeja has published 245 articles and has received more than \$6,000,000 from the National Institutes of Health (NIH) and \$2,900,000 from the VA as a principal investigator. Dr. Dudeja has also played an important role as a mentor, a sponsor, and a co-investigator on multiple federal grants worth over \$6,500,000. He has also mentored more than 20 PhD and MDs in their scientific careers. As a leader in Gastroenterology & Hepatology, Dr. Dudeja has served as a reviewer of multiple NIH and VA study sections. Dr. Dudeja is currently the chair of the American Gastroenterological Association Basic and Clinical Intestinal Disorders section and also chair of the American Physiology Society GI and Liver section.

Dr. Dudeja's research has focused on the biology of GI transport systems and how these are regulated by and can impact intestinal disorders such as IBD and diarrhea. Much of his recent work has focused on the chloride / bicarbonate transporter SLC26A3 (DRA) and over his long and distinguishable career, Dr. Dudeja has made multiple seminal contributions in the area of intestinal physiology, specifically on the mechanisms of diarrhea. Namely how diarrhea occurs in inflammatory bowel disease (IBD). In IBD, diarrhea is the most common and disabling symptom that patients have. Dr. Dudeja's research has made great strides in deciphering diarrhea in IBD. His findings to date have been both novel and are likely to yield more specific and therapeutic options for the diarrhea of IBD.

In summary, Dr. Dudeja's career has not only resulted in the training of innumerable young scientists in physiology but has greatly contributed to our better understanding of one of the most common diseases namely diarrhea.

12:30 p.m. to 1:45 p.m. **Lunch and Poster Session 1**

1:45 p.m.

Oral Session 3

Chair: Gayle Brazeau, PhD

| Time | Name | Abstract Title |
|-------------|-------------------|--|
| 1:45 p.m. | Maafi Islam | Chronic Intestinal Inflammation Downregulates Apical Na-Bile Acid Co-Transporter (ASBT) in SAMP1 Mouse Model of Inflammatory Bowel Disease |
| 2:00 p.m. | Raji Lukmon | Activation of antioxidant pathway by curcumin analog FLLL12 in head and neck cancer: implication for chemoprevention |
| 2:15 p.m. | Jacy Baxter | Obese adipose derived secretome increases phospho-S6 expression in Triple Negative Breast Cancer via mTOR signaling pathway |
| 2:30 p.m. | Shanmuga Sundaram | Intestinal Na-Bile Acid Co-Transport (Asbt) Is Uniquely Regulated Along the Crypt-Villus Axis and Caudal-Oral Length of the Small Intestine in Obesity |

2:45 p.m. to 4:00 p.m. Poster Session 2

4:15 p.m.

Presentation of Best Lecture and Poster Winners

Poster Session 1

| No. | Name/Abstract Title |
|-----|--|
| 1 | <p>Shane Taylor ACL Reconstruction with Bone Marrow Aspirate Concentrate, Demineralized Bone Matrix, Autograft Bone and Suture Tape Shows Significantly Decreased Tunnel Osteolysis at 6 Months</p> |
| 2 | <p>Chuchitra Thanigaivasan Adverse Childhood Experiences moderate the relation between minoritized status and engaging in substance use amongst adolescent psychiatric inpatients</p> |
| 3 | <p>Micah MacAskill The Use and Cost Effectiveness of Next Generation Sequencing in Orthopaedic Infections</p> |
| 4 | <p>Madeleine Marks Demographic Analysis of Over-the-Counter Acetaminophen Use in a Rural Population 80 Years and Older</p> |
| 5 | <p>Mohammad Noor COVID19 Hesitance Among Americans from a University-Affiliated Community</p> |
| 6 | <p>Rachel Price Use of Digital Flashcards in Reproductive Health Counseling</p> |
| 7 | <p>John Roth Comparison of Competing University Sport Medicine COVID Monitoring Programs: Screening vs Testing</p> |
| 8 | <p>Andrew Schaver Fertilized Anterior Cruciate Ligament Reconstruction Leads to Superior Functional and Patient Reported Outcomes at One Year Post-Operatively: A Prospective, Randomized Controlled Trial</p> |
| 9 | <p>Cora Miracle Aeroallergen sensitivity plays a larger role in Appalachian pediatric EoE severity</p> |
| 10 | <p>Davinder Singh Aorta-Right Ventricle Fistula development in a Patient with Infective Endocarditis</p> |
| 11 | <p>Caleb Spainhower Taking the First Step to Weight Loss: Addressing the Barriers in Rural Communities by Increasing Patient and Primary Care Provider Awareness of Bariatric Surgery and Pre/Post Care Treatment Options</p> |
| 12 | <p>Ean Bills Patients with Irritable Bowel Syndrome are less likely to post on Social Media about their disorder: A Twitter study</p> |
| 13 | <p>Anthony Workman Iatrogenic Pituitary Shutdown: A Rare Case of Atezolizumab-induced Hypophysitis</p> |

| | |
|----|---|
| 14 | Stanley Czahoroski Huntington Bacterial Endocarditis Risk Stratification Determination (HERD) Study |
| 15 | Erick Trent Geriatric Analysis of a Regional COVID-19 Screening Center |
| 16 | Thomas Wright Evaluating working memory training in substance use disorder and comparing recovery targets between patients, providers, policy makers, and community members |
| 17 | Adam Young The ARRIVE Trial in Practice: Does BMI impact outcomes? |
| 18 | Kennedy Snavely Medical Schools Dismantling Discrimination, Racism, and Stigma Through Structural Competency |
| 19 | Joshua Galbraith Evaluation of Adverse Childhood Experiences in obesity at weight-loss clinics compared to Adverse Childhood Experiences in patients with Substance Use Disorder at SUD treatment clinics |
| 20 | Rachel Lee Robotic Total Laparoscopic Hysterectomy: Uterine Manipulation Technique and Rationale |
| 21 | Cameron Cottrill Understanding the Relationship Between Delirium and Catatonia in the Clinical Setting: A Case Report |
| 22 | James Curry The Expansion of Lyme Disease: A Case of Infection in the Absence of Known Exposure |
| 23 | Kassandra Flores Re-Injury Fall Leading to Gross Hardware Failure in Humeral Shaft Fracture Revised with Intermedullary Nail: A Repeat Fracture Salvage Case Study |
| 24 | Haseeb Jafary Perforated Meckel's Diverticulum Mimicking Acute Colonic Diverticulitis in Adul |
| 25 | Muhammad Jafary Mental Illness in a South Asian Cultural Context: A Case Report |
| 26 | John Kinney Rare Form of Liver Damage in MODY Patient |
| 27 | Danny Holbert Gender Analysis of a Regional COVID-19 Screening Center |
| 28 | Calyb King Prevention of Broncho-Aspiration in the Surgical ICU by Prospective Monitoring of Protocols at a Tertiary Health Network System |

| | |
|----|--|
| 29 | Alex Ashley Value Assessment of Service Line Epigastric & Umbilical (EU) Hernia Repair at a Tertiary Academic Health Network System Over 12 Years |
| 30 | Tewodros Ayele Budd-Chiari Syndrome Diagnosis Achieved With High Clinical Suspicion Raised by EUS-Guided Portal Pressures and Liver Biopsy |
| 31 | Dustin Miller Two Cases of Severe Neonatal Human Parechovirus Infection Treated with Intravenous Immunoglobulin and Systemic Corticosteroids |
| 32 | Joseph Newman A case of new-onset mania with overlying catatonia in a patient with COVID-19 infection |
| 33 | Kevin Reger The Growing Incidence Of Lyme Disease in West Virginia and its Misdiagnosis as Bell's Palsy |
| 34 | Nicholas Royce Falsely Elevated A1c: Hemoglobin Wayne Mutation in an Appalachian Family |
| 35 | Matthew Schade Disseminated Adenovirus Infection in a Late Preterm Infant |
| 36 | Andrew Schaver Case Report: Conservative Management of a KD-IV Knee Dislocation |
| 37 | Dylan Smith Gallstone Ileus: A Case Report in a 74-Year-Old Male |
| 38 | Caleb Spainhower Atypical Presentation of a Visceral Artery Pseudoaneurysm with Concurrent Biliary Pathology |
| 39 | Rawan Elhamdani Retrospective Case Series of Babies Developing Severe Retinopathy of Prematurity Requiring Intravitreal Injections at Cabell Huntington Hospital |
| 40 | Trenton Hayes Internet Use and Isolation in the Rural, Community-Dwelling 80+ Year Olds |
| 41 | Anisha Valluri Generalized Violaceous Papulosquamous Eruptions in an HIV positive female |

| | |
|----|--|
| 42 | Seneca Williams Use of Mandibular Distraction Osteogenesis to Correct Micrognathia and Airway Obstruction in Newborn Female |
| 43 | Jacqueline Cavendish A comparative analysis of the trends of H. Pylori in Appalachia: A retrospective chart review |
| 44 | Zachary Wright Predictable Factors Associated with Hepatitis C Infections |
| 45 | Sophia Anton Compassion Fatigue in First Responders: analysis of the COMPASS program |
| 46 | Joseph Chirico Utilization of Endoscopic Ultrasound in the Diagnosis of a Cystic Lymphangioma of the Pancreas |
| 47 | Heba Boustany Case Report: Naltrexone for Binge Eating and Food Obsession Related to Trauma |
| 48 | Tanner Bakhshi B-Cell Non-Hodgkin's Lymphoma: an aggressive thyroid mass in an older adult |
| 49 | Collin Lamba Loss of intraoperative neurological monitoring signals after prone positioning during surgery for lumbar spinal stenosis: case report |
| 50 | Ayesha Liaqat Atypical Presentation of Multiloculated Pyogenic Liver Abscess in Pediatric Patient |
| 51 | Vivek Yadala Bone Marrow Biopsy, Does CT Guidance Add Value? |
| 52 | Bethany Andrew A retrospective, single-center analysis evaluating the influence of cerebral oxygen saturation on outcomes in patients requiring veno-venous extracorporeal membrane oxygenation (ECMO) |
| 53 | John Kinney Motivational Factors of Weight Loss in NAFLD Patients: Data From University Hospital in WV |
| 54 | Shannon Morrone Analysis of a Division I Athletic Department's Response to COVID-19 Pandemic: 5 Lessons Learned |
| 55 | Mariah Morris Effect of low-cost laparoscopic cholecystectomy simulation on medical student understanding of anatomical and medical concepts. |
| 56 | Zachary Wright Rare Case of Plasma Cell Infiltration-Induced Cirrhosis |
| 57 | Justin West Early Surgical Interest May Be Predictive of Performance on a Virtual Reality Surgical Simulator |

| | |
|----|---|
| 58 | Nicholas Casingal Evaluation of surgery clerkship student comfort level in OR |
| 59 | Shelley St Clair Resolution of Neurogenic Pruritus with Cervical Epidural Spinal Injections |
| 60 | Lauren Thompson Perinatal stroke- An unusual cause of early myoclonic encephalopathy with a favorable outcome |

Poster Session 2

| No. | Name/Abstract Title |
|-----|--|
| 61 | Seth Jude The Width of the Medial Joint Space Width can be Reliability Measured During the Anterior Medial Rotation Test |
| 62 | Colby Gresak Cardiometabolic and Behavioral Effects of Vaping and Exercise in Adolescent, Catalase Mice. |
| 63 | Calyb King Trauma Service Line Assessment at a Tertiary Academic Health Network System over 12 Years |
| 64 | Eric Medenhal Examination of Cord Blood at Birth in Women with SARS-CoV2 Exposure and/or Vaccination During Pregnancy and Relationship to Fetal Cortisol, Ferritin, Vitamin D, and CRP |
| 65 | Rileigh Elk An Acute Bout of Throwing on the Shoulder decreases Shoulder Strength and Subacromial space width in Inexperienced Overhead Throwers. |
| 66 | Dustin Darnell Ultrasound Measured Differences in Medial Knee Joint Space Width during the Valgus Stress Test and The Anterior Medial Rotation Test. |
| 67 | Amber Sturgill Nephrotoxic potential of 1,2,4-trichlorobenzene via oxidative stress induced lipid peroxidation |
| 68 | Leandro Barbosa Na/K-ATPase Signaling Tonicly Inhibits Sodium Reabsorption in the Renal Proximal Tubule |
| 69 | Renat Roytenberg Vaccine-Induced Immune Thrombotic Thrombocytopenia: what do we know so far? |
| 70 | Sasha Zill What makes walking behavior 'naturalistic'? Feedback signaling the rate of change of force (dF/dt) in serially homologous legs of insects |
| 71 | JinJu Wang MiRNA profiling of exosomes derived from perivascular adipocyte tissue in type 2 diabetic mice |

| | |
|----|--|
| 72 | Paige Vanaman Effect of increased IL6 levels found in obesity on Triple Negative Breast Cancer |
| 73 | Cecilia Sierra-Bakhshi Salmonella Infection in Diabetic Mice |
| 74 | David Shore Investigating a Novel Role for GPR68 in Oral Dysplasia |
| 75 | Harshal Sawant The protective effects of exercise on cerebral ischemia injury in diabetes |
| 76 | Neema Saadevandi Clarifying the role of Thymidine phosphorylase on the expression of Pyruvate Kinase M2 |
| 77 | Cheston Porter Telomere Length Dynamics in Male TALLYHO Mice |
| 78 | Marlena Pigliacampi Multiplexed immunostaining of IGF signaling components in growth plate cartilage |
| 79 | Nathen Olszewski NICOTINE SELF-ADMINISTRATION IS INVERSELY RELATED TO MEDIAL HABENULAR NEURONAL EXCITABILITY |
| 80 | Kaustav Mukherjee Wastewater Surveillance: Use of Digital Polymerase Chain Reaction to detect Sars-CoV 2 in Wastewater. |
| 81 | Preeya Modi The Intersection Of Alcohol, Glia And Behavior: Can Astrocytes Influence Anxiety-Like And Reward-Motivated Behavior Following Adolescent Ethanol Exposure? |
| 82 | Hunter Mitchell Preparation and physical properties of dyes based on 2H,10H-anthra[1,9,8-c,d,e,f]-2,7-naphthyridine-1,6,11-trione |
| 83 | Cora Miracle Obese Adipose Derived secretome drives Triple Negative Breast Cancer via stimulation of the mTOR pathway |
| 84 | Esther Mensah Influence of Western Diet on Peripheral Blood Cells in Myelodysplastic Syndromes-susceptible Mice. |
| 85 | Yogesh Meka In-vitro Pharmacodynamic Interactions of Vancomycin and Disulfiram (Antabuse®) in Staphylococcus aureus |

| | |
|----|---|
| 86 | Erin Mcgrady ELISA Analysis of Cytokine Expression in Intracerebral Hemorrhage |
| 87 | Zachary McConnell Discovery of genetic mechanisms driving stress-induced potentiation of novelty and anxiety phenotypes using genetically diverse mice |
| 88 | Olivia Lim Development of Vancomycin HPLC Methodology for Analysis of Microliter Plasma samples Using HPLC |
| 89 | Michael Leonardo Effects of isolation housing stress on the striatal transcriptome in male and female C57BL/6J and DBA/2J mice |
| 90 | Karlie LaFauci Methamphetamines and the Radiation Effects on the Heart |
| 91 | Lahari Kondeti Unique bone marrow cytokine signatures are produced following Bordetella pertussis whole cell or acellular vaccination in mice |
| 92 | Vinitha Joseph Antinociceptive Effects of Chemokine Receptor Antagonist on Formalin-Induced Pain |
| 93 | Christopher Grahe Effects of Prenatal Opioid Exposure on Cerebellum White Matter Development. |
| 94 | Saaman Ghodsi Chemical flavorants contribute to reinforcement-related behavior and directly alter midbrain dopamine neurons |
| 95 | Ashley Dague IDENTIFICATION AND ANALYSIS OF ANTIMICROBIAL COMPOUNDS FROM A MODEL MOSS CERATODON PURPUREUS |
| 96 | Samuel Crow HSP90 Inhibition reduces Phenotypic Plasticity in H1437 Lung Cancer Cells |
| 97 | Jessica Crislip Can primitive neurology translate into advanced insight? An investigation into the potential of using tardigrades as the next model organism. |
| 98 | Alex Ashley PLASMA BIOLOGICAL/METABOLOMICS LIVER-MARKERS CORRELATION WITH LIVER FIBROSIS PROGRESSION AND PRIMARY MALIGNANCY DEVELOPMENT IN NASH. |
| 99 | Jakob Adkins Identification of HIRA and ATRX as Novel Genes Controlling Telomere Length |

| | |
|-----|---|
| 100 | Kayla DeSchepper The Neuropeptide ProSAAS and its Involvement with Low and High Fat Diet, Body Weight, and Glucose Levels |
| 101 | Sarah Evans The Use of a Cannabinoid-based Drug on Acute Lung Injury and COPD |
| 102 | Caleb Spainhower Assessing Medical Student Knowledge and Satisfaction for Residency Specialty and Subspecialty Exposure Before and After Intervention |
| 103 | Osa Benjy Barriers to Orthopedic Care in Rural Areas of West Virginia |
| 104 | Charles Byrum VALUE ASSESSMENT OF SERVICE LINE APPENDECTOMY AT A TERTIATRY HEALTH NETWORK SYSTEM OVER A DECADE WITH PRELIMINARY RESULTS OF A RCT FOR PERFORATED APPENDICITIS. |
| 105 | Warda Farifi Usefulness of TSH screening after acute ischemic stroke |
| 106 | Hannah Hudson Nutritional Literacy and Application in Rural West Virginia Parents and Children |
| 107 | Rachel Maddox Improving Medical Student Understanding of Journal Articles using the PICO Method |
| 108 | Aryana Misaghi Can a smartphone application improve change management, medical education, attending satisfaction, and patient outcomes? |
| 109 | Yuki Nakao Perforated jejunal diverticulitis, important differential of acute abdomen in elderly patients |
| 110 | Cherishma Nagisetty Demographic Analysis of the Maternal Addiction & Recovery Center (MARC) Program |
| 111 | Jenna Zuzolo Quality of Life and Burnout in Future Physicians |
| 112 | Tori Miller Discontinuation of Routine Postpartum Complete Blood Count in Uncomplicated Vaginal Deliveries |
| 113 | Jacob Loggins Sex-specific differences in epicardial fat secretome from patients with and without coronary artery disease |
| 114 | Jared Reed Disseminated infection with Mycobacterium bovis following BCG therapy |

| | |
|-----|---|
| 115 | Khurram Anwar Hiding in Plain Sight; Advanced, HER-2 Positive Gastro Esophageal Junction Adenocarcinoma presenting with the Sign of Leser-Trelat- A Case Report |
| 116 | Dustin Darnell Ultrasound Measured Differences in Medial Knee Joint Space Width during the Valgus Stress Test and The Anterior Medial Rotation Test. |
| 117 | Ryan Churma Altered Enteroendocrine Cell Function in Obesity and Potential Therapeutic Role of Gut Microbial Metabolites |
| 118 | Caroline Putnam During simulated infection, loss of Irgm1 contributes to kidney disease phenotypes in mice. |
| 119 | Andrea Lauffer A Case of Bilious Worm Emesis in a Pediatric Patient Secondary Intestinal Helminthic Infection |
| 121 | Abraham Titus Iatrogenic Reversible Hypofibrinogenemia in the Setting of Using a Direct Thrombin Inhibitor for Treatment for Recurrent Deep Vein Thrombosis |

Oral Presentation Abstracts

Oral # 1

Abstract # 106

Name: Ashley Cox

Level: Doctoral student

Type: Basic

IRB/IACUC #: NA

Cinnamaldehyde Induces Cellular Stress Responses in Human Proximal Tubule Epithelial Cells

Use of flavorings in e-liquids have become widespread among people who use vaping devices, yet their use is not highly regulated. Cinnamaldehyde (CIN) is a reactive alpha, beta-unsaturated aldehyde that is one of the most commonly used flavorings in vaping e-liquids. The kidney is essential for excretion of many agents. Previously we have shown that 24h exposure to CIN in human non-cancerous renal proximal tubular cells (HK-2) induces the autophagic marker LC3B-II and also significantly decreases maximal respiration and spare capacity. We hypothesize that CIN exposure in HK-2 cells can trigger stress responses that are cytotoxic to the cell.

All studies were conducted using human non-cancerous renal proximal tubular cells (HK-2). HK-2 cells were plated, equilibrated for 48h, and treated with 0 (DMSO) or 5-100 uM cinnamaldehyde for 24 or 48h. Viability was assessed using MTT leakage and trypan blue exclusion using a Cell Countess. Western blot analysis probed for cellular stress and autophagy markers (4-hydroxynonenal [4-HNE], LC3B-I, LC3B-II, CHOP, apoptosis cocktail, and OXPHOS cocktail). Results were obtained from at least 4 independent experiments using different cell passages. Statistical differences between groups were analyzed using One Way ANOVA followed by post hoc Tukey test at a 95% confidence interval.

CIN was cytotoxic relative to control at 25-100 uM based on MTT assay ($p < 0.05$) for both 24 and 48h exposures ($p < 0.05$). Countess trypan blue exclusion assay showed no significant difference in cell membrane integrity at all concentrations and times when compared to control. Presence of 4-HNE was not significant following 24 or 48h exposure. The ratio of LC3B-II to LC3B-I, a marker of autophagy, was significantly increased at 24h ($p < 0.05$). This ratio was not significantly increased at 48h, but an increasing trend was observed. The endoplasmic reticulum (ER) stress marker CHOP was not significantly induced at 24h, but was induced at 48h at lower (0-75 uM) CIN concentrations. However, this CHOP expression was significantly decreased ($p < 0.05$) at 100 uM at 48h. Apoptosis probing showed cleaved caspase-3 was significantly expressed ($p < 0.05$) at 100 uM at 24h. Mitochondrial respiration complex probing showed that complex V (ATP synthase) was significantly decreased ($p < 0.05$) at 100 uM at 24h.

Cinnamaldehyde was cytotoxic to HK-2 cells, induced mitochondrial dysfunction, and may be activating the autophagic pathway. Significant expression of cleaved caspase-3 indicates activation of the apoptotic pathway. Significant decrease in expression of mitochondrial respiration complex V (ATP synthase) supports our previous findings that CIN exposure significantly decreases maximal respiration and spare capacity in HK-2 cells. CHOP expression is induced at 48h at lower (0-75 uM) concentrations, but decreases significantly at 100 uM CIN, indicating possible loss of function for this mechanism of action at higher concentrations at 48h exposure. Additional studies are needed to explore the cytotoxicity mechanisms.

Oral # 2

Abstract # 18

Name: Samuel Tetteh-Quarshie

Level: Doctoral student

Type: Basic

IRB/IACUC #: 664

A HIGH-FAT DIET HAS SEX-SPECIFIC EFFECTS ON NICOTINE VAPOR SELF-ADMINISTRATION IN MICE

Studies investigating the relationship between diets and drug use have shown that individuals that consume high-fat diets are likely to be dependent on other substances such as nicotine. However, the exact neurochemical mechanisms that modulate this effect have not been clearly elucidated. Therefore, our objective was to investigate if high-fat diet (HFD) impacts nicotine intake and in parallel examine potential changes in dopamine signaling in mice.

Adult male and female C57/BL6J mice were used in nicotine e-vape® self-administration (EVSA) assays after being maintained on a standard diet (SD) or HFD for 6 weeks. Weight and amount of food consumed by mice were recorded weekly. After the EVSA schedule, dopamine release in the nucleus accumbens core (NAc) was examined with fast-scan cyclic voltammetry.

Compared to SD-fed mice, female mice assigned to HFD exhibited increased nicotine EVSA during low-effort responding (FR1). Conversely, both male and female HFD-fed mice exhibited reduced motivation-related behavior in a progressive ratio task. Overall, HFD-fed mice exhibited reduced phasic dopamine release compared to standard-diet mice.

The results gathered from our experiment suggest that the HFD-induced nicotine intake may be due to a decrease in NAc dopamine release. Furthermore, these data which support previous findings that fat-rich diets may enhance nicotine intake is clinically relevant to understanding the etiology of HFD-induced obesity and nicotine addiction.

Oral # 3

Abstract # 123

Name: Vivian Naa Amua Wellington

Level: PhD Student

Type: Basic

IRB / IACUC# 756

High fat diet induced obese adipose derived secretome stimulates villus Na-glutamine co-transport

Background: Obesity remains a global health issue and may be caused by a confluence of genetic and diet induced factors. The adipose tissue secretes a range of adipocytokine hormones and growth factors while also ensuring the storage of excess nutrients. The amino acid glutamine is essential in human energy metabolism and is the preferred metabolic fuel of enterocytes. Glutamine is transported across the brush border membrane (BBM) of villus cells via the Na-glutamine co-transporter (B0AT1/SLC6A19). In Zucker rats, a genetic model of obesity, glutamine uptake via B0AT1 is stimulated secondary to an increase in the number of co-transporters in the BBM. However, the effect of diet-induced obesity on B0AT1 remains unknown.

Hypothesis: Diet-induced obesity uniquely regulates B0AT1.

Methods: For in vivo studies, Sprague Dawley (SD) rats were fed either high fat diet (HFD) (Test Diet 58Y) or chow diet (CD) for 6 weeks, representing the obese/HFD and control/CD group respectively. Visceral fat from each group was collected and used to prepare adipose derived secretome (ADS). Brush border membrane vesicles (BBMV) were generated by calcium precipitation and differential centrifugation using intestinal villus cells isolated by calcium chelation. Rat intestinal epithelial cells (IEC-18 cells) that were four days post-confluent were treated with ADS media and used for in vitro studies. B0AT1 activity was assessed by Na-dependent 3H glutamine uptake while Na-K-ATPase activity was assessed by inorganic phosphate release. Western blot analysis was used to determine changes in B0AT1 expression.

Results: B0AT1 mediated glutamine uptake was stimulated in whole villus cells from HFD rats. However, the activity of Na-K-ATPase which provides favorable concentration gradient for Na-glutamine transport was significantly diminished in villus cells from HFD rats. Glutamine uptake was significantly increased in HFD villus cell BBMV. In vitro, treatment with ADS from HFD, but not CD, stimulated B0AT1 mediated glutamine uptake. Furthermore, HFD-ADS treatment decreased Na/K-ATPase activity in IEC-18 cells. Western blot analysis of villus cell BBM from HFD and CD-ADS treated IEC-18 cells showed a significant increase B0AT1 expression.

Conclusion: In both in-vitro and in-vivo models of high fat-induced obesity, ADS appears to mediate B0AT1 stimulation secondary to an increase in the number of co-transporters.

Oral # 4

Abstract # 74

Name: Meredith Kesler

Level: Doctoral Student Pharmacy

Type: Basic

IRB / IACUC # 726

Western Diet Influences Megakaryopoiesis in a Mouse Model of Myelodysplastic Syndromes (MDS).

Del(5q) myelodysplastic syndromes (MDS) refer to hematologic malignancies associated with loss of expression of immune regulation genes on human chromosome 5q. Combined loss of TIFAB and miR-146a in mice recapitulates del(5q) MDS disease phenotypes in our double knock out (DKO) mouse model. MDS may progress to acute myeloid leukemia (AML) or bone marrow failure. In recent years, obesity has been found to be associated with MDS and AML. We hypothesized that Western diet accelerates initiation and progression of MDS phenotypes in a Tifab^{-/-};miR-146a^{-/-} DKO mice by inducing a unique bone marrow cytokine signature.

To test our hypothesis, we subjected DKO mice to a low fat control diet or a high fat Western diet for 15 weeks post-weaning. Mice were monitored for MDS-like phenotypes present in the blood, bone marrow, and spleen. We collected the media used for bone marrow extraction and performed cytokine analyses using RayBio® C-Series Mouse Cytokine Antibody Arrays (C2000).

We observed that DKO mice placed on the Western diet exhibited sex-specific changes in weight, blood and bone marrow phenotyping, spleen size, and bone marrow cytokine signatures when compare to DKO mice on a low fat control diet. Alterations in the parameters evaluated suggest dysmegakaryopoiesis, which is known to occur in del(5q) MDS patients.

Alterations in the parameters evaluated suggest dysmegakaryopoiesis, which is known to occur in del(5q) MDS patients. Collectively, our data suggest that Western diet alters cytokine signatures within the bone marrow, particularly altering cell lineage fate decisions that dysregulate megakaryopoiesis. These findings underscore the importance of diet in onset and progression of MDS/AML in individuals with increased susceptibility to these diseases. Future work to define potential drug targets to ease disease initiation and progression in obese populations will inform novel therapeutics.

Oral # 5
Abstract # 112
Name: Vijaya Sundaram
Level: MD/PhD Student
Type: Basic
IRB / IACUC# 756

Stimulation of Na-Glucose Co-Transport (Sglt1) Mediated by High Fat Diet-Induced Obese Adipose Derived Secretome in Intestinal Epithelial Cells

Background: Compared to individuals of normal weight, obese people are over 6 times more likely to develop Type-2 Diabetes Mellitus, which results from altered glucose homeostasis. The most important step in maintaining glucose homeostasis is the intestinal absorption of glucose through the Na-glucose co-transporter (SGLT1) at the brush border membrane (BBM) of villus cells. SGLT1 was stimulated in both genetic (Zucker) and high fat diet (HFD) induced obese rat intestine secondary to an increase in the affinity of SGLT1 for glucose without change in number of co-transporters at the BBM. It has been previously shown that adipose derived secretome (ADS) influences many physiological processes, however, it is not known whether ADS from HFD (HFD-ADS) may regulate SGLT1 at villus cells.

Hypothesis: SGLT1 stimulation in intestinal epithelial cells is mediated by HFD-ADS.

Aim: Determine the mechanism of regulation of SGLT1 by HFD-ADS during obesity.

Methods: Visceral fat from both HFD and control (CD) normal chow fed rats were obtained and used to prepare ADS media. Rat small intestinal epithelial cells (IEC-18 cells) grown to confluence in 24 well-plates were treated with ADS on day 4. To determine SGLT1 activity, Na-dependent 3H-O-methyl glucose uptakes were performed. Na-K-ATPase activity was measured as Pi released. Western blots for SGLT1 were performed using rat specific antibodies. Immunoprecipitation studies were performed to determine phosphorylation levels of SGLT1.

Results: SGLT1 in IEC-18 cells treated with ADS from HFD, but not CD, was significantly stimulated. In HFD-ADS treated IEC-18 cells, Na/K-ATPase activity was decreased compared to CD-ADS. Kinetic studies indicated the mechanism of stimulation of SGLT1 by HFD-ADS is secondary to an increase in the affinity (1/Km) of the co-transporter for glucose without change in the number of co-transporters. In Western Blot analysis, the protein expression of SGLT1 was unaltered between HFD-ADS and CD-ADS. However, SGLT1 phosphorylation was stimulated in HFD-ADS treated IEC-18 cells.

Conclusions: SGLT1 was stimulated by ADS from HFD obese adipocytes in IEC-18 cells secondary to an increase in the affinity of SGLT1 for glucose likely via altered phosphorylation of the co-transporter. The mechanism of stimulation of SGLT1 is identical to that seen in vivo in both genetic and HFD induced rat models of obesity. Therefore, it is likely the stimulation of intestinal villus cell SGLT1 at the BBM during obesity is mediated by ADS from obese adipocytes.

Oral # 6
Abstract # 58
Name: Xiaoling Wang
Level: Resident
Type: Clinical
IRB# Exempt (national database)

Assessment of Mortality among Patients having Colorectal Cancer and Atrial Fibrillation

Atrial Fibrillation (AFib) is the most common persistent cardiac arrhythmia, occurring in about 1% of the general population and Colorectal cancer (CRC) is the fourth most diagnosed cancer in the world. Although, there is well-established literature assessing the relationship of patients with cancer and AFib, very few studies have depicted the relationship between CRC and AFib. Our study aims to assess the effect of AFib on the mortality among CRC patients.

In this retrospective analysis, National Inpatient Sample (NIS) data from 10/2015 to 12/2017 was used which include 245,305 patients in this study. Demographic characteristics and clinical outcomes were compared among patients diagnosed with CRC with and without AFib. Bivariate analyses were performed using the chi-squared test or Fisher exact test (2-tailed) for categorical variables as appropriate, to assess the differences in the two groups.

Patients who had CRC and AFib had 1.71 (95% CI: 1.45-2.02) higher odds of mortality compared with those without AFib. After propensity score matching was done on demographics and clinical factors, there was still 1.44 (95%CI: 1.18-1.75) times higher probability of mortality in AFib patient. Additionally, CRC with AFib had significantly prolonged hospitalization and cost. Secondary outcome analysis showed that AFib associate with high odds of sepsis (OR: 1.45, 95%CI: 1.30-1.62), AKI (OR: 1.45, 95%CI: 1.30-1.62), lower GI bleeding (OR: 1.31, 95%CI: 1.21-1.43)) and respiratory failure (OR: 1.39, 95%CI: 1.15-1.67)) after the propensity match. Interestingly, females had 25% lower odds of predictive mortality compared with males who were diagnosed with colorectal cancer and AFib (95%CI: 0.58-0.97) In addition, subjects who had CCI of 2 had 65% lower odds of mortality (95%CI: 0.22-0.55) comparing with CCS of 3 or more.

Several studies have demonstrated that AFib is more common among CRC patient. With growing cancer burden and the high incident of AFib, it becomes important to study the effect of AFib on CRC mortality. As we found here, that AFib associate with 1.4 time higher odds of mortality in CRC patients after propensity match. Interestingly, higher odds of other complications such as sepsis, AKI, Respiratory failure and GI bleeding was also found in CRC patients with AFib, which could be the cause of higher mortality rate in AFib patient. Therefore, AFib could become a good indicator for the mortality in CRC patient.

Oral # 7
Abstract # 100
Name: Daniel Miller
Level: Medical Student
Type: Clinical
IRB# 1824496

Attention Deficit Hyperactivity Disorder (ADHD) and Co-existing Anxiety in the COVID-19 Era: A Comparison Study

There has been an increase in the prevalence of mental health issues in the pediatric population since the start of the COVID-19 pandemic and patients with ADHD are already at a higher risk of developing a comorbid anxiety disorder. This study looks at two different populations of ADHD patients. One group is patients whose parents completed a standard of care diagnostic Screen for Child Anxiety Related Disorders (SCARED) questionnaire prior to the pandemic and the second group would be patients whose parents completed the SCARED questionnaire after the start of the pandemic. The purpose of this is to document any changes in the rates of generalized anxiety and subtypes in ADHD pediatric patients before the start of the pandemic and after and then complete a chart review to see if treatment of these conditions has changed pre- and post-pandemic.

SCARED Questionnaires completed by parents of the patients from March 2018 to September 2019 were taken and the number of positive and negative results for each anxiety subtype were compared to ones completed between March 2020 and September 2021. The charts of these patients were then reviewed to determine response to stimulant treatment, addition of cognitive behavior therapy (CBT), and initiation of adjunctive psychopharmacological agents.

The COVID group 2 (n=21) when compared to the Pre-COVID group 1 (n=34) demonstrated an increased percentage of total, separation, and generalized anxiety and panic disorder, no change in the percentage of social anxiety, and a decreased percentage of school avoidance (Table 1). Although both groups revealed a favorable response to stimulant medication, the COVID group were more likely to receive both SSRI and CBT treatment (Table 2).

Given our results, anxiety should be screened for in all ADHD pediatric patients and monitored through the course of therapy because of the now apparent chronic nature of the COVID-19 pandemic. This continual monitoring will help to guide treatment options with SSRIs and CBT in the treatment of any comorbid anxiety disorder diagnosed in this patient population.

Oral # 8
Abstract # 43
Name: Danielle Roth
Level: Medical Student
Type: Basic
IRB / IACUC# 1776379

A virtual sex education tool improved reproductive health knowledge among adolescent girls

As adolescents turn to online resources for health information, OBGYNs can play an active role in creating evidence based resources for sex education. Marshall Teen Talk is an online comprehensive sex education curriculum developed by an OBGYN and medical students. The purpose of this study was to assess the effect of this tool on teens' reproductive health knowledge and self-efficacy.

This is a prospective study among females ages 14-18. Informed consent and parental consent was obtained. Subjects completed a pre-test survey containing a 20 question validated Reproductive Health Knowledge Index (RHKI) and six self-efficacy questions. They then completed the website curriculum ([www. Marshallteentalk.org](http://www.Marshallteentalk.org)), followed by a post-test survey containing the RHKI and same self-efficacy questions.

Thirty-three females completed the study with an average age of 16.42 (SD 1.09). Ten (30.3%) reported never having sex education in school. Overall mean RHKI score improved from the pre-test to the post-test. (87.67 SD 6.35 vs 90.82 SD 7.45, $p=0.012$) Change in knowledge score ranged from -16.25 to +19.17 with a mean increase of +3.14 (SD 6.77). Two subjects (6%) had no change in score, 23 subjects (70%) had an increase in score and 8(24%) had a decrease. A greater proportion of subjects reported improved confidence in obtaining birth control, recognizing an unhealthy relationship, and getting tested for STDs. 31 (93.9%) reported that they would recommend the website to a friend.

An online comprehensive sex education curriculum improved reproductive health knowledge and reports of self-efficacy among adolescent females.

Oral # 9

Abstract # 35

Name: Justin West

Level: Medical Student

Type: Clinical

IRB# IRB exempt

Trends in COVID-19 Testing in Rural Pediatric Populations at a Regional Testing Center

During the COVID-19 pandemic, pediatric populations obtained testing as a safety precaution for required school activities, extracurricular/recreational involvements, and other pursuits that provided risk for exposure. These risks are largely defined by similarities and differences in daily schedule, of which education is the most widespread. Mitigating these risks is the introduction of vaccinations. Trends in COVID-19 testing in a pediatric population after the approval of the COVID-19 vaccine in age-grouped cohorts of children under 18 has yet to be studied. We predict that testing rates in a pediatric population differ based upon factors such as schooling, vaccination availability and overall county testing rates.

A retrospective analysis of pediatric specific data from a regional COVID-19 screening center from March 2020 through April 2022 was conducted for age and temporal correlation patterns. Subjects were grouped by male and female gender and grade level. Calculations were conducted with a simple t-table test and a $p < 0.05$ was utilized for statistical significance.

Of the 13,447 pediatric patients screened, 6,783 (50.44%) were female which was consistent with the population of the county ($p = 0.9970$). The percentage of preschool (PS) females (45.67%) differed from elementary school (ES) (50.97%; $p = 0.00002$), middle school (MS) (49.13%; $p = 0.0137$) and high school (HS) (53.86%; $p < 0.0001$). HS also differed from ES ($p = 0.008$) and MS ($p = 0.0002$) in ages. No gender difference was seen between ES and MS ($p = 0.144$). PS had lower rates of testing during peaks in testing ($p = 0.00002$), while HS was tested more ($p = 0.00014$). All groups were similar during non-peak times.

The average number of tests per week for each group were divided by the number of years in each group to create comparable numbers (tests/week/year = TWY). The TWY for PS ages were the only group to decrease numbers tested following adult vaccinations (4.33 vs 3.22 TWY). All four groups increased their testing following pediatric vaccine availability before decreasing again after vaccination was available to children aged 5+.

Gender and testing frequency differences were seen between groups divided along educational lines demonstrating the appropriateness in dividing the groups this way. All four groups trended in similar directions in relation to vaccination availability, except for a decrease in PS testing after adult vaccine availability. This could represent the protective effect of the vaccination on grandparent caregivers of this out-of-school population.

Oral # 10
Abstract # 82
Name: Shoshi Chowdhury
Level: Medical Student
Type: Clinical
IRB# 1915845-3

Clinical Outcomes in a Veteran Cohort with Moderate Acute COVID-19 Infection Treated with Monoclonal Antibodies or Antivirals

During the early phase of the COVID-19 pandemic, numerous treatments were tested in small, non-randomized and randomized clinical trials demonstrating variable results on the combined clinical endpoint of mortality and need for hospitalization. We evaluated COVID-19 treatments in a Veteran population with moderate COVID-19 infection.

The purpose of our research project is to describe characteristics and evaluate clinical outcomes in patients with COVID-19 infection based on whether they did or did not receive therapy with monoclonal antibodies or antiviral medication.

We reviewed medical records for 69 Veterans presenting for evaluation and management of acute COVID-19 infection. We collected demographic information, co-morbid conditions, COVID vaccine information, vital signs, pulse oximetry, laboratory data, and type of COVID treatment received. We also reviewed the record for the clinical outcomes of mortality and hospitalization, as well as evidence for 'long COVID' symptoms. We used simple statistics to describe the study population. We used chi square to compare categorical variables and the Student's t-test to compare continuous variables between those who did and did not receive COVID-19 treatment.

Among the 69 Veterans reviewed to date, mean age was 61.2 years (sd 13.5) and 92.8 (N=64) percent were men. There were 50 patients (72.5%) that received COVID-19 treatment, and all were treated with casirivimab/imdevimab. Those receiving COVID-19 treatment were more likely to have diabetes (81.8% treatment vs. 56% no treatment; $p=0.02$) and hypertension (82.0% treatment vs. 47.4% no treatment; $p=0.004$), and less likely to have anxiety or depression (55.2% treatment vs. 85.0% no treatment; $p=0.006$). The combined clinical endpoint of death or hospitalization was no different between those who received or did not receive treatment (10.0% treatment vs. 10.5% no treatment; $p=1.0$). There was a trend towards lower death or hospitalization in those who received at least one COVID-19 vaccine (8.7% vs. 13.0%), although this was not significant ($p=0.68$)

We found that Veterans who received COVID-19 treatment were more likely to have hypertension and diabetes but less likely to have anxiety or depression. Perhaps these conditions were factors in either the patient or provider's decision-making regarding treatment. The combined endpoint of death and hospitalization was no different in those who received COVID-19 treatment, but there was a trend towards lower death and hospitalization in those who received at least one COVID-19 vaccine. Further examination of the patient cohort (N>800 charts remaining for review) will strengthen our study.

Oral # 11
Abstract # 92
Name: Maafi Islam
Level: PhD Student
Type: Basic
IRB / IACUC# 743

Chronic Intestinal Inflammation Downregulates Apical Na-Bile Acid Co-Transporter (ASBT) in SAMP1 Mouse Model of Inflammatory Bowel Disease

Bile acids (BA) are essential for intestinal digestion and absorption of dietary fats and fat-soluble vitamins. BA are absorbed in the brush border membrane of terminal ileal villus cells by the apical sodium-bile acid co-transporter (ASBT/SLC10A2). Malabsorption of BA may lead to fat and vitamin malabsorption leading to malnutrition weight loss and vitamin deficiencies, significant morbidities of inflammatory bowel disease (IBD, e.g., Crohn's disease). Moreover, malabsorption of BA leads to increased colonic fluid secretion and permeability resulting in diarrhea, the most common and disabling complications of IBD. Therefore, it is crucial to understand how ASBT mediated BA malabsorption (BAM) is regulated in IBD, to formulate efficient treatment strategies. Hypothesis: BAM in chronic ileitis is mediated secondary to the inhibition of ASBT.

SAMP1/YitFc mice (10wks), a spontaneous model of chronic ileitis were used with AKR as controls. Ileal villus cells were isolated by the Ca ++ chelation technique. Brush border membrane (BBM) vesicles were performed by Mg++ precipitation and differential centrifugation. Na-dependent 3H-taurocholate uptake was conducted to determine ASBT activity. qRT-PCR and Western blotting studies were also performed to determine ASBT mRNA and protein expression.

BA uptake was significantly reduced in intact villus cells from SAMP1 mice compared to AKR (SAMP1: 2908+ 82.7 nmol/mg protein•2min; AKR:7525+192.8; p<0.05, n=4). Na-K-ATPase which provides the favorable Na gradient for optimal functioning of ASBT in the BBM was also downregulated in SAMP1 mice (data not shown). BA uptake was also significantly reduced in BBM vesicles (SAMP1: 7388+ 692.3 nmol/mg protein•1min; AKR: 17873+ 610.9; p<0.05, n=3). Kinetic studies demonstrated that the mechanism of inhibition of ASBT in inflamed ileum was due to a decrease in the maximum rate of transport (Vmax: SAMP1: 5124+ 67.61 nmol/mg protein•15sec and AKR 14020+ 564.3; p<0.05, n=4) as well as affinity (1/Km: SAMP1: 126.6+ 2.3uM and AKR: 79.07+ 6.4; p<0.05, n=4). Further, ASBT expression was found to be significantly reduced at the level of mRNA and protein in SAMP1 compared to AKR (p<0.05; n=6).

ASBT is inhibited in chronic ileitis secondary to a decrease in both the co-transporter numbers as well as the affinity of the co-transporter for bile acids. Further studies will be performed to determine the molecular regulation of ASBT in chronic intestinal inflammation.

Oral # 12
Abstract # 27
Name: Raji Lukmon
Level: Masters Student Pharmacy
Type: Basic
IRB / IACUC# NA cell lines

Activation of antioxidant pathway by curcumin analog FLLL12 in head and neck cancer: implication for chemoprevention

Carcinogenesis is initiated with nonrepairable genetic mutation(s) due to exposure to carcinogen or endogenously derived oxidative stress. Mitigation of oxidative stress via activation of antioxidant pathway showed promise in preclinical chemoprevention studies. Previously, we have reported that FLLL12, a potent synthetic analog of natural compound curcumin, induces apoptosis of head and neck (HNC) and lung cancer cell lines by modulating AKT-dependent protein translational pathways and DR5 pathways, respectively. Hypothesis: FLLL12 activates antioxidant pathway to mitigate oxidative stress and be useful for chemoprevention.

Whole transcriptome analysis followed by ingenuity pathway analysis was conducted to identify novel pathways affected by FLLL12. qPCR and western blotting were conducted to study mRNA and protein expression, respectively.

Ingenuity pathway analysis (IPA) of 2-fold modulated genes have identified activation of NRF pathway as one of the most significantly affected pathways along with the upregulation of genes such as HMOX-1, NQO1 and SLC7A11 which are known for mitigating oxidative stress. To confirm dose-dependent expression of HMOX-1, NQO1 and SLC7A11 mRNA and protein in normal (HOK), premalignant (MSK-LEUK1) and malignant (MDA686TU and JHU022) cell lines, total RNA was isolated after treatment with various doses of FLLL12 for 24h. qPCR analysis confirmed that the expression of HMOX-1, NQO1 and SLC7A11 mRNA were strongly and significantly upregulated by FLLL12 in all cell lines. Furthermore, total cell lysates were extracted from the cell lines and expression of HMOX-1, NQO1 and SLC7A11 proteins were examined by western blotting. We found that FLLL12 also upregulated the expression of HMOX-1, NQO1 and SLC7A11 proteins.

Our data confirmed that FLLL12 induced the expression of HMOX-1, NQO1 and SLC7A11. Future experiments will be conducted to identify transcription factor that induces the expression of these genes as well as their role in diminution of oxidative stress.

Oral # 13
Abstract # 22
Name: Jacy Baxter
Level: Medical Student
Type: Basic
IRB / IACUC# NA deidentified

Obese adipose derived secretome increases phospho-S6 expression in Triple Negative Breast Cancer via mTOR signaling pathway

Obesity has become a frequent comorbidity in the United States, especially in rural and impoverished areas. Obesity is arbitrarily defined as a body mass index (BMI) above 30 kg/m² but is medically considered a constant inflammatory state due to increased pro-inflammatory signals secreted by the adipose tissue. Obese women have a higher probability of developing triple negative breast cancer (TNBC) compared to non-obese women [1]. TNBC cells are distinguished by the absence of estrogen receptor, progesterone receptor, and HER2 expression [2]. A solid link between the underlying mechanisms of obesity and the aggression of TNBC remains understudied [2]. Previous studies have concluded that obese patients have larger, higher stage, and higher grade TNBC tumors compared to those found in non-obese patients [4]. We aim to investigate the mechanisms behind this association utilizing obese adipose derived secretome (OADS), which has been used previously to target the mechanistic Target of Rapamycin (mTOR) signaling pathway in estrogen receptor positive breast cancer [5]. mTOR complex 1 is associated with cell metabolism and growth, implicating its importance in cancer pathogenesis [3]. We hypothesize that TNBC cells treated with OADS will express more phospho-S6 via downstream effects of mTOR complex 1.

Breast adipose tissue was collected from de-identified peritumor breast samples at Edwards Comprehensive Cancer Center. BMI > 30 kg/m² were obese and BMI < 30 kg/m² were lean. Adipose tissue was cultured in Dulbecco's Modified Eagle Medium (DMEM) for 24 hours. After 24 hours, secretions were collected. MDA-MB-231 and MDA-MB-436 were plated in DMEM with 10% fetal bovine serum. Cells were treated with either LADS or OADS at 10%. Cells were lysed using RIPA buffer along with protease and phosphatase inhibitors, then succumbed to western blot analysis. Primary antibodies for β -actin (mouse, 1:2000), CD-44 (mouse, 1:2000), MMP-9 (rabbit, 1:1000), MMP-2 (rabbit, 1:2000), total- and phospho-S6 (rabbit, 1:2000), and total- and phospho-NDRG1 (rabbit, 1:2000) were applied. Chemiluminescence and colorimetric imaging techniques were performed.

MDA-MB-231 and MDA-MB-436 cells treated with obese adipose derived secretome demonstrated increased mTOR signaling via the readout phospho-S6 compared to those treated with lean adipose derived secretome (p-value < 0.05).

Obese adipose derived secretome induces signaling of mTOR complex 1 in triple negative breast cancer at a higher level compared to lean adipose derived secretome.

Oral # 14
Abstract # 107
Name: Shanmuga Sundaram
Level: MD/PhD Student
Type: Basic
IRB / IACUC# 756

Intestinal Na-Bile Acid Co-Transport (Asbt) Is Uniquely Regulated Along the Crypt-Villus Axis and Caudal-Oral Length of the Small Intestine in Obesity

Background: Dyslipidemia, which is the imbalance of lipids, is an important sequela of obesity. Given that bile acids (BA) are essential for the absorption of dietary lipids in the intestine, it stands to reason that the increased absorption of lipids in obesity is a result of increased BA pools in the intestine. In turn, the intestinal absorption of BA is essential for the proper regulation of the BA pool in the intestine. However, the exact mechanism by which BA absorption in the intestine is altered in obesity remains unknown.

Under normal conditions, the terminal ileum is the exclusive site of BA absorption. This absorption of BA is facilitated by the Apical Sodium Dependent Bile Acid Transporter (ASBT) which is in the brush border membrane (BBM) of villus cells. However, it is not found in the crypt cells.

Previously, we have shown that in a rat model of obesity (Zucker Rats), increased BA absorption was secondary to the increased villus cell BBM expression of ASBT and increased levels of BA handling proteins to increase transepithelial transport of BA. Looking beyond the cellular level, BA pools may be altered even more if the net expression of ASBT along the crypt-villus axis and the caudal oral length of the small intestine are also altered in obesity.

Hypothesis: Crypt-villus axis and caudal-oral expression of ASBT is affected in obese intestines.

Methods: Visceral fat from both HFD and control (CD) normal chow fed rats were obtained and used to prepare ADS media. Rat small intestinal epithelial cells (IEC-18 cells) grown to confluence in 24 well-plates were treated with ADS on day 4. To determine SGLT1 activity, Na-dependent 3H-O-methyl glucose uptakes were performed. Na-K-ATPase activity was measured as Pi released. Western blots for SGLT1 were performed using rat specific antibodies. Immunoprecipitation studies were performed to determine phosphorylation levels of SGLT1.

Results: SGLT1 in IEC-18 cells treated with ADS from HFD, but not CD, was significantly stimulated. In HFD-ADS treated IEC-18 cells, Na/K-ATPase activity was decreased compared to CD-ADS. Kinetic studies indicated the mechanism of stimulation of SGLT1 by HFD-ADS is secondary to an increase in the affinity (1/Km) of the co-transporter for glucose without change in the number of co-transporters. In Western Blot analysis, the protein expression of SGLT1 was unaltered between HFD-ADS and CD-ADS. However, SGLT1 phosphorylation was stimulated in HFD-ADS treated IEC-18 cells.

Conclusions: SGLT1 was stimulated by ADS from HFD obese adipocytes in IEC-18 cells secondary to an increase in the affinity of SGLT1 for glucose likely via altered phosphorylation of the co-transporter. The mechanism of stimulation of SGLT1 is identical to that seen in vivo in both genetic and HFD induced rat models of obesity. Therefore, it is likely the stimulation of intestinal villus cell SGLT1 at the BBM during obesity is mediated by ADS from obese adipocytes.

Poster Presentation Abstracts

Poster # 1

Abstract # 12

Name: Shane Taylor

Level: Resident

Type: Clinical

IRB / IACUC #: 1455859-2

ACL Reconstruction with Bone Marrow Aspirate Concentrate, Demineralized Bone Matrix, Autograft Bone and Suture Tape Shows Significantly Decreased Tunnel Osteolysis at 6 Months

Tunnel widening is a potentially serious complication following anterior cruciate ligament (ACL) reconstruction that can lead to increased revision rates. It is also a very prevalent problem with the incidence ranging in the literature from 25-100%. The exact etiology of tunnel widening is unknown with multiple mechanisms being proposed both biologic and mechanical. ACL reconstruction adding a combination of bone marrow aspirate concentrate, demineralized bone matrix, autograft bone, and suture tape (The Fertilized ACL) has previously been described in the literature. This combination adds biologics to both the femoral and tibial tunnels. We have hypothesized that adding biologics to the bone tunnels can lead to faster bone healing, decreased tunnel widening, and this could possibly lead to improved outcomes following ACL Reconstruction. We evaluated patients at 6 months with CT scans to evaluate tunnel widening in patients that have undergone The Fertilized ACL vs standard ACL reconstruction.

We enrolled 24 patients who were then subsequently randomized to either The Fertilized ACL or standard ACL reconstruction. Patients then underwent ACL reconstruction based on the group that they have been assigned with either a quadriceps autograft or FGI Graftlink allograft. Patients then had a CT scan at 6 months to evaluate the femoral and tibial tunnels. For the femoral tunnel measurements were taken on the axial and coronal views while for the tibial tunnel measurements were taken from the sagittal and coronal images. The measurements were discussed with a trained radiologist and were blinded to whether the patient had Fertilized or standard ACL reconstruction.

2 patients in the standard ACL reconstruction were lost to follow up at 6 months leaving 10 in the standard ACL reconstruction and 12 in the Fertilized ACL group. For the tibial tunnel the standard ACL reconstruction showed widening on the sagittal and coronal views of 5.62mm +/- 2.50mm, and 3.00mm +/- 2.28mm respectively. In the Fertilized ACL group tibial tunnel widening of 2.24mm +/- 0.76mm and 1.03mm +/- 1.07mm. The difference in tunnel widening was found to be significant with p values of 0.0001 for the sagittal and 0.0075 on the coronal indicating significant decrease in tibial tunnel widening in the Fertilized ACL group. For the femoral tunnel the standard ACL reconstruction showed tunnel widening on the axial and coronal views of 2.57mm +/- 0.90mm and 3.39mm +/- 2.29mm. The Fertilized ACL group showed tunnel widening of 1.08mm +/- 1.36mm and 1.17mm +/- 1.41mm. The decrease in tunnel widening in the Fertilized ACL group was also found to be significant on both the axial and coronal views p values of 0.004 and 0.0056 respectively

The Fertilized ACL which adds bone marrow aspirate concentrate, demineralized bone matrix, autograft bone, and a suture tape to the standard ACL reconstruction show significant decrease in tunnel widening compared to standard ACL reconstruction at 6 months. There are some studies that show that tunnel widening may not appear until 1 to 2 years so longer term follow up is needed to see if the Fertilized ACL will still show less tunnel widening at later follow up. Also, we included patients that both quadriceps autograft or allograft ACL reconstruction. It has been shown in the literature previously that patients with allograft ACL reconstruction have shown more tunnel widening than patients that had autograft for their ACL reconstruction. However, the amount of patients with allograft

were equal between the 2 groups. It is not clear which of the materials added to the femoral or tibial tunnels may be leading to less tunnel widening, but this shows that adding biologics to the ACL reconstruction tunnels can lead to less tunnel widening and possibly decrease revision rates.

Poster # 2

Abstract # 51

Name: Chuchitra Thanigaivasan

Level: Medical Student

Type: Clinical

IRB / IACUC #: 879582

Authors: Chuchitra Thanigaivasan MS, Sarah Thomas PhD, Elizabeth Thompson PhD, Sophia Sodano BS, Micaela Maron BS, Jeffrey Hunt MD, and Jennifer Wolff PhD

Adverse Childhood Experiences moderate the relation between minoritized status and engaging in substance use amongst adolescent psychiatric inpatients

Adverse childhood experiences (ACEs; parental death, bullying) are linked to developing psychiatric disorders and substance use. Individuals with a minoritized status due to race, ethnicity, sexuality, or gender identity often have more ACEs. ACEs are linked to substance use, hypothesized due to coping. The study objective was to test whether the relation between minoritized status and ever using a substance depends on ACEs in a sample of adolescent psychiatric inpatients.

Youth hospitalized at a psychiatric unit in Northeast USA (n=417, 11-18 years, 64% female) completed surveys on substance use and demographic characteristics upon admission from 4/2021 to 5/2022. A total of 299 adolescents (71.7%) endorsed at least 1 minoritized identity (range: 0-8; median 1; racial, ethnic, sexuality, and/or gender identity). The number of ACEs ranged from 0-19 ($x=7.22$, $SD=4.32$). Adolescents indicated if they ever used cannabis, alcohol, or vaped nicotine. Logistic regression moderation analyses tested the association amongst minoritized status, ACEs, and type of substance use, (covariates: age, sex). Significant interactions were probed at 16th, 50th, and 84th percentiles (ACEs: 2, 7, 12).

Sample-wide, 46.5% vaped nicotine; 41.2% used alcohol; 44.4% used cannabis. The number of ACEs significantly moderated the link between minoritized status and substance use. For cannabis, the slope for the effect of minoritized status was significant ($p = .006$) only with low ACEs (2; $b = -0.52$): minoritized youth had lower log-odds of cannabis use with low ACEs. For alcohol, the slope for the effect of minoritized status was significant ($p = .015$) only with high ACEs (12; $b = 0.32$): minoritized youth had greater log-odds of alcohol use with elevated ACEs. For vaping, the slopes for the effect of minoritized status was significant ($p < .01$) only with low ACEs (2; $b = -0.57$) or high ACEs (12; $b = 0.46$): minoritized youth had lower log-odds of vaping with low ACEs and greater log-odds with high ACEs.

The link between minoritized status and the use of different substances varied depending on the number of ACEs experienced. Considering ACEs and an intersectional perspective on life experiences may be beneficial for treatment of minoritized youth inpatients in the context of comorbid psychiatric issues.

Poster # 3

Abstract # 37

Name: Micah MacAskill

Level: Resident

Type: Clinical

IRB / IACUC #: 1709633-2

Authors: Micah MacAskill MD, Jonathan Lash MD, William Fravel MD, Matthew Bullock DO
Marshall Orthopaedics department

The Use and Cost Effectiveness of Next Generation Sequencing in Orthopaedic Infections

Next generation sequencing relies on obtaining tissue and fluid samples and isolating the genetic material from bacteria isolated within a wound or surgical site and comparing it with a genetic database for all bacteria known to cause infection. This method has been shown to drastically improve the bacterial yield from tissue samples. Afterwards antibiotic treatment can be tailored specifically to combat the offending bacteria with greater precision. Metagenomic Next Generation sequencing has been shown to have utility in the diagnosis and treatment of various infections and cancers (Gu et al., 2019; Kwon et al., 2019; Wilson et al., 2019).

Orthopaedic infections carry significant morbidity, mortality, and cost. Five year mortality approaches 25.9% in patients undergoing revision for prosthetic joint infections and the average cost per case for total knee PJI is estimated to be \$28,161 (Schwartz et al., 2020; Zmistowski et al., 2013). For prosthetic joint infections and other musculoskeletal and orthopaedic infections, a rapid, effective, and cheap tool for diagnosis may aid the United States healthcare system promote survival and antibiotic stewardship.

A significant number of orthopaedic infections, including prosthetic joint infections, remain culture negative throughout the duration of treatment. Culture negative prosthetic joint infection is a difficult problem to diagnose and treat effectively, with a wide range of values reported for negative routine cultures with suspected PJI. Tande and Patel 2014 reported an aggregated value of 14% of prosthetic joint infections are culture negative (Tande and Patel, 2014).

Additionally, next generation sequencing has been shown to outperform standard culture methods for polymicrobial samples in basic science studies (Cummings et al., 2016). Results may also be much more rapid than standard culture, especially when evaluating for fungi and other fastidious organisms which may take several weeks to culture using traditional methods. Elucidating all microorganisms involved in a single infection is critical to prevent treatment failure due to undercoverage with antimicrobial choice or utilizing unnecessarily broad-spectrum antimicrobials leading to antimicrobial resistance.

The main goal of this study is to compare results and estimate costs of next generation sequencing to routine cultures for the identification of orthopaedic infections. After diagnosis with presumed infection requiring operation, fifty consecutive patients were enrolled to include routine bacterial culture with additional next generation sequencing testing of soft tissue and fluid samples. Concordance between methods of diagnosis was evaluated and a cost analysis was performed to evaluate the utility of next generation sequencing for orthopaedic infections.

This prospective study compares efficacy and cost effectiveness of using next generation sequencing for identification of microbial infectious cause of orthopaedic infections compared to standard culturing methods. Our study group consisted of 50 patients presenting to Cabell Huntington Hospital/Marshall University Department of Orthopaedics with an orthopaedic infection which required surgical irrigation and debridement for treatment. Each patient offered inclusion in the study was evaluated by a board-certified orthopaedic surgeon, who determined that their case requires surgical treatment of their

infection with irrigation and debridement per well-defined standards of care.

Examples of orthopaedic infections that were treated included but were not limited to native joint infections, periprosthetic joint infections, deep soft tissue infections of the hand and extremities, periosteal abscesses, infected fracture non-unions, and osteomyelitis.

Exclusion criteria included patients <18 years of age. Patients were not excluded based on gender, race, ethnic group, or primary language.

Intraoperatively, antibiotics were held until specimens were obtained. Three to five intraoperative routine bacterial cultures were sent to be evaluated by the hospital lab, and the MicrogenDx OrthoKey PJI kit (Lubbock, TX) was collected in the standard fashion and sent to the reference lab for testing. Culture data and inflammatory markers including erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) and serum white blood cell count (WBC) were recorded. Microorganism results for each patient from each lab were recorded and evaluated for concordance.

A cost analysis is being performed with full methodology to follow.

Overall results are pending due to being with statistician;

1-Microgen cultures + NGS (still not sure exactly what that is) has an equal detection rate to CHH if you include Orthopedic cultures which take 14 days.

2-without orthopedic cultures Microgen + NGS vastly outperforms CHH (synovial fluid cultures and Tissue cultures only)

3-Microgen without NGS is not better than anything at CHH

4-Microgen positivity does not correlate with lower CRP detections than CHH and CRP is not an accurate predictor of positive results on either Microgen or CHH or both in this sample

5-Men and women are infected at the same rate in our sample

Cost analysis is pending with our statistician.

We know that MicroGen can run all the cultures from one sample for a price of about \$350 where a hospital culture is about \$400 per culture and we have to obtain 4-5 cultures per case. Then if we add additional cultures (fungi or acid fast bacilli) these are additional costs to the hospital anywhere between \$200-\$500 per culture. This does not account for cost savings related to earlier diagnosis and transition to narrow spectrum antimicrobials which is what our cost analysis is evaluating.

Conclusions pending final statistical analysis.

Poster # 4
Abstract # 38
Name: Madeleine Marks
Level: Medical Student
Type: Clinical
IRB / IACUC #: 1775576-3
Co-authors: Madeleine Marks, MSII
Trenton Hayes, M.D.
Robert Walker, M.D.
Adam M. Franks, M.D.
Courtney Wellman, M.D.

Demographic Analysis of Over-the-Counter Acetaminophen Use in a Rural Population 80 Years and Older

Community-dwelling seniors 80 years or older old are the most rapidly growing population in West Virginia, yet little is known about them. Chronic pain from musculoskeletal system disorders affects many seniors. American Geriatrics Society guidelines for pain management recommend acetaminophen as the drug of choice for moderate, chronic pain. However, potential risk associated with acetaminophen use is elevated in this population, especially those with liver disease. Previous research on this population notes that they do not always inform physicians about over the counter (OTC) medications they take. OTC acetaminophen has the potential to impact medical care by exacerbating current medical issues or interacting with prescribed medications.

Appalachian patients 80+ years old are at risk for medical complications from OTC acetaminophen use. Practices for the use of this population are unknown by their primary physicians.

An anonymous survey was prospectively given to patients 80+ years old regarding OTC acetaminophen use habits, their physician's awareness of these habits, and relative comorbidities. Data were analyzed using simple T-table tests. A $p=0.05$ was utilized to signify statistical significance.

Of the 280 patients surveyed, acetaminophen was used in 134 (47.86%) of the patients. No differences were seen in the acetaminophen group for gender ($p=0.08$). Acetaminophen-using patients (AP) were less likely to tell their physician than non-acetaminophen-using patients (NAP) (39.55% vs 51.30%; $p=0.046$). Rates of following package instructions were lower in AP than NAP (26.87% vs 73.38%; $p<0.00001$).

The communication disconnect between patients and providers for OTC analgesics carries medical consequences. Acetaminophen, specifically, adversely impacts the liver and interacts with combination narcotics. We find in this study, that the population of community-dwelling patients 80 years and older are not only less likely to tell their physicians about their acetaminophen use but are less likely to follow packaging instructions. That combination is dangerous in this vulnerable population.

Poster # 5
Abstract # 127
Name: Mohammad Noor
Level: Medical Student
Type: Clinical
IRB / IACUC #: 1652598-2

COVID19 HESITANCE AMONG AMERICANS FROM A UNIVERSITY-AFFILIATED COMMUNITY.

The COVID-19 pandemic has had a dreadful impact on economies and healthcare systems globally. Although COVID vaccination has prevented mortality, still a degree of hesitance prevails. We aim to assess COVID-19 vaccine hesitance in our community

Quantrix® platform was used for four sequential IRB-approved online surveys, i) prior to and ii) after State Policy protocols for COVID-19 vaccine administration. iii) As a follow-up survey to identify variables affecting participants' decisions for hesitance on vaccination policies, and iv) to determine vaccine's adverse events. Three groups of participants were included: (1) University Students, faculty, and staff (MS), (2) University Health System patients (MP), and (3) University Comprehensive Cancer Center patients (MCP). SPSS software was used for modeling variables comparing groups at a 0.05 level of significance.

Out of the 15,275 responders that completed the first survey, 63.5% were willing to get vaccinated, with a significant difference in acceptance among groups, MS:56.6%, MP:66.2%, and MCP:71.6% ($p < 0.05$). Acceptance of vaccination improved among the 11,978 responders of the second survey, where 87.4% of all the participants had received either one or two doses of a COVID-19 vaccine (MS:84.5%, MP:90.2%, and MCP:91.6% ($p < 0.05$)). 9.7% of those that did not get vaccinated reported safety and efficacy as significant concerns. Variables associated with hesitance to vaccination were age (<44years vs. older) and degree of education (lower than vs. higher than a college degree). In addition, among the 7,764 and 6,931 participants that completed the third and fourth surveys, respectively, safety and efficacy concerns were the main factors affecting participants' decisions. Nevertheless, participants' concerns decreased during pre-vaccination, post-vaccination, and follow-up periods (87%, 56%, and 46%, respectively, $p < 0.05$). Tiredness/fatigue was the most reported minor/moderate symptom by the participants, especially after the second dose ($n=2289$, 81.03% of the mild side effects reported), while Anxiety was the most reported severe symptom by participants mainly after the second dose ($n=248$, 40.72% of the severe side effects reported)

Although vaccination acceptance rose to 87.4% after FDA approval, continued education on vaccine safety and efficacy is critical for further decreasing the hesitance rate.

Poster # 6

Abstract # 61

Name: Rachel Price

Level: Medical Student

Type: Clinical

IRB / IACUC #: 1633650-8

Co-authors: Rachel Price, Dr. Meghan Anderson, Morgan Ruley, and Dr. Jennie Yoost

Use of Digital Flashcards in Reproductive Health Counseling

Education is a critical part of patient care, as it provides patients with the capability to make well-informed decisions regarding their health. This benefit is dependent on the patient's ability to understand the information presented to them by their physician. Reproductive health is a complex topic that adolescent patients may find difficult to understand. Visual aids have been used in other clinical settings to better communicate health information by presenting it in a format that may be easier for patients to comprehend.

The purpose of this study is to determine if the use of visual aids helps improve adolescent understanding of reproductive topics discussed during clinic visits. The visual aids (flashcards) used included graphics of contraceptive methods (birth control pills, patches, intrauterine devices, and implants) and anatomy (external and internal reproductive anatomy). English-speaking adolescents aged 11-17 who were accompanied by a consenting guardian and had the capacity to complete a post-assessment were recruited at the Marshall Health OB/GYN department. The patients were randomly assigned to two groups, flashcards or no flashcards, using opaque envelopes. The patients in the flashcard group were counseled with the use of a flashcard relevant to the topic of their visit and the patients assigned to the control group were counseled in the standard fashion. At the conclusion of the visit, all patients completed a post-assessment questionnaire to determine their understanding of topics discussed during their clinic visit. Additionally, patients in the flashcard group were asked to assess the effectiveness of the flashcards as a teaching tool.

After power analysis calculations we plan to recruit 196 subjects to participate (98 per group). Currently, 116 subjects have participated, and recruitment is ongoing. Initial data evaluation on the first 84 subjects is reported here. The mean age is 13.8, and 42 subjects were randomized to the flashcard group, while 42 were randomized to the control group. In the flashcard group, 41 (97.6%) agreed or strongly agreed that the use of flashcards helped them understand the subject matter better. The control group was asked if they would have learned more if flashcards would have been used. 16 (38.1%) agreed or strongly agreed with that statement, 6 (14.3%) disagreed, and 20 (47.6%) were neutral. Further data collection and analysis will determine which flashcards and specific topics may be the best to use this educational tool.

Poster # 7
Abstract # 89
Name: John Roth
Level: Medical Student
Type: Clinical
IRB / IACUC #: NA
Authors: John Roth, MS-IV
John Castillo, MD
Vincent Morra, DO
Andy Gilliland, MD
Adam M. Franks, MD
Davis Rupp, MD
Kasey Stickler, MD

Comparison of Competing University Sport Medicine COVID Monitoring Programs: Screening vs Testing

Collegiate sports experienced rapid and unique challenges in adapting to the unprecedented effects of the COVID-19 pandemic. Athletics create an environment which promotes viral spread through physical contact, sharing of confined spaces, and engagements between regularly traveling groups. To minimize transmission, university athletics departments instituted multiple unique surveillance guidelines. These protocols are usually based up screening vs testing as the primary focus. The benefit of either option has not yet been studied.

The testing protocol will be superior to the screening protocol in protecting staff and student-athletes from infection.

Both schools' records from the 2020-2021 school year were retrospectively searched for the number of staff and student athletes undergoing screening and/or testing and resulting positive cases. The logistical impact was examined through the proportion of games cancelled from infection and overall cost of the monitoring protocols. Statistical analysis was through t-table test and a $p < 0.05$ denoted significance.

The screening protocol resulted in 26,874 screens, resulting for the need for in 139 student-athlete tests. The 14 subsequent positive results created a positive percent rate (PPR) of 10.04%. No screens were completed in the testing protocol, rather 14,837 student-athletes were tested with 158 positive cases, resulting in a 1.06% PPR ($p < 0.00001$). The screening protocol generated 17 (50%) staff infections, whilst the testing protocol reported 43 (14.78%) case ($p = 0.0002$). No significant infections were noted from either protocol, but 29 games were missed in the screening and 41 in testing protocols.

A pandemic such as COVID contains numerous factors which can hinder efforts to create a safe but cost-effective disease monitoring program and the optimal method has not been studied. The testing protocol decreases the rate of infection in student athletes and staff but with a cost of increased financial and competition time.

Poster # 8
Abstract # 134
Name: Andrew Schaver
Level: Resident
Type: Clinical
IRB / IACUC #: NCT04178538

Fertilized Anterior Cruciate Ligament Reconstruction Leads to Superior Functional and Patient Reported Outcomes at One Year Post-Operatively: A Prospective, Randomized Controlled Trial

Purpose: To compare one-year patient-reported outcomes in patients who received Fertilized anterior cruciate ligament (FACL) reconstruction vs. Standard ACL (SACL) reconstruction.

Methods: A prospective, randomized controlled trial at a single institution was performed to compare outcomes of sixty patients who underwent either Fertilized or Standard ACL reconstruction. Skeletally mature patients <25 years old received quadriceps tendon autografts, while patients ≥ 25 years old received allograft ACLr with an all-inside technique. FACL reconstruction utilizes bone marrow aspirate, demineralized bone matrix, and suture tape augmentation with the goal of accelerating biologic incorporation and enhancing graft stability early after surgery. Patients with associated meniscal and chondral pathologies were included. Those with multi-ligament injuries, previous ipsilateral knee surgeries, and workmen's compensation claims were excluded. Students T-test and chi-square analysis was used to compare functional patient-reported outcome scores (PROs) at 2 weeks, 6 weeks, 12 weeks, 6 months, and 1 year after surgery (significance level $p < 0.05$).

Results: Fifty-seven patients were included (FACL: 27 patients, 11 females, 40%; SACL: 30 patients, 15 females, 50%). Three patients in the FACL group withdrew from the study. The proportion of patients <25 years old in both groups was similar (FACL 70.3% vs SACL 73.3%, $p = 1.0$). The rate of meniscus tears was also similar between groups (FACL 64.2% vs SACL 73.3%, $p = 0.57$). Terminal flexion range-of-motion was greater in those who received FACL at 2 weeks (87° vs 58° , $p < 0.001$) and 6 weeks (125° vs 109° , $p < 0.0001$). The difference in limb symmetry index was significantly greater in the FACL group (80.6 % vs. 36.7% [Delta 43.9%], $p < 0.001$). Two patients underwent manipulation under anesthesia in each group. Forty-five patients (78.9%) had PROs available one year after surgery (FACL 89% vs. SACL 70%, $p = 0.11$). Mean Knee Injury and Osteoarthritis and Outcome Score (KOOS) Quality of Life (QOL) scores at 6 months post-op were significantly greater in the FACL vs SACL group (67.8 ± 17.7 vs. 52.6 ± 18.4 , $p = 0.004$). Mean KOOS Sport/Rec and QOL scores at 1-year post-op were both significantly greater in the FACL vs. SACL group (Sport/Rec: 90.9 ± 11.6 vs. 79.5 ± 21.7 , $p = 0.04$; QOL: 82.6 ± 15.9 vs. 58.0 ± 29.9 , $p = 0.002$). In patients <25 years, Marx activity scores were significantly greater in the FACL vs. SACL group (13.9 ± 3.9 vs. 10.1 ± 5.3 , $p = 0.03$). No patient in either group sustained ACL re-injury at 1 year post-operatively.

Conclusion: Patients who received bone marrow aspirate, demineralized bone matrix, and suture tape augmentation during Fertilized ACL reconstruction achieved greater early range of motion and limb symmetry vs. standard ACLr. Mean KOOS QOL both at 6 months and 1 year and Marx activity scores in younger patients were also significantly greater at one year after surgery. This suggests that the Fertilized ACL's acceleration of biologic incorporation and stability of the graft may have continued benefits at 1 year postoperatively.

Poster # 9
Abstract # 25
Name: Cora Miracle
Level: Medical Student
Type: Clinical
IRB / IACUC #: 1611178

Aeroallergen sensitivity plays a larger role in Appalachian pediatric EoE severity

Eosinophilic Esophagitis (EoE) is a chronic allergic disorder that is characterized by eosinophils infiltrating the esophagus leading to symptoms such as dysphagia, vomiting, and failure to thrive in children. Unfortunately, patients with EoE often suffer from other allergic conditions such as asthma, atopic dermatitis, and allergic rhinitis. While these comorbidities are known, the literature has documented food allergy as the most common comorbidity. In this study we sought to uncover the most common comorbidity within our population. We hypothesized that in our population, aeroallergen sensitization would play a larger role in EoE pathogenesis as compared to food allergy.

A retrospective chart analysis of fifty-four pediatric patients with the diagnosis of EoE was conducted. An eosinophilic esophagitis diagnosis with an esophageal endoscopy result of ≥ 15 eosinophils/high powered field (hpf) was required to be included in the study. Charts were screened for location, BMI, symptoms, esophageal changes, allergic comorbidities, and aeroallergen sensitization. The number of sensitized aeroallergens were counted including trees, grass, weeds, molds, and dust mite. Response to therapy with a proton pump inhibitor (PPI) was evaluated. To compare the difference pre/post PPI among the aeroallergen sensitized and non-sensitized groups, the Wilcoxon Signed Ranks Test was performed. Spearman's rho correlation was used to determine the association between the number of aeroallergens and eosinophils. Analyses were performed using SPSS V.23.

Forty-four males and ten females aged 18 years or less were included. Location (urban/rural) and BMI had no effect on eosinophil count or symptoms. Allergic comorbidities were prominent in the population including allergic rhinitis (50%), asthma (40%), eczema (20%), and food allergy (40%) but showed no significant impact on EoE severity as an independent comorbidity diagnosis. In addition, there was no demonstrable difference in the number of visual findings recorded supporting a diagnosis of EoE between aeroallergen sensitized and non-sensitized groups (furrows, plaques, rings, edema, or erythema). However, when looking at aeroallergen sensitization results, a correlation between the number of aeroallergens a patient with allergic rhinitis was sensitized to and the number of eosinophils/hpf found on pathology review of the esophageal biopsy was noted. As the number of aeroallergens increased, the number of eosinophils increased. (ρ (pre-distal) = 0.46, $p=0.003$, ρ (post-distal) = 0.319, $p<.001$). Results from PPI therapy demonstrated that patients who were sensitized to aeroallergens responded better to PPI treatment as compared to their non-allergic counterparts ($z= -2.6$, $p=0.01$).

West Virginia EoE patients had allergic rhinitis more frequently than food allergy as a comorbidity in this study. In addition, increasing aeroallergen sensitization was correlated with increasing eosinophil count. This group of patients with aeroallergen sensitization were more likely to respond to PPI therapy than the non-sensitized group. Further research into the relationship of aeroallergen sensitization and its effect on EoE is indicated especially as this is an under recognized association in clinical EoE care.

Poster # 10
Abstract # 70
Name: Davinder Singh
Level: Resident
Type: Clinical
IRB / IACUC #: NA
Authors: Davinder Singh

Marshall University, Internal Medicine PGY-2

Aorta-Right Ventricle Fistula development in a Patient with Infective Endocarditis

Introduction:

Infective endocarditis (IE) presents as a life-threatening condition that needs prompt evaluation and management. Endocarditis, usually caused by an infection, spreads hematogenously and attaches to damages areas in the heart. Without adequate treatment it can lead to damaged heart valves and multiple complications including congestive heart failure (CHF), peri annular abscess, and systemic embolization which are common. We present a case of infective endocarditis with fistula development between the aortic valve and right ventricle.

Case presentation:

35-year-old male with past medical history significant for aortic valve endocarditis status post aortic valve replacement presented to the hospital with septic shock in the setting of prosthetic valve endocarditis. Upon presentation he was complaining of shortness of breath, fevers, chills, rigors and CTA of the chest showed left lower lobe pulmonary emboli, pulmonary edema and bilateral pleural effusions. He was subsequently started on the heparin drip for PE. Laboratory results were significant for leukocytosis, hemoglobin of 11.1, and lactic acidosis. Blood cultures were obtained which grew methicillin-resistant staphylococcus aureus (MRSA). Infectious disease were consulted and recommended continuing the patient on Vancomycin and performing TEE to evaluate status of the bioprosthetic aortic valve. TEE was performed which showed evidence of fistula from the aortic valve to the right ventricle. Cardiothoracic surgery were consulted and recommended against surgical intervention due to the patient being a poor surgical candidate.

Conclusion:

Infective endocarditis epidemiology has evolved over the years and incidence of IE in the United States increased from 11 per 100,000 population to 15 per 100,000 population. Diagnosis of IE requires clinical data points that includes physical exam, microbiology cultures, and cardiac imaging. The development of two dimensional and transesophageal echocardiography (TEE) has significantly improved the non-invasive detection of vegetations, presence of valvular destruction, perivalvar infection, mobile echodense masses, abscesses, and presence of new dehiscence of a valvar prosthesis. Our case illustrates a rare complication of aorto-right ventricle fistula development.

Poster # 11

Abstract # 133

Name: Caleb Spainhower

Level: Medical Student

Type: Clinical

IRB / IACUC #: pending

Co-authors: John Roth, Armein Rahimpour MD, Thomas Adams MD, James Paugh DO, Semeret Munie MD

Taking the First Step to Weight Loss: Addressing the Barriers in Rural Communities by Increasing Patient and Primary Care Provider Awareness of Bariatric Surgery and Pre/Post Care Treatment Options

The prevalence of obesity for citizens within the State of West Virginia ranks among highest within the nation at 37.7% of the state population. Presently, bariatric surgery remains the most effective long-term weight loss therapy, however, utilization of this treatment option remains low. This study aims to identify perceived barriers to weight loss programs among obese patients. The second part of this project seeks to determine primary care provider knowledge regarding peri-operative care for bariatric surgical patients as well as provide Continuing Medical Education Opportunities (CME) of such care to these clinicians. We hypothesize that the initial survey will indicate a lack of patient exposure to bariatric interventions prior to our CME interventions and post analysis surveys.

Data will be collected at outpatient surgery & primary care clinics in Logan and Point Pleasant Counties through surveys. Patient information will include current health status and previous weight loss attempts as well as baseline knowledge of bariatric surgery and potential reservations regarding weight loss treatment options. PCPs will also be surveyed at these locations regarding bariatric knowledge and comfort level managing perioperative bariatric care to patients. This data will then be utilized to create Patient Education Seminars (PES) and CMEs which will be offered to patients and PCPs, respectively, by the research team later in the 2022-2023 academic year.

The study remains ongoing with continued surveying of participants throughout the fall of 2022. Following acquisition, data will be compiled to common barriers to pursuing bariatric surgery for development of CME & PES opportunities.

Presently, bariatric surgery remains an effective but underutilized resource in confronting the growing obesity crisis which is disproportionately affecting West Virginia. The main objective of this study is to heighten awareness of weight loss treatment options in the rural areas to ultimately increase the number of rural patients who pursue weight loss treatment options.

Poster # 12

Abstract # 102

Name: Ean Bills

Level: Medical Student

Type: Clinical

IRB / IACUC #: Marshall IRB determined this project to be non-human-subject-research on June 8th 2022.

Authors: Ean Bills (1) , Nayiri Derian (2), Archana Ramalingam (2), Tewodros Ayele (2), Johannes Massell (3), Miranda van Tilburg (2)

1. Marshall University Joan C. Edwards School of Medicine
2. Marshall Health, Department of Internal Medicine
3. University of Basel (Basel, Switzerland)

Patients with Irritable Bowel Syndrome are less likely to post on Social Media about their disorder: A Twitter study

Internalized stigma associated with certain diseases has been shown to negatively impact the health outcomes of those with stigmatized conditions. Research has shown that patients with Irritable Bowel Syndrome (IBS) face more stigma than those with Inflammatory Bowel Disease (IBD), but less research has been conducted to examine how those differences in stigma reflect in patients' willingness to talk about their condition on social media. This study aims to examine if IBS patients are less likely to share their symptoms on social media compared to IBD patients and IBS advocates.

All Twitter accounts shown to make posts containing the terms "Irritable Bowel Syndrome," "#IBS," "Inflammatory Bowel Disease," or "#IBD" in weeks 21 and 22 of 2022 were pulled from Twitter and compiled in a spreadsheet. Accounts determined to be bot accounts, non-GI-specific health news sources, or primarily used for marketing were excluded. Accounts from individuals, healthcare systems, non-profit foundations, GI specific news sources, and research groups were included. Included accounts were then analyzed and classified based on if they were attributed to IBS/IBD patients or from an advocate (e.g., healthcare providers, patient foundations etc.).

A total of 4188 posts were collected in weeks 21 and 22 of 2022. We removed 1257 posts for ineligibility with a remaining 2931 posts. Most of these posts were about IBD (2325; 79.3%) versus IBS (606; 20.7%). The majority of posts were posted by advocates (2239; 76.4%) versus patients (692; 23.6%). Posts about IBS were more likely to be from advocates than patients (78.7% vs 21.3%), Similar findings were found for posts about IBD (75.8% vs 24.2%).

Despite IBD affecting 1.4% and IBS approximately 10% of the population, IBD receives 3 times more social media posts than IBS. Furthermore, advocates such as healthcare providers are 3.2 times more likely to post about IBS or IBD than patients. These findings reflect a larger focus on IBD in social media among both patients and advocates, likely due to IBD being seen as more serious. The lack of attention to IBS may reduce likelihood that patients receive the care and support that they need. Data collection is ongoing for this study.

Poster # 13
Abstract # 109
Name: Anthony Workman
Level: Resident
Type: Case Study
IRB / IACUC #: NA
Authors: Mohammed Al-Hiari M.D.
Anthony Workman M.D.
Ebubechukwu Ezech MBBS
Samson Tekka M.D.
Solomon Woldetensay M.D.

Idiopathic Pituitary Shutdown: A Rare Case of Atezolizumab-induced Hypophysitis

With advancements in medical knowledge and technologies, more cancers are being diagnosed than before, and with that more therapies are being discovered. Immune checkpoint inhibitors (ICI) are one of these novel treatment strategies for malignancies. The increased use of these medications has, however, led to the emergence of side effects aptly named immune-related adverse events (irAE). Endocrinopathies are the most common of these events; although not many, most cases were reported in patients taking cytotoxic T lymphocyte-associated protein 4 (CTLA-4) inhibitors. To our knowledge, there are only two previous cases of hypophysitis among patients taking programmed cell death-ligand protein 1 (PD-L1) inhibitors. Due to its rarity, medication-induced hypophysitis remains under the radar and more information is needed to inform appropriate detection of this side effect.

We present a case of a 64-year-old male with a history of metastatic hepatocellular carcinoma status post left adrenalectomy who presented with generalized weakness and anorexia. The patient was lethargic and hypotensive with systolic blood pressure in the 70s mmHg and he required multiple infusions of intravenous fluid. He had multiple episodes of asymptomatic hypoglycemia down to 65 mg/dL despite being on an oral diet. Our suspicion prompted us to order endocrinology labs that revealed low ACTH and cortisol levels of 6.2 pg/dL (7.2-63.3 pg/dL) and 1.3 mcg/dL (6.2-19.4 mcg/dL), respectively, strongly suggestive of secondary adrenal insufficiency, while FSH, LH, TSH, Prolactin, and IGF were within normal limits. Apparently, the patient had been treated with Atezolizumab for 8 cycles or 33 weeks prior to presentation. Brain MRI did not show anatomical abnormalities, masses, or enhancement. A more detailed review showed that he developed hypothyroidism with low TSH and low free T4 after the 4th cycle of immunotherapy and was started on levothyroxine, no further testing was performed back then. Given the patient's age, no prior history of autoimmune disorders, the previous lab and imaging findings, and the clinical history, we conclude that this is a case of Atezolizumab-induced hypophysitis leading to the development of hypopituitarism. Hydrocortisone was started and symptoms improved markedly. The patient's blood glucose and blood pressure remained stable and he was eventually discharged.

Cases of PD-L1 inhibitor-induced hypophysitis are rare, however, all have reported cortisol deficiency indicating the severity of the adverse events of such medications. For instance, identifying hypothyroidism in our case prior to the development of adrenal insufficiency and its sequel could have prompted us to detect medication-induced hypophysitis and act before severe complications occur. We suggest and advocate frequent testing for the pituitary function test for patients on ICI in anticipation of irAE, especially if they develop hormonal deficiencies in the pituitary axis.

Poster # 15
Abstract # 99
Name: Erick Trent
Level: Medical Student
Type: Clinical
IRB / IACUC #: NA

Geriatric Analysis of a Regional COVID-19 Screening Center

The SARS-CoV-2 (COVID-19) outbreaks began in December 2019 in Wuhan, China and culminated in a global pandemic. Coordinated containment efforts between numerous national and international agencies produced lockdowns, mask mandates, restricted international travel, and social distancing policies. Traditionally, the elderly use far more healthcare resources than other age cohorts. Understanding utilization trends during the COVID-19 pandemic could be useful to understand resource needs for this and future community outbreaks.

Hypothesis

Age-specific differences in adults seeking healthcare services can be used to predict and model increased community testing rates.

A retrospective analysis of the geriatric specific testing data (65+ years old) from the regional COVID screening center was conducted for gender or temporal correlation patterns. Data were analyzed with simple t-table tests. A $p < 0.05$ was utilized to signify statistical significance.

Patients 65+ years old were 11.61% of the tested population. This is underrepresentation by 7.64% compared to county numbers. It is known that 2.40-3.29% less likely to seek testing than general population rates. The 57.28% female testing rate was significantly lower than the rate of non-geriatric adults (59.46%; $p = 0.0002$). The percentage of adults 85+ years old tested, compared to 65 through 84 years old, was 5.75%. Increased rate of testing this group were not different between 'in peak' or 'out of peak' times (45.16% vs 47.92%; $p = 0.7738$). Peaks 1 and 2, which were not associated with high infection rates, had lower rates above average (27.27%) than Peaks 3-5 (49.02%) but sample size minimized significance ($p = 0.1708$). No gender difference occurred relative to peak testing ($p = 0.6822$)

Geriatric patients were less likely to seek testing than the general population. We hypothesize this is due to fewer occupational exposures and an increased fear of infection risks leading to better social distancing. Decreased percentage of geriatric females sought testing compared to females in the non-geriatric adult cohort. Individuals 85+ years old who were tested, only comprised 5.75% of the tested geriatric population, with no significant differences in rates related to peaks in testing.

Poster # 16
Abstract # 130
Name: Thomas Wright
Level: Medical Student
Type: Clinical
IRB / IACUC #: 1876243

Evaluating working memory training in substance use disorder and comparing recovery targets between patients, providers, policy makers, and community members

Substance use disorder results in debilitating psychological and physical impairments that last for many years after cessation of substance use. In particular, activities of daily living (ADLs) are impacted and many individuals in recovery report decreased well-being and increased depression. This occurs despite a motivation to regain activities. One barrier to regaining previous activity levels is impaired working memory. Working memory training has been established as a cognitive rehabilitation strategy in conditions such as pediatric ADHD, normal aging, MS, and stroke. However, the current treatment of substance use disorder primarily relies on abstinence and preventing relapse. Strategies for cognitive rehabilitation in recovering substance users have been limited. Therefore, we propose that working memory training will help patients achieve the primary goal of abstinence and improve other aspects of cognition. Additionally, we intend to compare the targets of patients and providers to determine if patient goals align with current treatment paradigms.

Searches containing the phrases “substance use disorder” and “working memory training” were conducted with Google scholar and PubMed. A date range of 1993 to the present (May 2022) was set. The search results yielded 239 and 201 articles, respectively. The articles were further sorted based on randomized clinical trials with working memory as the intervention. Articles were excluded if another primary pathology affecting working memory such as dementia or stroke was present. Eight articles were selected and analyzed using the PRISMA protocol for systematic review. Of the chosen articles three pertained to alcohol, one for cannabis, one for cocaine, and three for opioids.

This study consists of a one-time anonymous survey. Physical flyers will be given out and digital copies of the flyer will be posted on social media across the community and given to SUD treatment organizations if they wish to participate in this study, to encourage any and all persons who wish to participate a chance for their opinion of successful recovery to be heard. This survey will be conducted via Qualtrics with anonymous links and QR codes to take the participants to the website. For any participant that wishes to take the survey on paper, a paper copy will be provided as well as a sealed box with an opening for them to return the survey to maintain confidentiality. All paper surveys will be collected and manually entered into Qualtrics to complete the data set. The data will be stored in Qualtrics which is a HIPAA compliant to maintain patient confidentiality. Any paper surveys will be kept in a locked cabinet in a locked room with restricted access to anyone but the research team. Upon the conclusion of this study the paper copies will be destroyed. This data will be used to compare the goals of recovery from different perspectives across the community. This information will be helpful to know which future directions to pursue for research and treatment of persons with substance use disorder.

Working memory outcomes: abstinence at 1 month, attrition rates, cravings, and triggers over eight clinical trials.
Survey results pending analysis.

Working memory training is a promising strategy for rehabilitating ADLs of substance users in recovery.

Poster # 17
Abstract # 9
Name: Adam Young
Level: Resident
Type: Clinical
IRB / IACUC #: 1682811-1

The ARRIVE Trial in Practice: Does BMI impact outcomes?

To investigate the effect of obesity on labor duration and cesarean section rates in primiparous women undergoing routine induction at 39 weeks or later with an average BMI that was greater than the ARRIVE Trial.

A retrospective chart review of all deliveries from 2018 to 2020 at Cabell Huntington Hospital involving functional singleton primiparas induced at 39 weeks or later was undertaken.

Of 2648 deliveries, 294 met inclusion criteria. The BMI ranged from 20.2 to 61.8 with a mean of 32.5. Mean time to delivery was 22hr 31 min with 81% delivering vaginally. Time to delivery was 19hr 28 min if the BMI < 30 while it was 24hr 58min if the BMI > 30 ($p < 0.001$). The cesarean section rate did not depend on BMI when age, induction agent, and arrival time were controlled.

Routine induction of labor in primigravidas at 39 weeks resulted in longer induction times if the BMI was greater than 30. The overall rate of cesarean section did not differ by BMI and is similar to previously published reports. Our practice aligned with the trial publication, and we gained data for counseling our patients on what to expect for IOL and success rate based on BMI.

Poster # 18

Abstract # 117

Name: Kennedy Snavelly

Level: Medical Student

Type: Community Health

IRB / IACUC #: 1931744-1

Authors: Lauri Andress, PhD, MPH, JD

Beverly Delidow, PhD

Kennedy Snavelly

Medical Schools Dismantling Discrimination, Racism, and Stigma Through Structural Competency

The purpose of this report is to understand the transportation experiences and food access barriers of socially vulnerable individuals in Huntington, West Virginia. Additionally, the parameters involved in the construction and funding of grocery stores in communities as well as the federal regulations imposed on a city's public transportation planning process will also be explored in this study.

We identified areas of Huntington, West Virginia in which many residents are low-income (LI), have limited food access, and have limited access to private transportation and/or depend on public transportation using public data. We then contacted social agencies who advocate for and represent marginalized individuals in these identified areas to assist in recruiting interviewees. We interviewed an individual who wished to speak about their experiences with transportation and food access. A shop along interview was also conducted. The shop along interview, also known as a walking interview, is an interview method that is conducted by researchers accompanying individual participants on shopping trips in their own familiar environments. Through observing and asking questions while traveling to the grocery store, we examined our interviewee's transportation and shopping experience. Both interviewed were transcribed and coded based on parameters of both food and transportation security, which were subsequently assessed.

An analysis of our participant's food and transportation security revealed several parameters of each that were insufficient, including accessibility, affordability, and availability. Additionally, we identified our participant's suggested improvements for several of these parameters, as well as their input regarding how underrepresented citizens' involvement in the community planning process can be maximized.

Understanding the experiences of underrepresented citizens is central to assessing measures of a community's transportation access and food security. Additionally, it is necessary that underrepresented citizens have an active role in the city planning processes and decisions that affect both of these frameworks.

Poster # 19
Abstract # 113
Name: Joshua Galbraith
Level: Medical Student
Type: Educational
IRB / IACUC #: 1949204-1

Evaluation of Adverse Childhood Experiences in obesity at weight-loss clinics compared to Adverse Childhood Experiences in patients with Substance Use Disorder at SUD treatment clinics

The purpose of this research project to determine:

- 1) a relationship between Adverse Childhood Experiences (ACE) Survey scores and Obesity.
- 2) if so, is this a similar relationship between ACE Survey scores and substance use disorder (SUD).
- 3) To determine if the relationship between ACEs and obesity is similar to the relationship between ACEs and SUD.

Hypothesis: There exists a similar relationship between the trends of ACE Survey Scores in SUD patients and ACE Survey Scores in Obesity patients

- 1) Anonymous ACE Surveys with a few demographic questions will be administered to patients struggling with their weight through several medical weight loss clinics.
- 2) Deidentified data containing the ACE scores from patients that are served by several Licensed Behavioral Health Centers providing Medication-Assisted Treatment for substance use disorder will be correlated to the ACEs score seen in the obese population. The ACE survey from these MAT clinics were completed as a routine part of their behavioral health care and were not administered as a part of the study. Any data analysis will be completed using deidentified data from MAT clinics and the anonymous surveys from the weight loss clinics.
- 3) A correlation study will then be performed determining if there is a relationship between the scores and the diagnoses.

On average 61% of people in America have an ACE Score of 1 or greater. On average 12.6% of people in America have an ACE Score 4 or greater. Study results shows that 64.6% of Obese Patients had an ACE Score of 1 or greater (significantly higher than the national average). On average 25.3% of obese patients had an ACE Score 4 or greater (significantly higher than the national average). Study results shows that 82% of Substance Use Disorder (SUD) Patients had an ACE Score of 1 or greater (significantly higher than the national average). On average 45.8% of Substance Use Disorder (SUD) Patients had an ACE Score 4 or greater (significantly higher than the national average).

To note parental separation or divorce is normally the second highest ACE Score domain documented by people in America (28.2%). The study shows that parental separation or divorce was the highest ACE Score domain amongst both the Obese Patient (42%) and SUD Patients (64.6%).

Findings highlight that childhood adversity is higher in both the obese population and substance use disorder population. Identifying at-risk populations for higher ACEs is essential to improving the health outcomes and attainment across the lifespan. ACE Score evaluations could allow intervening measure that focus on childhood trauma resolution and possibly decrease likelihood of developing both Obesity and Substance Use Disorder. Incorporating mental health into treatment regimens for both populations could improve long term outcome.

Poster # 20
Abstract # 76
Name: Rachel Lee
Level: Medical Student
Type: Educational
IRB / IACUC #: 1625731-2

Robotic Total Laparoscopic Hysterectomy: Uterine Manipulation Technique and Rationale

The addition of robotic-assisted hysterectomy to the surgical toolbelt further improved and expanded the ability of gynecologists to perform minimally invasive surgery. The efficacy of a surgeon to perform these cases is intertwined with the skills of the entire team, and a reliance falls onto the individual controlling the uterine manipulator. We sought to report on our experience with the uterine manipulation technique and rationale during a robotic hysterectomy.

Institutional IRB approval was obtained to review retrospectively our data at the Cabell Huntington Hospital for robotic hysterectomy performed by the gynecologic oncology team from August 2014 to August 2022. Description of the manipulation technique and illustration is created in order to facilitate each step of the procedure. Data evaluated includes console time, length of surgery, number of malignant versus benign cases, intra-operative and post-operative complications, and length of stay in the hospital.

2111 robotic-assisted hysterectomies were performed during the study period by the gynecologic oncologist with 419 had benign indications. All cases were performed using the DaVinci Xi® system with a bedside assistant controlling the uterine manipulator. All cases included a VCare® uterine manipulator, and a visual and a practical tutorial were given to the assistant prior to starting the case. The mean console time for benign hysterectomy was 34 minutes ranging between 17 and 70 minutes. The average blood loss was around 50 ml. While the rate of conversion to open laparotomy was 0, 1 case had an intraoperative complication with a small bowel injury at the level of the veress needle entry which was identified and repaired promptly in the operating room. One case had a post-operative pelvic abscess requiring percutaneous drainage and antibiotics. The average length of stay was 1 day.

Robotic hysterectomy is safe and can be performed efficiently. With the proper teaching of the bedside assistant on how to best manipulate the uterus the procedure could be rendered safer with a decreased operative time. Our manipulation tutorial could be used for teaching and educational purposes.

Poster # 21
Abstract # 15
Name: Cameron Cottrill
Level: Medical Student
Type: Case Study
IRB / IACUC #: NA

Understanding the Relationship Between Delirium and Catatonia in the Clinical Setting: A Case Report

Delirium is a reversible, neuropsychiatric syndrome encountered often in the ICU, typically presenting secondary to an underlying medical condition, toxicity, or infection. Clinically, patients with delirium experience acute changes in cognition and psychomotor function. Catatonia is a more severe psychomotor syndrome characterized by a wide range of marked motor, emotional, and behavioral deficits. Both syndromes have been linked to long-term cognitive complications, with delirium being a risk factor for quicker progression to dementia and long-term cognitive impairment. The long-term complications of catatonia are not as extensively researched, though recently there have been proposals linking catatonia as a cause of long-term cognitive and motor impairment. Historically, the relationship between delirium and catatonia was poorly understood and lead to a lack of association between the two diagnoses. As catatonia has become further defined, so has the acknowledgment of the overlap between psychomotor symptoms of both syndromes. This also suggests that catatonia may have been previously underdiagnosed for many years. Management of the two conditions is quite different, therefore, understanding the crossover and co-occurrence of catatonia and delirium is imperative for appropriate treatment. The patient discussed in this report, a 54-year-old Caucasian female, presented to the ED with complaints of weakness and increasing somnolence at home. During the first two days of admission, the patient exhibited increasing levels of confusion and agitation but was still communicative with staff. Workup in the ED revealed an underlying UTI, leading to a preliminary diagnosis of delirium. As this patient continued to decline in function, psychiatry became involved for further analysis considering history of depression, bipolar disorder, anxiety, and medication management. Over the course of two more days, she became minimally responsive and dysphoric, with features qualifying for the diagnosis of catatonia by the DSM-V and severity assessed by the Bush-Francis Catatonia Rating Scale. She received four doses of lorazepam 1mg, orally, which resulted in improvement of catatonic symptoms. On day six, the patient was alert, oriented, and showing minimal signs of catatonia or delirium, albeit significant confusion over her hospital course. This case suggests a relationship between delirium and catatonia and brings attention to an issue that is fairly common in the clinical setting and may be under-recognized.

Clinical appearance and chart review.

Clinical course and outcome. Comparison and contrasting evidence with prior studies and information.

This case suggests a relationship between delirium and catatonia and brings attention to an issue that is fairly common in the clinical setting and may be under-recognized.

Poster # 22

Abstract # 54

Name: James Curry

Level: Medical Student

Type: Case Study

IRB / IACUC #: NA

The Expansion of Lyme Disease: A Case of Infection in the Absence of Known Exposure

A 60-year-old Caucasian male presented to the walk-in clinic with fatigue, severe joint pain, and a faint rash on his trunk that had been present for 3 days. He had no known tick exposure

Case Study

Diagnosed with Lyme Disease and treated. He developed a Jarisch- Herxheimer reaction.

Lyme Disease is expanding in WV, which forces us to have a high index of suspicion even in the absence of known tick exposure.

Poster # 23
Abstract # 94
Name: Kassandra Flores
Level: Medical Student
Type: Case Study
IRB / IACUC #: NA

Re-Injury Fall Leading to Gross Hardware Failure in Humeral Shaft Fracture Revised with Intermedullary Nail: A Repeat Fracture Salvage Case Study

Proximal humerus fracture is the third common limb fracture following hip and distal radius fractures¹. At this point in time, there no definitive standard of treatment for these fractures. Fractures of the proximal humerus can be managed non-operatively or surgically with plate and screw constructs or with intramedullary nails (IMNs). Each management strategy has advantages and disadvantages that must be considered. Conservative management eliminates all surgical risk, however, carries the risk of secondary displacement¹, malunion, and non-union depending on severity of initial injury displacement. IMN has been shown to have an overall smaller incision length, shorter operation time, reduced peri-operative bleeding and faster fracture healing time^{1,2,3} and is preferred for patients with comorbidities than plating⁴. Biomechanically, the central fixation of IMN can resist greater varus force and maintains better stability in eversion, flexion and extension¹. However, IMN has been linked an increased risk of shoulder complications such as shoulder impingement and restriction of movement and pain and sometimes still requires an open reduction particularly when there is concern for injury to the radial nerve⁵. Plate fixation allows for direct visualization and reduction of fracture⁵ as well as provides biomechanical advantages in bending resistance and torsion resistance¹.

Similar to proximal humerus fractures, the management of distal humerus fractures ranges from conservative functional bracing to internal fixation with plate and screws. However, distal humerus fractures have a unique challenge with the proximity to the elbow joint. Although it may be difficult to obtain a rigid fixation structure without compromising the joint, operative fixation has been shown to give greater satisfactory results with long term success and is now largely considered the current standard treatment⁶. Non-operative treatment is utilized in non-displaced fractures and in patients unable to tolerate surgery^{6,7}.

Chart review and literature search.

Case: A 68-year old female presented to the ED with left proximal arm pain that she sustained after a fall from a horse. Imaging confirmed a left proximal third humerus fracture that was >100% displaced with valgus and recurvatum angular deformity. Six days following the initial injury the patient underwent open reduction and internal fixation with a plate and screw construct. Final fluoroscopic imaging showed excellent reduction with appropriate positioning of implants. At the six-week post-op, the patient showed significant improvement. Three days after this visit, the patient returned to the ED with pain following another fall. Imaging identified gross construct failure with new fracture and comminution in addition to re-displacement of the initial fracture. Multiple screws were broken with several screw heads free in the soft tissues with complete failure of fixation distally. After considering staged hardware removal and conservative management, replating, and IMN, the decision was made to place an IMN pending successful removal of the broken hardware. All hardware was successfully removed, and the patient underwent revision open reduction internal fixation using an IMN. The patient then fell again about 3 weeks after the second surgery sustaining a peri-implant fracture around the distal nail and locking screws. There was also slight backing out of proximal screw which was palpated through the skin. Overall, the alignment was fairly well maintained with intact hardware and so the decision was made to treat the new fracture non-operatively with a long-arm cast and quickly replaced to a hinged elbow brace to allow range of motion. The patient was successfully treated with this method and is doing well.

Conclusion: This case represents a complex problem of revision and salvage following a re-injury after typical humeral shaft fracture surgery. The choice of revision construct required consideration of multiple factors. Removal of the broken screw shafts required use of a trephine creating large holes and stress risers that needed to be sufficiently spanned by the revision construct. With the successful removal of all hardware, IMN allowed the ability to stabilize the previous screw holes as well as areas of comminution spanning the entire humerus without the larger more invasive approach that would have been required to accomplish the same goals with a plate. It additionally provided the benefit of a biomechanically stronger construct than a plate which was an added advantage in this accident-prone patient. With the subsequent distal humerus fracture maintaining alignment and the remaining hardware intact, a non-operative approach was successful in treatment and eliminated the risks of another operation.

Poster # 24

Abstract # 77

Name: Haseeb Jafary

Level: Medical Student

Type: Case Study

IRB / IACUC #: NA

Perforated Meckel's Diverticulum Mimicking Acute Colonic Diverticulitis in Adult

Perforated Meckel's diverticulum is a rare complication involving the most common congenital malformation of the gastrointestinal tract. We present a case of a 63-year-old female with a perforated Meckel's diverticulum that presented similar to colonic diverticulitis. Due to the extremely low prevalence of this condition in this age group, we report anticipatory guidance to support the literature and current guidelines to ensure Meckel's diverticulum is not prematurely ruled out or omitted as a differential.

In conclusion, perforated Meckel's diverticulum is a rare phenomenon in adults, but one that requires rapid initiation of treatment due to the potential complications. As preoperative diagnosis has been shown to be challenging, a perforated Meckel's diverticulum must be considered when physicians are formulating their differential diagnoses. As mentioned, there is no indication to remove an asymptomatic Meckel's diverticulum in adults. Further cases will assist in for future diagnosis and treatment of this condition.

Poster # 25

Abstract # 135

Name: Muhammad Jafary

Level: Resident

Type: Case Study

IRB / IACUC #: NA

Authors: D. Scott Murphy MD (program director, MU psychiatry)

Muhammad Jafary, MD

Stephanie Gao, MD

Paul Doucet, D.O

Mental Illness in a South Asian Cultural Context: A Case Report

Patient presents to an Inpatient Psychiatric Unit with symptoms of depression, and symptoms initially thought to be attributable to psychotic depression. The patient made several statements attributing the behavioural outbursts of her autistic daughter to that of a "curse" and "bad luck". The patient was admitted to the unit and worked up for medical and substance induced causes which were negative. Initial impressions were consistent with a diagnosis of Bipolar I disorder, with psychotic features. An interpreter was phoned to facilitate discussion with the patients native language. Upon exploring the patients beliefs, initially attributable to psychotic or depressive delusions, It was ascertained that these were commonly held cultural beliefs in the patients native culture and are not a symptom of true psychosis. Thus, Clinicians should maintain a low threshold for utilising interpreter services and consider the cultural context and the role it plays in mental health. Such Cultural competency can lead to more accurate diagnosis, and reduce the likelihood cultural phenomena are misattributed to psychiatric illness.

Case Report, no PHI is included

commonly held cultural beliefs in the patients native culture and are not a symptom of true psychosis

Clinicians should maintain a low threshold for utilising interpreter services and consider the cultural context and the role it plays in mental health. Cultural competency can lead to more accurate diagnosis, and reduce the likelihood cultural phenomena are misattributed to psychiatric illness.

Poster # 26
Abstract # 66
Name: John Kinney
Level: Medical Student
Type: Case Study
IRB / IACUC #: NA

Rare Form of Liver Damage in MODY Patient

Mature Onset Diabetes of the Young (MODY) is a rare form of DM caused by various mutations. Hepatocyte Nuclear Factor 1-beta (HNF1B) defects are a rare cause of MODY that can result renal cysts and abnormalities of the uterine tract and pancreas. MODY increases the risk of complications of diabetes, such as cirrhosis. Diabetic cirrhosis is often associated with steatosis of the liver. The prevalence of NAFLD in Type 2 diabetics is thought to be 30-50%. Rarely do we see severe liver fibrosis without steatosis. Diabetic hepatosclerosis is thought to be secondary to microangiopathic injury. Such cases present with normal serum aminotransferase levels (ATL) and elevated alkaline phosphatase (AP) levels, likely a result of decreased sinusoidal volume. NAFLD patients present with elevated ATL and normal AP, due to steatohepatitis. We present a case of persistently elevated AP with normal ATL and hepatic fibrosis with biopsy findings of NASH.

A 40-year-old F with a BMI of 20 and PMH of HNF1B mediated MODY, anatomical defects of the pancreas and uterus, and 5 year elevation in AP. Fibroscan confirmed stage 2 fibrosis of the liver and no steatosis. Liver biopsy confirmed Fibroscan results, and showed nodular regenerative hyperplasia (NRH), perisinusoidal fibrosis, and diabetic hepatosclerosis (Figure 1). CT scan of the abdomen showed normal liver and spleen and absent body and tail of pancreas.

This patient is of particular interest due to their fibrotic liver damage in the presence of diabetes and in the absence of any fatty liver disease. Hepatosclerosis induced liver damage is a rare cause of liver fibrosis in diabetics. NRH is a rare condition that is associated with autoimmune disease, immunodeficiency, hematologic factors, infection, neoplasms, and drug-related cases (2). To our knowledge this is the first published case of HNF1B mediated liver fibrosis and findings of NRH in this patient population. It is important to monitor these patients in regard to progression towards cirrhosis as well as monitoring for presence of non-cirrhotic portal hypertension and its complications seen in patients with NRH.

Poster # 27
Abstract # 47
Name: Danny Holbert
Level: Medical Student
Type: Clinical
IRB / IACUC #: NA

Gender Analysis of a Regional COVID-19 Screening Center

Introduction

In December 2019 a viral outbreak originating in Wuhan, China led to the first global pandemic in a decade. In March 2020 the World Health Organization declared COVID-19 a global pandemic permanently altering the healthcare landscape. Our government implemented nation-wide lockdowns, along with strict COVID-19 quarantine protocols, to combat rising infection rates. To assist these efforts locally, the department of Family and Community Health at Marshall University implemented and coordinated a regional screening center for over two years. Analyzing the demographic data should allow greater understanding of gender differences in testing during the COVID-19 pandemic.

Hypothesis

There are gender-specific difference in healthcare-seeking attitudes that correlate with testing rates in a regional COVID-19 testing center.

A retrospective analysis of the gender specific data from the COVID screening center was conducted for age and temporal correlation patterns. Data were analyzed by simple t-table test and a $p < 0.05$ was utilized for significance.

Females comprised 57.47% of those tested (40,003 of 69,612). This percentage was higher than the 50.90% of females within the county ($p < 0.00001$). Pediatrics exhibited lower percentages of females (50.44%) than either non-geriatric adults (59.46%; $p < 0.00001$) or geriatric adults (57.28%; $p < 0.00001$). The difference between geriatric and non-geriatric adults was also significant ($p = 0.0002$). No gender difference was found during spikes in testing ($p = 0.78$).

Historically, people identifying as women were more likely to seek medical care. The data show this trend continued with adult women accounting for higher levels of testing than their population would predict. This predominately female trend did not hold true for the pediatric patients, who are largely not responsible for the choice to seek medical care. Times of high testing volume did not display gender differences from low volume testing times. This data indicates adult woman are generally more likely to seek medical care during a pandemic, but further external factors should be explored.

Poster # 28
Abstract # 30
Name: Calyb King
Level: Medical Student
Type: Clinical
IRB / IACUC #: 945673-7

PREVENTION OF BRONCHO-ASPIRATION IN THE SURGICAL ICU BY PROSPECTIVE MONITORING OF PROTOCOLS AT A TERTIARY HEALTH NETWORK SYSTEM.

Broncho-aspiration (BA) is defined as the inhalation of oropharyngeal or gastric contents into the respiratory tract. With a mortality rate of 21% and clinical incidence of 2.9-4.7 aspirations per 10,000 administered general anesthetics, BA is a medical concern deserving attention from protocol deviations. This study aims to determine the ICU-BA incidence rate, monitor protocol deviations, and prospectively appraise interventions that may reduce its incidence.

An IRB approved protocol was instituted for surgical ICU admissions (August of 2021 through September of 2021, n=159) that included bedhead 30-deg, H2-receptor-antagonist administration, and BID mouthwash. Base-line incidence of BA was found by retrospectively screened surgical ICU admissions (January of 2010 through December of 2020, n=20,192). A propensity cohort study was performed by matching age, BMI, and comorbidities of BA+ and BA- patients from the database with prospectively enrolled subjects. Univariate and multivariate modeling was performed by coding on SPSS.

ICU base-line BA incidence over a 10 year expand period was 5.6%. Despite higher presence of comorbidities, patients under protocol had a significant decrease in the incidence of BA at 0.6% ($p < 0.01$). Enrolled subjects presented with a higher proportion in active smoking, ESRD, and surgical history compared to BA+/BA- matched-controls ($p < 0.05$).

Adherence to BA prevention protocols reduced by 10-fold a chance of BA in surgical patients during their ICU stay. Deviations of BA prevention protocol are more common due to a shortage of ICU nurses.

Poster # 29

Abstract # 83

Name: Alex Ashley

Level: Medical Student

Type: Clinical

IRB / IACUC #: 945673-10

Co-authors: *Ashley A3*, *Cuaranta A1,3*, *Abdelmasseh M1,3*, *Iqbal A1,3*, *Thompson E1,3*, *Munie S1,3*, *Finley R1,3*, *Todd D2,3*, *Payne B1,3*, *King C3*, *Montgomery G3*, *King C3*, *Yurchak M 1*, *Willis J2,3*, *Gorka A2*, *Kadiyala V2,3*, and *Sanabria J1,3*

1Department of Surgery, Marshall University Joan Edwards School of Medicine, Huntington, WV, USA. 2 Marshall Institute for Interdisciplinary Research, Marshall University Joan Edward School of Medicine, Huntington, WV, USA. 3Department of Nutrition and Metabolomic Core Facility, Case Western Reserve University School of Medicine, Cleveland, OH, USA.

VALUE ASSESSMENT OF SERVICE LINE EPIGASTRIC & UMBILICAL (EU) HERNIA REPAIR AT A TERTIARY ACADEMIC HEALTH NETWORK SYSTEM OVER 12 YEARS.

Over a million hernia repairs (HR) are performed per year in the US, where 10-15% are EU hernia repairs, with a recurrence rate higher than inguinal hernias. We aim to evaluate the value of service line EU hernia repair in our health network system.

Clinical variables (v=84) from patients (>18yo) who underwent umbilical/epigastric (EU) hernia repair were retrieved from a Health System warehouse retrospectively (Jan-2010 to July-2016) and prospectively (Aug-2016 to Dec-2020) under IRB-approved protocols. The quality domain (Observed/Expected) was assessed on index admission by grading post-operative complications (standardized grading system, PC), length of stay (LOS), 30-day readmission (RA), percentage of textbook cases (TBC), and net promoter score as a surrogate of patient satisfaction (PS). As surrogates for cost domain, total hospital charge (TC) accrued for admission/re-admission and reimbursement index (RI) were used. Univariate and multivariate analyses were performed using SPSS.

Open (58%) vs. MI (42%) EU hernia repairs were performed on 1,489 patients with a gender distribution ratio of 3:2 for males, at a mean age and BMI of 53.8±14.7 years and 33.5±9.3 kg/m², respectively. Open and MI repair was comparable, nevertheless, mesh placement was significantly associated with a higher LOS (1.5 vs 1.1days, p<0.01), total PC (12.6 vs. 3.7%, p<0.01), RA (4.7 vs. 1.6%, p<0.05), and TC (\$29,021 vs. \$24,800, p<0.05). Sex-male, type of Dx-epigastric, comorbidity-ESRD, and mesh placement were predicted PC. Age (>65), gender-male and ASA>2 were risk factors for RA.

The service line epigastric/umbilical hernia repair demonstrated a high value in our healthcare network system. The type of hernia, and mesh placement were risk factors for PC, while age strongly predicted RA.

Poster # 30
Abstract # 69
Name: Tewodros Ayele
Level: Resident
Type: Clinical
IRB / IACUC #: NA

Budd-Chiari Syndrome Diagnosis Achieved With High Clinical Suspicion Raised by EUS-Guided Portal Pressures and Liver Biopsy

Budd Chiari syndrome (BCS) is a rare syndrome due to hepatic venous obstruction in the absence of cardiac cause, mostly secondary to thrombosis. As high as 80% of patients present with ascites. The diagnosis should be suspected in patient with acute or chronic liver disease without identified cause. Venous obstruction can be seen on Doppler ultrasound, CT, or MRI of the hepatic veins and inferior vena cava. In some cases, hepatic venogram is needed for its diagnostic and therapeutic advantages. We report a 50-year-old woman with BCS who underwent successful wire recanalization, angioplasty and thrombolysis of the right hepatic vein

Case report

50-year-old woman with no significant past medical history presented with abdominal distension and bilateral lower extremity swelling of two weeks duration. On exam, abdomen was distended with positive signs of fluid collection with +3 bilateral lower extremity edema. Labs revealed total bilirubin 3.3 direct bilirubin 1.4, alkaline phosphatase 477, ALT 38, AST 96, PT 14.4, INR 1.35.

Ultrasound showed Heterogeneous appearance of liver and large volume ascites. Doppler study showed normal hepatic and portal venous flow.

Abdominal MRI showed hepatic steatosis and caudate lobe hypertrophy. Large volume paracentesis was done with analysis showing SAAG of 3.1, WBC 364, Neutrophils 8.

EGD revealed large esophageal varices. Viral hepatitis panel, ceruloplasmin, alpha-1antitripsin, ASMA, AMA antibodies were negative. EUS guided liver biopsy and portal pressure measurement was done showing venous pressure gradient of 13 consistent with portal hypertension. Liver biopsy showed grade 2 fibrosis and zone 3 congestion. Hepatic venogram showed chronically occluded right hepatic vein on which successful wire recanalization, angioplasty and thrombolysis was done. Further workup also was positive for JAK 2 mutation suggesting polycythemia vera as the underlying cause. Beta blocker and diuretics were started. Patient showed significant improvement with ascites and MELD score.

First line investigation for diagnosis of BCS is doppler ultrasound which reveals the obstruction in hepatic veins however in cases where it does not, MRI can show findings associated with hepatic vein obstruction like caudate lobe hypertrophy which in our case was seen and led us to further investigate. Elevated IVC pressure found on EUS, and caudate lobe hypertrophy found on imaging should hint suspicion of BCS. Hepatic venogram remains the gold standard modality giving both diagnostic and therapeutic advantages.

Poster # 31
Abstract # 125
Name: Dustin Miller
Level: Resident
Type: Case Study
IRB / IACUC #: NA

Co-authors: Brandi Holthaus, Marie Frazier, Benjamin Karabasz, Jacob Kilgore, Mariana Lanata, J Michael Waldeck, and Kate Waldeck

Two Cases of Severe Neonatal Human Parechovirus Infection Treated with Intravenous Immunoglobulin and Systemic Corticosteroids

Human parechoviruses (HPeV) are non-enveloped RNA viruses previously classified as enteroviruses. HPeV infections were thought to be rare, yet with the increase availability of molecular testing it has been found to be the second most common cause of fever, sepsis and meningitis in the neonatal population. Commonly these are self-limited infections with overall good outcomes. However, more recent strains have been associated with more serious clinical sequelae leading to a CDC issued health advisory related to severe HPeV infections in neonates. Currently, there are no recommend therapies for severe HPeV, although intravenous immunoglobulin (IVIG) has been used in some case reports and has demonstrated some success for severe enterovirus sepsis.⁴ The theory is HPeV IgG transfusion can mitigate acute viremia.^{5 6} A few case reports have also used high dose steroids with reported success.⁷ A small autopsy case series suggests direct viral infection and resulting inflammation of the CNS vascular smooth muscle as the etiology for the striking resulting leukomalacia,⁸ providing a potential explanation for the benefit of pulse steroids. This therapy is used less frequently due to unclear data and the risks of immune suppression in the setting of active viremia.

We present a case series of two infants admitted to the pediatric intensive care unit (PICU) of Hoops Family Children's Hospital with severe HPeV sepsis and encephalitis.

Case 1

A previously healthy, ex 36.6 week 18-day-old male infant was admitted for a 1-day history of poor feeding, irritability, and high-pitched cry. Physical exam on admission was significant only for poor peripheral perfusion which improved with 20cc/kg of fluid resuscitation. Initial labs were remarkable only for mild AST (93 units/L) and ALT (98 units/L) elevation, and a minimally elevated CRP (0.31, upper limit of normal 0.3). Supportive treatment for dehydration was initiated, but 12 hours after admission he became lethargic with minimal response to stimuli and loss of newborn reflexes, hypothermic (95.5 F), and developed an irregular respiratory pattern with resultant respiratory acidosis. On hospital day (HD) 2, he was transferred to the PICU and placed on BiPAP, with initial improvement in respiratory acidosis. A full septic work up was obtained and antibiotic therapy with ampicillin and gentamicin was initiated. CSF analysis showed no pleocytosis with a normal protein and glucose, but a CSF PCR panel was positive for HPeV. The Pediatric Infectious Disease (ID) team was consulted at this time. A lab workup for possible inborn error of metabolism was also initiated and ultimately returned negative.

By HD 3, patient had required significant fluid resuscitation for hemodynamic instability, and was intubated due to recurrent apnea. He also developed several abnormal laboratory findings, including significant bandemia (> 40%), very high procalcitonin (28 ng/mL), profound troponin leak (478 pg/mL, upper limit of normal 79 pg/mL), a high pro-B type brain natriuretic peptide (pBNP) (3,854 pg/mL), and a persistent metabolic acidosis requiring bicarbonate administration due to hypotension. He also developed thrombocytopenia, and a coagulation panel was obtained that was consistent with disseminated intravascular coagulation (DIC) but was also particularly remarkable for very low

fibrinogen (< 50 mg/dL). Hematology was consulted and he was treated with fresh frozen plasma (FFP), cryoprecipitate and vitamin K. Liver enzymes continued to rise and peaked in the 200s on hospital day 3. An echocardiogram (ECHO) revealed normal function. Long term electroencephalogram (EEG) monitoring (LTM) was placed due to the apneic episodes, and EEG showed frequent interictal subclinical seizure activity reflecting status epilepticus with seizure focus in the left frontal-temporal-central region, for which he was treated first with levetiracetam, then phenobarbital, to achieve seizure control. All seizure activity was subclinical. Due to EEG findings, in consultation with ID, a single dose of IVIG was given just after midnight on HD 4.

On hospital days 4-5, his EEG continued to have focal abnormalities in the left frontal-temporal-central region, but there were no clear seizures seen, and on HD 6, a non-contrasted MRI was read as normal. On HD 7 he had recurrence of subclinical status epilepticus on LTM for which phenobarbital was added. His troponin levels had slowly trended down but remained quite elevated (> 180), but his pBNP levels continued to rise dramatically, to over 160,000 by day 7. A repeat ECHO was obtained and notable for mild LV dilation with low-normal left ventricular systolic function, EF ~50 suggestive of possible viral myocarditis. His PT/PTT/INR had all normalized, but he continued to require cryoprecipitate transfusions for recurrent fibrinogen levels < 100. At this time, the PICU team became concerned that the pBNP elevation was of CNS origin and that the fibrinogen consumption was from the CNS injury,⁹ as it has been shown that pBNP can be significantly elevated in viral encephalitis in children.¹⁰ Given these concerns, and the echocardiogram findings, he was re-started on IVIG on HD 7, 1g/kg/day x 5 days. Over the course of day 7, his seizure frequency increased, and fosphenytoin was started with good response. Given ongoing fibrinogen consumption and rising D-dimer, as well as rising pBNP, a repeat contrasted MRI and MRV were obtained to rule out a thrombotic or necrotic process. This scan was notable for severe restricted diffusion in the white matter of bilateral cerebral hemispheres, the internal and external capsules, the corpus callosum, and thalami as well as a few areas of punctate hemorrhage. There were no thrombi seen.

On HD 8-9, his pBNP had dropped from > 175,000 to 42,000 while troponins increased to 250-300. He also did not require cryoprecipitate for 48 hours post-reinitiation of IVIG. Unfortunately, his EEG continued to worsen with bilateral epileptiform activity. He was started on lacosamide with minimal improvement, and on HD 10 a pentobarbital drip was started to induce burst suppression. After a discussion with ID and the family about the risks of high dose steroids with possible concurrent viremia, the team elected to start a methylprednisolone 30mg/kg/day burst x 3 days followed by a taper.

He was maintained in burst suppression until HD 17. His last dose of IVIG was on HD 11, and his last dose of high dose steroids was on HD 14. He required no further cryoprecipitate transfusions after HD 9. His pBNP continued to drop rapidly, down to 1,532 on HD 16. He was weaned completely off of pentobarbital on HD 18 and was seizure free on clobazam, lacosamide, levetiracetam, and a midazolam infusion. Once midazolam infusion was stopped, he required addition of topiramate and then oxcarbazepine to achieve complete seizure control.

An MRI on HD 22 revealed severe, widespread leukomalacia. However, the patient remained seizure free. He was successfully extubated on HD 33. He did require thickened formula due to reflux but had no suck/swallow dysfunction. He was able to be weaned from clobazam and lacosamide prior to discharge with no recurrence of seizure activity. Ultimately, he was discharged home on oral (PO) feeds on HD 55 on levetiracetam, oxcarbazepine, and topiramate. His neurological examination at that time was non focal, tone was normal, with good startle to noise, and he was fixing and tracking appropriately.

Case 2:

A previously healthy 7-day old ex 37-week infant was admitted to the PICU for hypothermia (94F), decreased tone, and apnea. Physical exam revealed marked cutaneous erythema/vasodilation without desquamation, hypotonicity, and decreased responsiveness. Initial labs were remarkable for significant bacteremia, hypoglycemia, and mild metabolic acidosis, with normal inflammatory markers. She was placed briefly on BiPAP before being intubated for recurrent apnea on HD 2. A modified septic work up was done as she was too unstable for lumbar puncture, and she was started on ampicillin, gentamicin, and acyclovir pending lumbar puncture (LP). LTM was also started because of apneic spells. She received 80cc/kg of crystalloid fluid resuscitation in the first 24 hours, with transient improvement. By HD 2 she was requiring high dose epinephrine and norepinephrine infusions to maintain adequate systemic blood pressure. A coagulation panel was consistent with DIC and she received vitamin K and FFP. She continued to require high dose pressors on HD 3, at which point a pBNP (16,649) and troponin (661) were obtained. An echocardiogram done that day was grossly normal. EEG remained normal for age. She was also found to have a very high procalcitonin, which peaked at 61 on HD 3. A serum PCR for HPeV sent on this day was positive, but did not result until HD 10.

On hospital day 4, her EEG began to show some asymmetry. Her coagulopathy corrected with FFP and her hemodynamics were stable enough for LP. There was no CSF pleocytosis, but the PCR returned positive for HPeV. At this time, ID was consulted and IVIG 1g/kg/day x 5 days was initiated. Given the EEG changes, she was loaded with levetiracetam prophylactically, and EEG normalized that night. Her pBNP stabilized at around 18,000 on HD 5-6, her troponin downtrended (241), as did her procalcitonin. By the evening of HD 6, she was weaned off of pressors and an MRI/MRV was obtained overnight, revealing small foci of restricted diffusion within the bilateral periventricular white matter. On the morning of hospital day 7, she had recurrence of asymmetric, but non-epileptiform, EEG changes. That same day, her pBNP increased to 25,253 despite declining troponin and inflammatory markers. Her fibrinogen also dropped and she again required FFP. Given recurrence of lateralized EEG findings correlating with known ischemia on MRI, rising pBNP, and dropping fibrinogen, the family was offered high dose steroid therapy. After a risk/benefit discussion, they elected to proceed with high dose methylprednisolone, which was started on the afternoon of HD 7.

She continued to have intermittent lateralized spikes on EEG on hospital day 8, but her EEG normalized on day 9 and was subsequently discontinued. Her pBNP peaked at 43,502 on HD 9 then dropped by more than 50% on HD 10 to 21,170 and continued to downtrend until discharge. She required no further cryoprecipitate transfusions after day 7. A repeat MRI obtained on HD 12 showed the same area of, now subacute, bilateral periventricular white matter ischemic changes with no new areas of infarction or restricted diffusion. She was extubated on HD 14, transferred to the pediatric floor on HD 15, and was able to be discharged home feeding by breast and bottle on HD 17 on levetiracetam monotherapy. She had a normal neurological examination for age.

HPeV is a common viral illness that can cause severe disease including shock, encephalitis resulting in leukomalacia, and likely myocarditis in neonates. This year (2022) we are seeing increased severe disease in neonates, with worst outcomes including increased mortality. To date, there are no specific therapies recommended to modulate severe disease in these neonates. Our case series demonstrates interesting laboratory findings, correlating rising pBNP and dropping fibrinogen to worsening neurological/EEG findings, with a temporal improvement in these laboratory findings after administration of both IVIG and steroids. Our patients tolerated methylprednisolone well when initiated once hemodynamically stable. In our patient in which IVIG and methylprednisolone were started earlier, the clinical outcome was significantly improved compared to the one with later initiation, suggesting earlier initiation of these therapies may be beneficial. More robust studies are required to understand impact of IVIG and steroids and their appropriate timing in these cases.

Poster # 32
Abstract # 41
Name: Joseph Newman
Level: Resident
Type: Case Study
IRB / IACUC #: NA

A case of new-onset mania with overlying catatonia in a patient with COVID-19 infection

A variety of neuropsychiatric disorders have been described in association with infection by SARS-CoV-2, the causative agent responsible for Coronavirus Disease 19 (COVID-19). The range of neuropsychiatric presentations that has been documented include delirium, catatonia, psychosis, and mania. We herein report a presentation of new-onset mania with overlying catatonia in an adult with no prior diagnosed psychiatric disorders that manifested following diagnosis of COVID-19, ultimately requiring inpatient psychiatric hospitalization for treatment. Numerous hypotheses have been proposed to elucidate the exact mechanism of how SARS-CoV-2 can lead to these neuropsychiatric manifestations. It is presumed that direct CNS infiltration, possibly via interaction with ACE2 receptors, and cytokine network dysregulation may result in neural injury thus resulting in an array of behavioral changes. This case provides an example of the various neuropsychiatric symptoms that may present in COVID-19 infection, as well as the complexities and difficulties of managing neuropsychiatric disorders with active COVID-19 infection.

Poster # 33

Abstract # 16

Name: Kevin Reger

Level: Medical Student

Type: Case Study

IRB / IACUC #: NA

Authors: 1. Kevin Reger MUSOM student

2. Lindsay Ruth-Littlehales MD, MU Neurology Resident

3. Jared Hollinger MD, MU Neurology Attending physician

The Growing Incidence Of Lyme Disease in West Virginia and its Misdiagnosis as Bell's Palsy

Lyme disease is a zoonotic spirochete infection in humans due to *Borrelia burgdorferi*, the only known spirochete in the *Borrelia* genus capable of causing Lyme disease in North America. It is transmitted by the *Ixodes scapularis* tick that is classically associated with the endemicity of the Northeast region of the United States. Lyme disease of the CNS leads to Lyme neuroborreliosis (LNB). We present an initial misdiagnosis of LNB as Idiopathic Bell's palsy. A 25-year-old female with acute unilateral left facial weakness presented to a local emergency department, where she was diagnosed with Idiopathic Bell's palsy and prescribed a Prednisone taper and Valacyclovir with no additional testing. Only partial symptomatic improvement was noted at her follow-up appointment with her local neurologist's office. History of outdoor activity was disclosed, though she had no recollection of tick exposure. Serological testing subsequently returned positive for acute Lyme disease. Data available from the CDC and the West Virginia Office of Epidemiology and Prevention Services (OEPS) show that the incidence of *Borrelia burgdorferi* infection has aggressively spread across West Virginia in the past ten years, having risen from 6.9 per 100,000 people in 2010 to 39.2 per 100,000 in 2019. We believe this almost seven-fold increase in incidence merits additional clinical education for West Virginia physicians to help raise suspicion of Lyme disease during endemic months to minimize delay in proper diagnosis and improve patient outcomes.

Chart review of the patient, as well as literature review of review articles and primary research.

Lyme neuroborreliosis (LNB) is the consequence of untreated *Borrelia burgdorferi* infection of the CNS. It most commonly presents as cranial neuritis, meningitis, and radiculoneuritis. These presentations may coincide with one another or, as in this case, an isolated presentation. Cranial nerve VII, the facial nerve, is the most common target in this infection and can be either unilateral or bilateral. This presents with lower motor neuron findings of facial weakness, manifesting as signs such as an asymmetric smile or drooping eyelid. This neurologic presentation is similar to that of an Idiopathic Bell's palsy which underscores the need for a high index of suspicion and screening for Lyme disease risk factors, and ultimately testing for Lyme Disease. This claim is corroborated by a retrospective study done by Pacheco et al., following Bell's palsy diagnosis in New Jersey emergency departments from February 2013 through January 2018. This study investigated 442 cases of Bell's palsy, in which 359 (81%) patients were tested for Lyme disease with serology, with 57 (16%) positive results. This study found a statistically significant increase of 7.1 times more positive Lyme tests and 1.3 times higher incidence of Idiopathic Bell's palsy during endemic months, peaking in July. This data supports our concerns to raise clinical suspicion for neuroborreliosis during these months, as New Jersey has a 3-year incidence rate of Lyme disease compared to West Virginia, 33.2 and 32.5, respectively. This high incidence rate, defined as endemic by the CDC, highlights the necessity of physicians in the West Virginia area to recognize a potential LNB diagnosis.

Lyme disease can be complex due to a widely heterogenous presentation resulting in missed or delayed diagnosis. Factors contributing to this difficulty include the patient's lack of recall of recent outdoor activities or tick exposures, rash limited to concealed areas or absence of rash, limited physical exam findings, or nonspecific symptoms such as headache, fevers, aches, or fatigue. In Marshall University Health Sciences Research Day

addition to the variety of nonspecific constitutional symptoms, facial nerve palsy is not pathognomonic to any specific disease. In a study of 559 patients with facial nerve palsy in a Lyme-endemic area, Lyme disease was found to be the etiology in 4.7% of patients.

Proper diagnosis and treatment of Lyme neuroborreliosis are essential for patient outcomes, as inappropriate treatment may lead to worsened outcomes. A 2017 study followed 51 patients with serologically confirmed Lyme disease facial nerve palsy, like the patient in our case. In this study, patients were treated with monotherapy (MT) of antibiotics, dual therapy (DT) antibiotics and corticosteroids, and triple therapy (TT) with antibiotics, corticosteroids, and antivirals. This study showed a significantly worse recovery at 12 months in DT and TT arms rather than in the antibiotic monotherapy (MT) arm, lending evidence to our claim that timely diagnosis and appropriate treatment provides better patient outcomes in LNB.

This data highlights the importance of developing an adequate clinical evaluation tool to identify Lyme disease risk factors, allowing for rapid testing. Therefore, we propose a simple questionnaire for physicians to utilize during endemic months to reduce the number of misdiagnosed Lyme Disease cases, resulting in appropriate treatment for our patients earlier in their disease course. This questionnaire can help evaluate patients for Lyme Disease exposure and risk factors. It can easily be used in primary care, emergency room, and subspecialist settings. If the answers to any of the questions in the proposed questionnaire are positive, then the CDC's recommended two-step serologic testing should be completed to assess Lyme disease. Current CDC diagnostic guidelines recommend that an ELISA for antibodies to *B. burgdorferi* should be obtained first. If the ELISA is negative, the patient does not have Lyme disease. If the ELISA is positive or borderline, a confirmatory Western blot for both IgM and IgG antibodies should be performed second. If our patient had been evaluated with the proposed questionnaire at her initial ED visit, she would have answered "yes" to one of the questions, and the CDC's two-step serologic testing procedure for Lyme Disease could have been initiated.

Questionnaire:

1. Have you lived or visited Lyme endemic areas from May to October?
2. Did you participate in outdoor activities (i.e. hiking, camping, biking, sports, dog walking, etc) in Lyme endemic areas?
3. Have you found a tick on your body recently?
4. Have you had a rash recently?

We believe this case, along with reviewed literature, supports our claim that physicians located in endemic areas for Lyme Disease should increase their clinical suspicion for LNB, particularly during the endemic months of May through October. We discussed the presentation of unilateral facial nerve palsy in a patient incorrectly diagnosed with Idiopathic Bell's palsy and the timeline of events leading to this patient's correct Lyme disease diagnosis. We proposed a clinical questionnaire to aid West Virginia physicians in detecting Lyme disease to improve patient outcomes. We believe that had this questionnaire been utilized in the ED setting during our patient's initial evaluation, the appropriate workup would have been completed earlier, providing prompt diagnosis and treatment.

Poster # 34
Abstract # 46
Name: Nicholas Royce
Level: Medical Student
Type: Case Study
IRB / IACUC #: NA

Falsely Elevated A1c: Hemoglobin Wayne Mutation in an Appalachian Family

Hemoglobin (Hgb) A1c is an important diagnostic measurement for diabetes mellitus. Typically, an elevated hemoglobin A1c is indicative of abnormal elevated blood glucose levels. However, false elevations can occur not only from decreased red blood cell turnover (such as asplenia, B12/Folate deficiency anemias), but also from certain hemoglobinopathies. The hemoglobinopathy, Hgb Wayne, which is caused by an inherited single-gene frameshift mutation in the globin gene, can cause elevated readings of hemoglobin A1c as measured by certain methods. This discrepancy with actual blood glucose levels can lead to a wrongful diagnosis of diabetes and potential dangerous treatments.

Case:

A 59-year-old obese male without significant medical history presented to discuss elevated home blood pressure readings. Laboratory studies included a Hgb A1c of 10.7% and a fasting glucose of 96 mg/dL. Lifestyle modifications for weight loss and medical management of diabetes mellitus were started. Despite a 20-pound weight loss and normal blood glucose readings, the patient had a persistently elevated hemoglobin A1c level. Additional hemoglobin A1c testing using an immunoassay, revealed an A1c of 5.3%. Suspecting a hemoglobinopathy, hemoglobin electrophoresis was performed which confirmed the presence of the rare Hgb Wayne variant. The patient's son independently presented to his physician recently. Blood work demonstrated a Hgb A1c of 10.0% and fasting glucoscan of 74 mg/dL.

Hgb A1c can be measured with a immunoassay, enzymatic assays, ion-exchange high performance Liquid Chromatography (HPLC), or boronate affinity HPLC. When ion-exchange HPLC is used, as it was initially in this case, Hgb A1c was falsely increased. As hemoglobinopathies can lead to misdiagnoses of diabetes and initiation of anti-glycemic medication, clinicians should consider this and other hemoglobinopathies when patients have glucose readings incompatible with measured glucose levels or recurrent hypoglycemia with persistent elevated Hgb A1c readings.

Poster # 35

Abstract # 67

Name: Matthew Schade

Level: Resident

Type: Case Study

IRB / IACUC #: NA

Co-authors: Austin Rush, Benjamin Karabasz, Steven Skaggs, Lauren Thompson, Joseph Werthammer and Mariana Lanata

Disseminated Adenovirus Infection in a Late Preterm Infant

Adenoviruses are a family of DNA viruses usually causing self-limited disease mostly involving respiratory and gastrointestinal tracts in children, with about 80% of infections occurring in children less than 4 years old.¹⁻² In contrast, neonatal adenovirus infection is uncommon, often disseminated with high morbidity and mortality.^{1,3} We present the first diagnosed case of disseminated adenovirus infection in the neonatal intensive care unit (NICU) at Hoop's Family Children's Hospital.

Male born at 36 weeks gestational age via vaginal delivery, weighing 2100 grams. He was admitted to well born nursery but later transferred to the NICU on day of life one (DOL 1) for hypoglycemia and hypothermia. Hypoglycemia was corrected and patient remained in the NICU advancing feeds. He was ready for discharge on DOL 7 when he acutely developed tachypnea and occasional apnea. He was placed on a nasal cannula 2 liters of room air to maintain the oxygen saturation >95%. On DOL 8 he had worsening respiratory distress requiring high flow nasal cannula. He became lethargic with poor perfusion. Full sepsis workup was performed, and patient was started on Gentamicin and Vancomycin. A lumbar puncture revealed 9 RBCs, 2 WBCs, normal protein, normal glucose, and a negative multiplex PCR panel. CSF, urine, and blood cultures were negative. CBC, LFTs and inflammatory markers were unremarkable. On DOL 9 patient continued to have increased oxygen requirements, chest X-ray was normal, respiratory multiplex PCR panel was obtained which was positive for Adenovirus. Antimicrobials were discontinued and 1g/kg of IVIG was administered. The infant was transferred to Nationwide Children's Hospital (NCH) for optimal testing capabilities, access to antiviral therapy as well as consideration for a recently published therapy with adjuvant haploidentical virus-specific T lymphocytes (VSTs).⁴ At NCH the patient received Cidofovir 1mg/kg three times weekly along with Probenecid. Nasopharyngeal, blood, CSF, and stool samples were all positive for Adenovirus confirming disseminated infection. The patient had a high blood viral load of >2,000,000 copies. He received a total of 16 days of antiviral therapy, after which the viral load was undetectable. Hearing test on DOL 31 showed moderate conductive hearing loss in the right ear. MRI of brain on DOL 33 showed numerous cysts, small amount of hemorrhage in the left calcarine sulcus, and hypomyelination vs white matter injury. The patient was successfully weaned to room air and discharged home.

Adenoviruses can cause severe and disseminated disease in neonates, especially if acquired in the first two weeks of life. With limited and suboptimal therapeutic options mortality remains as high as 85%, which is why early recognition and treatment is crucial for improved survival.¹ This case illustrates the subtle, non-specific presentation of disseminated adenovirus infection in the neonate. We present this case to familiarize clinicians with this potentially lethal illness to enable early recognition and treatment in the hopes of improving prognosis.

Poster # 36
Abstract # 131
Name: Andrew Schaver
Level: Resident
Type: Case Study
IRB / IACUC #: NA

Case Report: Conservative Management of a KD-IV Knee Dislocation

Knee dislocations are often associated with multiple ligament tears often requiring surgical management to restore knee stability. The Schenck classification (from KD-I through KD-V) describes knee dislocation injuries based on the number of ligaments injured. In addition, posterolateral knee dislocations are a subtype of knee dislocations that classically occurs after a strong rotational force causes the medial femoral condyle (MFC) to pass through the medial soft tissues of the knee thereby creating a block to closed reduction and requiring open reduction. Posterolateral knee dislocations are typically thought to be “irreducible” and there is scant literature regarding closed reduction maneuvers. In this case report, we describe a successful closed reduction maneuver of a posterolateral knee dislocation and good outcome of a KD-IV knee injury with non-operative, conservative management.

A 51-year-old female with morbid obesity sustained a right posterolateral knee dislocation after twisting injury during a fall from standing height. This was accompanied by lateral patella dislocation, and a dimple sign was present on physical exam. Distal sensation and perfusion were intact, and radiographs revealed lateral subluxation of the tibiofemoral joint with a wide medial compartment and lateral dislocation of the patella.

The patient was brought to the operating room for closed versus open reduction under general anesthesia. Prior to incision, the knee joint was flexed to 120 degrees, the tibia was internally rotated, and a large valgus force was applied to the knee joint. The dislocation was reduced, and the dimple sign disappeared. Fluoroscopy confirmed successful closed reduction of the dislocation. A knee spanning external fixator was applied, and a MRI was obtained post-operatively demonstrating ACL, PCL, MCL and LCL tears (KD-IV). The patient was managed definitively without surgical management of the ligamentous injuries and had a good outcome.

In this case, knee flexion and tibial internal rotation combined with a valgus force at the distal thigh successfully reduced a posterolateral knee dislocation. In addition, a KD-IV multi-ligamentous knee injury was managed conservatively with a good outcome demonstrating that not all patients with this pattern of injury require operative management.

Poster # 37
Abstract # 20
Name: Dylan Smith
Level: Medical Student
Type: Case Study
IRB / IACUC #: NA

Gallstone Ileus: A Case Report in a 74-Year-Old Male

Gallstone ileus is a rare complication of complicated gallbladder disease. Typically the result of a cholecystocholeduodenal fistula, a gallstone enters the small bowel and impacts in the ileum causing an obstruction. In this case study, a 74-year-old male presented to the emergency department with nausea, vomiting, and constipation for 2 weeks. CT revealed pneumobilia and a 3.1cm calcified mass in the terminal ileum. The patient was successfully treated with a robotic assisted enterotomy alone without complications.

Three main surgical treatment modalities exist for treating gallstone ileus. One of the treatments is an enterotomy alone. Another treatment is a one stage procedure that includes stone extraction via enterotomy fistula repair with or without a cholecystectomy. A third option is to perform the two-stage procedure, where enterotomy is performed first with fistula repair as a second surgery later. While the literature provides evidence for all surgical treatments, enterotomy alone remains the mainstay treatment for most patients due to their lower mortality rates and reduced postoperative complications. The patient was successfully treated with a robotic assisted enterotomy alone without complications.

Poster # 38

Abstract # 13

Name: Caleb Spainhower

Level: Medical Student

Type: Case Study

IRB / IACUC #: NA

Co-authors: Toufeeq Suliman MD, Matthew Krantz MD

Atypical Presentation of a Visceral Artery Pseudoaneurysm with Concurrent Biliary Pathology

Visceral artery aneurysms (VAAs) and visceral artery pseudoaneurysms (VAPAs) are rare and typically involve the splenic artery, celiac artery, superior and inferior mesenteric arteries and the associated branches of each [1]. The most common of these VAAs are found in the splenic artery with approximately 60% prevalence followed by hepatic artery aneurysms at 20% prevalence with the most commonly occurring hepatic artery aneurysms involving the common hepatic artery. The average age is 40 years and occurs more commonly in males than females with a two to one ratio. These VAAs and VAPAs provide a high morbidity and mortality association as the first clinical manifestation in upwards of 80% of cases is aneurysmal rupture presenting with hemodynamic instability from gastrointestinal bleeding, obstructive jaundice, and acute onset of epigastric or right upper quadrant pain [3]. These can also be incidentally found on imaging [1]. Therefore, prompt recognition is of the utmost importance, especially if the aneurysm is greater than two centimeters or associated with clinical symptoms. Risk factors for formation and progression of VAAs include atherosclerosis, congenital syndromes, autoimmune diseases, long standing hypertension and collagen disorders. VAPAs are associated with blunt or penetrating trauma, inflammation, infection, vasculitis, and iatrogenic trauma secondary to surgical and endoscopic procedures [1,2,3].

There are a few modalities to manage these rare aneurysms when identified. These approaches depend on the specified location where extrahepatic aneurysms are preferably repaired via open or endovascular surgical repair. While embolization is preferred for intrahepatic aneurysms, ruptured aneurysms are treated through an open surgical approach [4,5]. With the nature of endovascular repair being minimally invasive, this therapeutic approach tends to be the standard of care in most situations, however there are still many indications to utilize open surgery. The decision for open versus endovascular approach is based on the clinical presentation, baseline anatomy and surgeon preference[5].

Case Description -

The patient is a 67-year-old male who presented to our facility with concern for acute cholecystitis as well as an incidental two centimeter hepatic artery pseudoaneurysm seen on CT at an outside facility. He presented to his local emergency department with one day of abdominal pain located in the RUQ with associated nausea, vomiting and anorexia and denied a previous history of abdominal pain or trauma. Imaging showed a distended gallbladder with cholelithiasis and wall thickening along with a common bile duct stone and a two centimeter pseudoaneurysm of the common hepatic artery between its origin and the gastroduodenal artery. He denied any use of tobacco, diabetes mellitus and coronary artery disease but medical history was significant with poorly controlled hypertension and concern for non-alcoholic steatohepatitis.

He was started on IV antibiotics for acute cholecystitis and blood pressure was controlled. Due to the multiple acute conditions, a multidisciplinary discussion was held between General Surgery, Vascular Surgery and Gastroenterology and the decision was made to proceed with angiogram and stenting of the common hepatic pseudoaneurysm. Once appropriate access was obtained, the pseudoaneurysm was excluded with a 7 x 39 Viabahn balloon expandable stent and completion angiogram performed to confirm lack of flow into the pseudoaneurysm. Of note, he did require heparinization for the procedure

and was started on antiplatelet therapy post operatively as per the standard of care.

He was then taken for ERCP which showed choledocholithiasis as well as an obstructive cystic duct stone. Sphincterotomy was performed and the common bile duct cannulated, and balloon sweep performed with removal of sludge and stones. A double J cystic duct stent was then placed for treatment of cholecystitis. His abdominal pain resolved, and he will be scheduled for elective laparoscopic cholecystectomy in approximately three months once antiplatelet therapy can be held.

Visceral artery pseudoaneurysms are rare but have significant morbidity and mortality risk if allowed to progress to rupture. Therefore, prompt recognition of these aneurysms is of utmost importance through imaging or clinical suspicion. The Society for Vascular Surgery guidelines recommend repair of hepatic artery pseudoaneurysm when the diagnosis is made. Though many can present asymptotically and be found incidentally, others can present with obstructive jaundice, vague abdominal pain, gastrointestinal hemorrhage, or uniquely alongside cholecystitis as this patient. VAAs and VAPAs should be considered in the differential for emergency department physicians and surgeons in patients that present with vague abdominal pain including overlying acute cholecystitis.

Poster # 39
Abstract # 116
Name: Rawan Elhamdani
Level: Medical Student
Type: Clinical
IRB / IACUC #: 1830960-1

Retrospective Case Series of Babies Developing Severe Retinopathy of Prematurity Requiring Intravitreal Injections at Cabell Huntington Hospital

Retinopathy of prematurity (ROP) is a developmental retinal vasoproliferative disease which primarily affects premature infants and is the leading cause of childhood blindness worldwide. Treatment of severe ROP with intravitreal injection of an angiogenesis inhibitor, bevacizumab (Avastin), was first reported in the literature in 2008. Treatment at our tertiary neonatal intensive care unit (NICU) at Cabell Huntington Hospital in Huntington, West Virginia using this method in place of peripheral retina ablative laser treatment began in 2014. Current ROP screening guidelines for retina examination of premature babies is based on gestational age at birth and birth weight. This study describes the associated risk factors in neonates who developed severe ROP requiring intravitreal injection at our institution by a single pediatric ophthalmologist over the past eight years.

After obtaining IRB approval, a retrospective chart review identified neonates born at Cabell Huntington Hospital between 2013-2022 diagnosed with severe ROP requiring treatment by a single pediatric ophthalmologist. The resulting 20 charts were reviewed by three independent reviewers. Each premature newborn's clinical course was evaluated for potential risk factors leading to severe ROP including gestational age at birth, maternal drug use, weight at birth and 4 weeks, type and duration of respiratory support, route of delivery, Apgar scores, race, sex, associated systemic complications, time to development of severe ROP requiring initial treatment, and need for further ROP treatment due to recurrence.

A total of 20 patient charts were reviewed and their data analyzed. Average gestational age at birth was 24 weeks. Nine were vaginal deliveries. Apgars at 1 and 5 minutes averaged 5.4 and 6.8 respectively. The male to female ratio was 11:9. The racial background of the babies was not diverse, with 19 of the 20 babies (95%) being Caucasian and one baby identified as African American. Maternal drug use was detected in 5 of 19 mothers at delivery. Fourteen of the pregnancies were single gestation with the other 6 being surviving twins. The mean time to development of severe ROP requiring treatment was 86 days (12 weeks). The mean gestational age at diagnosis of severe ROP was 36 weeks. Average weight gain occurred in 19 of the 20 babies at 4 weeks of age and was 154g from birth weight. One baby lost 125g from their birth weight at 4 weeks. The mean percent weight gain at 4 weeks was 28.55%. Seventeen babies were diagnosed with bronchopulmonary dysplasia (BPD). All of the babies were diagnosed with anemia and treated with multiple units of packed red blood cells. Intraventricular hemorrhage was diagnosed in 12 (60%). Thirteen of the babies (65%) were diagnosed with sepsis during their NICU clinical course. All of the babies required respiratory support for over 100 days; 17 were hospitalized for the first 100 days of life.

There were 3 babies who experienced recurrence of their ROP after intravitreal injection. The time to recurrence ranged from 21 to 144 days. Interestingly, these babies were all Caucasian males. Comparisons were performed between the babies requiring treatment and babies not requiring treatment for ROP. There were 642 babies meeting criteria for ROP examination (1500g or less or gestational age of less than 31 weeks) from 2013 to date. Only 20 of the 642 (3.12%) progressed to severe ROP requiring treatment. Severe ROP requiring treatment in our NICU occurred only in the most premature babies all ≤ 26 weeks gestational age and < 900 g at birth.

Current criteria for ROP screening examination are based on birth weight ≤ 1500 g and/or gestational age ≤ 30 weeks. From 2013 to present, there were 642 babies meeting criteria for ROP screening at Marshall University Health Sciences Research Day

CHH NICU, of which 20 (3.12%) progressed to require treatment for severe ROP. Nationally, the rate of severe ROP requiring treatment among at risk premature infants ranges from 4% to 10%. In our NICU the premature babies developing severe ROP tended to be not only the smallest (< 900g) and earliest gestational age (\leq 26 weeks), but also the most critically ill babies. Associated risk factors in these babies with severe ROP requiring treatment at our institution included neonatal course with sepsis, anemia, intraventricular hemorrhage, and severe respiratory system deficiencies. The identification of these risk factors is helpful in guiding future interventions and neonatal care in these babies at high risk of blindness if their ROP is not detected and promptly and appropriately treated.

Poster # 40

Abstract # 50

Name: Trenton Hayes

Level: Resident

Type: Clinical

IRB / IACUC #: 1778537-2

Internet Use and Isolation in the Rural, Community-Dwelling 80+ Year Olds

In today's world, communication infrastructures and norms have adjusted to allow more to be done online than ever before. Those with reliable high speed internet connections have access to many services, including those that allow for socialization. This study aimed to explore whether having access to the internet prevented isolation and loneliness among Appalachian patients aged 80+, a population particularly susceptible to mental and physical consequences of loneliness and isolation.

Hypothesis: Appalachian patients age 80+ who have access to internet will report stronger social networks and less feelings of loneliness than those without internet access.

A survey was prospectively given to patients of 80 years old or greater about their internet use habits and their perceived loneliness. Data were analyzed using the simple T-table test. A $p=0.05$ was utilized to signify statistical significance.

Of the 28 patients surveyed, 19 (65.52%) utilized the internet. Internet users were older (88.6 vs 85.6 yo) and trended both toward being married (53% vs 44%) and away from living with a family (0.05% vs 33%). Most used the internet <1 hour (68.42%), had cellular internet (57.89%), utilized a personal computer for access (47.37%), and used it for news and social media (both 36.84%). Internet users were less likely to be isolated ($p=0.05$).

Reliable access to an internet connection can keep elderly patients safely connected to friends and family in the face of a global pandemic, decreasing the risk of mental and physical sequelae of loneliness and isolation.

Poster # 41
Abstract # 93
Name: Anisha Valluri
Level: Medical Student
Type: Case Study
IRB / IACUC #: NA

Generalized Violaceous Papulosquamous Eruptions in an HIV positive female

The rates of HIV and syphilis co-infection have steadily risen, and infection with syphilis has been shown to increase the risk of HIV transmission in high-risk populations. The clinical manifestations of syphilis can vary in patients based on HIV status. This case highlights the growing incidence of HIV and syphilis in patient populations.

A 25-year-old gravida 2, para 2, female with a history of poorly controlled HIV presented to the dermatology clinic for evaluation of one-month history of a generalized asymptomatic rash. She also complained of a headache unrelieved by aspirin, paracetamol, and caffeine. She denied vomiting, neck stiffness, tingling, numbness, or fatigue.

Mucocutaneous examination revealed several ill-defined violaceous papules and plaques with predominantly peripheral scaling over her face, trunk, and extremities, including her palms and soles (Figure 1a). Multiple ill-defined healing erosion with peripheral serpiginous violaceous borders was present in the buccal mucosa (Figure 1b). The lesions over the palms and soles were well-demarcated with a coppery hue (Figure 1c). In addition, there were well defined violaceous papules over the labia majora (Figure 1d).

Gentle pressure on the lesions on the back with a blunt object resulted in severe tenderness. The patient has a history of HIV with non-compliance to antiretroviral therapy. History also positive for prior chlamydia and gonorrhea infections. She exhibited high-risk sexual behavior.

Our patient had major risk factors for syphilis transmission including a history of unprotected sexual activity with multiple partners, prior sexually transmitted diseases, and HIV infection. Other risk factors include intravenous drug use and men who have sex with men. Physical examination of our patient was positive for deep dermal tenderness upon palpation of her lesions with a blunt object. This is known as the Buschke-Ollendorff sign and is strongly associated with secondary syphilis.

Poster # 42
Abstract # 14
Name: Seneca Williams
Level: Medical Student
Type: Case Study
IRB / IACUC #: NA

Use of Mandibular Distraction Osteogenesis to Correct Micrognathia and Airway Obstruction in Newborn Female

We present a case of Pierre Robin sequence and neonatal abstinence syndrome (NAS) in a newborn female patient to highlight the surgical technique of mandibular distraction osteogenesis to correct airway obstruction due to micrognathia. The patient presented as a transport after delivery due to respiratory distress. She had a cleft palate and micrognathia. The absence of other dysmorphic features diagnosed her with non-syndromic Pierre Robin sequence. Mandibular distraction osteogenesis was performed to solve her upper airway obstruction. This procedure allowed the patient to be weaned from all respiratory support and nasogastric tube feeds by the end of her hospitalization. She was able to be discharged home weeks before her internal hardware was surgically removed. Mandibular distraction osteogenesis was previously unavailable in rural Appalachia, making this case novel to the area. WV is disproportionately affected by the ongoing opioid epidemic in the United States. There is currently little literature exploring a potential association between substance abuse during pregnancy and PRS. Our case presents a possible avenue of new research into substance-induced birth anomalies.

Poster # 43

Abstract # 103

Name: Jacqueline Cavendish

Level: Masters Student

Type: Clinical

IRB / IACUC #: 1891947-1

Authors: Cavendish, Jacqueline, Cecchetti, Alfred, Lamichhane, Rajan, Murughiyan, Usha, Sundaram, Umapathy

A comparative analysis of the trends of H. Pylori in Appalachia: A retrospective chart review

H. pylori is a bacterium that can cause chronic gastritis, peptic ulcer disease, and gastric cancer. H. pylori infection is associated with lower socioeconomic status, rural living conditions, and contaminated water sources. While the rate of H. pylori infection in the United States is decreasing, little is known about H. pylori presence in the Appalachian region. This study hypothesizes that the trend of H. pylori infection in the Appalachian population is increasing or decreasing at a slower rate than the background population. Additionally, this study hypothesizes that rural location and obesity are positively correlated with rates of H. pylori infection in the Appalachian population.

This is a descriptive study using multi-year (2019-2022) retrospective data obtained during patients' regular healthcare system interactions. The data is from health institutions including Cabell Huntington Hospital, Marshall Health, and St. Mary's Hospital contained within the Appalachian Center for Cellular transport in Obesity Related Disorders, Appalachian Informatics Platform (ACCORD-AIP) developed by the Appalachian Clinical and Translational Science Institute's Division of Clinical Informatics. We used appropriate ICD 9/10 diagnosis codes to detect patients who have been tested for H. pylori. We also collected zip code, body mass index, gender, age, and year of admission.

Poster # 44
Abstract # 104
Name: Zachary Wright
Level: Medical Student
Type: Basic
IRB / IACUC #: 1807776

Predictable Factors Associated with Hepatitis C Infections

Hepatitis C (HCV) infections have previously been correlated with many predictable factors such as a history of IVDU and homelessness, however, few studies have investigated its correlation with a mental health diagnosis singularly. The aim of our study is to examine the connection of mental health diseases with HCV infection with and without simultaneous IVDU to determine its significance by itself.

Using a confusion matrix with the outcome variables being HCV status, our data calculated the predictable accuracy of predetermined variables and then used the new logistic regression model to re-evaluate statistically significant variables.

Among those in the study, 249 participants were non-IV drug users with 38 individuals (15.26%) having HCV. Of the 38, 26 (10.44%) had a mental health diagnosis with the remaining 12 (4.82%) having no diagnosis. Our results found statistical significance in association with IVDU, individuals with homelessness, those who are in an unsafe environment, and those who have a mental health diagnosis.

With few previous studies investigating the correlation of mental health with HCV outside the setting of IVDU, our study results are important as they suggest a significant link between the two and further propose a question of undiscovered predictable factors associated with HCV infection.

Poster # 45
Abstract # 78
Name: Sophia Anton
Level: Medical Student
Type: Clinical
IRB / IACUC #: 1662986-6

Compassion Fatigue in First Responders: analysis of the COMPASS program

First responders experience increasing rates of burnout and compassion fatigue from the opioid crisis and an ongoing global pandemic. These challenges add more stress to a stressful profession. To combat the mental health problems in these occupations, local municipal departments are utilizing external interventions as potential mental health therapies. The COMPASS Project was designed to better understand the mental health status of individuals in the fire department (FD) and police department (PD) and improve their quality of life by normalizing the open discussion of mental and physical health.

Compassion fatigue can be seen in first responders, which should be evident in how they participate in the COMPASS program interventions.

A retrospective analysis of the 2022 COMPASS data was conducted to look for demographic and testing trends. Data were analyzed with simple t-table tests, using a $p=0.05$ to signify statistical significance.

Results were evenly split between FD ($n=31$) and PD ($n=30$), except for the former having 5 supervisors and the latter classifying 12 supervisors ($p=0.037$). No differences were seen in seniority ($p=0.284$) and number COMPASS interventions ($p=0.310$) between departments, but supervisors trended toward more interventions ($p=0.065$). Wellness, Depression, PTSD, Emotional Support, and Resilience results were not statistically different for either department or job description. Supervisors reported less physical activity ($p=0.006$) and poorer eating habits ($p=0.040$). The PD had higher burnout rates ($p=0.007$).

The FD trended toward more use of the Activities/Event intervention ($p=0.073$). Supervisors trended toward more COMPASS App use ($p=0.061$). Seniority trended toward less Physical Coaching ($p=0.058$). Wellness scores improved with Training App use ($p=0.027$). Physical Activity ($p=0.132$) scores trended lower with COMPASS App use.

Based on the COMPASS project data from 2022, no significant differences occurred between the FD and PD, other than more burnout in the PD. Training App use correlated with increased Wellness. Other interventions show promise in improving mental health but sample size limits statistical significance. As more data is collected, new findings can shape future interventions.

Poster # 46

Abstract # 95

Name: Joseph Chirico

Level: Medical Student

Type: Case Study

IRB / IACUC #: NA

Authors: Joe Chirico, MSIV and Wesam Frandah, MD

Utilization of Endoscopic Ultrasound in the Diagnosis of a Cystic Lymphangioma of the Pancreas

ABSTRACT

Cystic lymphangiomas of the pancreas are exceedingly rare benign neoplasms, representing approximately 0.2% of all cystic lesions of the pancreas. While the exact etiology remains unclear, the predominant theory posits that they result from congenital malformations of lymphatic channels. Here we present a case of a 29-year-old African American woman who was found to have a 7.5 X 4.9 cm multicystic mass of the head of the pancreas on computed tomography for evaluation of epigastric pain as well as nausea and vomiting. The patient then underwent endoscopic ultrasound-guided fine needle aspiration of the lesion, which revealed a thick white fluid high in amylase and triglycerides, findings consistent with the condition. Historically diagnosed following complete surgical resection, advances in ultrasonographic technology have allowed for a more conservative, yet equally effective approach. This case demonstrates the utility of endoscopic ultrasound in the diagnosis of the condition, and the importance of keeping cystic pancreatic lymphangioma on the differential.

Describe pathophysiology, presentation and diagnosis of cystic lymphangioma of the pancreas.

Endoscopic ultrasound is a minimally invasive and effective tool in diagnosing cystic lymphangioma of the pancreas.

As above.

Poster # 47
Abstract # 24
Name: Heba Boustany
Level: Medical Student
Type: Case Study
IRB / IACUC #: NA

Case Report: Naltrexone for Binge Eating and Food Obsession Related to Trauma

Naltrexone is an opioid antagonist commonly used to treat alcohol use disorder and opioid use disorder by acting on the opioid reward system in the brain. Naltrexone has also shown evidence of off-label success in the treatment of impulsive/compulsive behaviors driven by the reward pathway, such as binge eating, purging (Stancil et al, 2019), and aggression and hyperactivity in ASD (Chobane, et al, 2000). This case report explores the use of naltrexone in a young woman with a history of food-related trauma, ASD, and schizoaffective disorder, bipolar type. The patient had been reportedly deprived of food and water repeatedly in her childhood by her parents which has resulted in psychogenic polydipsia, bingeing, and food obsessive behaviors observed in the inpatient psychiatric setting.

We present the case of a 28 year old woman with intellectual disability, ASD, severe food-related trauma, and schizoaffective disorder, bipolar type. This patient has been in inpatient psychiatric care for the past 8 years, and has been transferred from several facilities due to aggressive behavior. The patient has been observed to have episodes of aggression towards the staff and copatients related to food-obsession and hyperfixation on appetite. Medication options for controlling impulsive behavior were explored and included lisdexamfetamine, which was unavailable in the facility pharmacy, methylphenidate, which was not tolerated by the patient, and naltrexone. A trial of 50mg of naltrexone daily was initiated.

After 30 days of continuous naltrexone therapy, no episodes of aggression related to food-obsession were reported, observed fixation on appetite was decreased, as well as thoughts of food. After 60 days of therapy, the patient continues to do well, with no episodes reported.

This case demonstrates the effectiveness of the utilization of naltrexone in the treatment of food-obsessive impulsive behaviors and aggression through antagonism of the opioid reward pathway.

Chabane, N., Leboyer, M. & Mouren-Simeoni, M.C. (2000). Opiate antagonists in children and adolescents. *European Child & Adolescent Psychiatry* 9, S44–S50.
<https://doi.org/10.1007/s007870070018>

Stancil, S. L., Adelman, W., Dietz, A., & Abdel-Rahman, S. (2019). Naltrexone Reduces Binge Eating and Purging in Adolescents in an Eating Disorder Program. *Journal of child and adolescent psychopharmacology*, 29(9), 721–724. <https://doi.org/10.1089/cap.2019.0056>

Poster # 48

Abstract # 26

Name: Tanner Bakhshi

Level: MD/PhD

Type: Case Study

IRB / IACUC# NA

Co-authors: Emily Hendricks, M.D.²

Evan McClanahan, M.D.¹

Scott Gibbs, M.D.³

Adam M. Franks, M.D.¹

Kathleen M. O'Hanlon, M.D.¹

1. Department of Family and Community Health, Marshall University Joan C. Edwards School of Medicine, Huntington, WV, 25701
2. Department of Internal Medicine, West Virginia University School of Medicine, Morgantown, WV, 26506
3. Department of Otolaryngology, Marshall University Joan C. Edwards School of Medicine, Huntington, WV, 25701

B-Cell Non-Hodgkin's Lymphoma: an aggressive thyroid mass in an older adult

Primary thyroid lymphoma (PTL) is a rare malignancy of the thyroid gland. It is more common in the elderly, females, and those with Hashimoto's thyroiditis (HT). Diffuse large B-cell lymphoma (DLBCL) is the most common subtype. PTL typically presents as a rapidly enlarging, painless neck mass. Recognition of PTL requires a high degree of clinical suspicion, as compressive symptoms can soon follow. Thus, prompt identification and management is crucial.

A 68-year-old male presented to the Family Medicine walk-in clinic with a one-week history of sore throat and dysphonia. A follow-up visit several days later revealed neck swelling and cervical adenopathy. Computed tomography (CT) showed a 2.7-cm solid mass in the right lateral wall of the supraglottic larynx between the hyoid bone and right thyroid cartilage. Positron emission tomography (PET) showed hypermetabolic bilateral thyroid nodules and right cervical adenopathy. Anaplastic thyroid carcinoma (ATC) was initially suspected due to its aggressive nature, but CT-guided core biopsies were consistent with Stage II DLBCL, non-germinal center type. Due to compressive symptoms and impending airway collapse, a tracheostomy was performed roughly 3 weeks after initial presentation. After 3 cycles of R-CHOP chemotherapy and consolidated radiotherapy to a total dose of 3060 cGy in 17 fractions, repeat PET/CT confirmed complete resolution seven months later.

This case highlights the challenges of recognizing, diagnosing, and treating a patient with PTL in a primary-care setting. The patient initially presented with non-specific upper respiratory symptoms, is a male, and had not yet been diagnosed with HT. An important take-away is that PTL can be distinguished from ATC by a confirmed diagnosis of HT and the presence or absence of calcifications on CT. A correct diagnosis is essential, because ATC requires surgical resection and has a high mortality, while PTL is often curable with chemoimmunotherapy and radiation.

Poster # 49
Abstract # 136
Name: Collin Lamba
Level: Resident
Type: Case Study
IRB / IACUC #: NA

Loss of intraoperative neurological monitoring signals after prone positioning during surgery for lumbar spinal stenosis: case report

Various complications associated with prone positioning in spine surgery have been described within the literature. Patients in the prone position for a prolonged time period are subject to neurological deficits and/or loss of intraoperative signals due to compression neuropathies. However, positioning related neurological deficits are rare in lumbar spine surgery. Although intraoperative neuro monitoring (IONM) is more commonly used during spinal deformity surgery, its use in routine lumbar degenerative surgery has received mixed results.

Case Report

The authors present a case of a patient with significant lumbar spinal stenosis with complete loss of somatosensory evoked potentials (SSEPs) in his bilateral lower extremities after positioning the patient prone onto a Jackson table. After loss of signals, the patient was transferred off the operating table and returned to the supine position with return of SSEPs. A second attempt to position the patient prone on the operating table was performed. Again, there was complete loss of his bilateral lower extremity SSEPs. At that point, the decision was made to postpone the surgery and admit the patient for further work up including evaluating for spinal cord compression in the cervical and thoracic spine as well as potential vascular causes. MRI of the thoracic spine revealed a paracentral disc protrusion with resultant central and foraminal stenosis with spinal cord compression at the T9-10 level.

This case demonstrates the utility of IOMN during routine lumbar spinal surgery to potentially prevent position related neurological deficits associated with prone positioning and facilitated identifying a more cephalad area of spinal cord compression as a possible cause of loss of IOMN signals.

Poster # 50
Abstract # 105
Name: Ayesha Liaqat
Level: Resident
Type: Case Study
IRB / IACUC #: NA

Atypical Presentation of Multiloculated Pyogenic Liver Abscess in Pediatric Patient

Patient is an 8-year-old-female with a history of ruptured appendicitis at age 3 but otherwise insignificant medical history who presented to the emergency department (ED) with complaints of fatigue, reduced oral intake and recurrent fever for 8 days. Three days prior to ED arrival, the patient was evaluated by her primary care physician (PCP) and noted to have a negative Monospot, negative respiratory pathogen PCR panel, and a CRP of 29.5 mg/dL; recommended supportive care and close interval monitoring. Eventually brought to the ED due to persistent fevers refractory to antipyretics, reduced appetite, and fatigue affecting daily activities. Review of systems otherwise negative. Exposure history revealed a recent travel to Missouri approximately 2 weeks prior to initial fevers. Family stayed in a hotel, had no exposure to fresh or unchlorinated water, nor did the patient have any recent tick or mosquito exposures. Patient and her family live on a farm with cats and a dog. Neighboring property used to have livestock, but none within the last 2 years. Initial histories didn't reveal any recent injuries, but ~1 week into her stay, it was discovered that the patient had abdominal trauma from a fall and a more recent bicycle accident.

On physical examination, she was pale and ill-appearing but awake, alert and oriented. Other notable findings included dry mucous membranes with a mottled skin appearance and delayed peripheral capillary refill; however, no murmurs, organomegaly or tenderness on abdominal examination, and remaining evaluation was unremarkable. Labs demonstrated an elevated WBC of 21.06k/cmm (segmented neutrophils 83.9%), elevated CRP of 29.50 mg/dL, and elevated ESR of 83 mm/hr. Urinalysis showed 51-100/hpf with moderate leukocyte esterase and 2+nitrite but repeat Monospot and respiratory pathogen PCR panel were both negative. Blood and urine cultures were obtained, and the patient was started empirically on vancomycin and ceftriaxone before being admitted to the PICU for evidence of early septic shock with initial suspicion of a urinary source.

Renal/retroperitoneal ultrasound imaging was obtained to further evaluate potential nephrologic pathology. While no renal pathology was uncovered, patient was noted to have a complex cystic lesion (6.0 x 3.7 cm) within the right hepatic lobe of liver accompanied by smaller lesions throughout the liver. Follow-up computerized tomography (CT) of the abdomen and pelvis with IV and oral contrast demonstrated a large, multiloculated cystic and solid mass lesion with surrounding inflammation of the right lobe of the liver. CT Chest with IV contrast was also performed and revealed a pulmonary parenchymal abnormality in the anterior segment of the right upper lobe with small right sided plural effusion concerning for a congenital cystic abnormality with echotexture not similar to hepatic findings per discussion with Radiology. The Pediatric Infectious Diseases team was consulted for further management recommendations.

Antibiotics were expanded to vancomycin, cefepime, and metronidazole covering for implicated bacterial and parasitic pathogens. Patient underwent US-guided drainage of the largest hepatic abscess, with fluid described as thick and greenish in color. Cytopathology was consistent with abscess (negative for neoplasm) and the anaerobic bacterial culture was positive for both *Bacteroides fragilis* and *Fusobacterium nucleatum* ssp *fusiform*. All other cultures (e.g., aerobic bacterial, fungal, and mycobacterial) were without growth and universal PCR testing of the hepatic abscess identified only *Fusobacterium nucleatum*. *Entamoeba histolytica*, *Echinococcus*, and *Bartonella henselae* serum testing were negative. The remaining infectious workup was negative.

Patient required two more IR-guided abscess drainages before having consistently downward trending inflammatory markers, resolved fevers, and improved clinical disposition. The patient was ultimately discharged on ciprofloxacin and metronidazole to complete a 4-week total course including 2 weeks after her final procedural intervention. Repeat abdominal ultrasound 2 weeks after discharge demonstrated a decreased size and heterogenous fluid collection with some residual complex area remaining. Patient has returned to full normal daily activity without known complications to date.

Conclusions

Pyogenic liver abscesses are rare in developed countries and most commonly present with prolonged fever, abdominal pain, nausea, vomiting, cough, and/or pleural effusion. Most infectious are polymicrobial with the most implicated organisms being *Klebsiella pneumoniae*, and *Escherichia coli*. Risk factors for both development and subsequently more severe disease include immunocompromised status (e.g. malignancy, malnutrition, immunomodulatory medications), chronic granulomatous disease (CGD), sickle cell disease, diabetes mellitus, biliary tract anomalies, abdominal trauma, certain exposures increasing risk for parasitic infections, systemic sepsis, perforated appendicitis, umbilical infection or abdominal procedural intervention.

In this case, the patient had a history of perforated appendicitis, but when she was 3 years old. Repeat clinical history well into admission revealed two episodes of abdominal trauma that were potential etiologies. Further, her congenital lung abnormality could be associated with underlying liver pathology that became secondarily infected, but radiological review suggested different tissue appearances between lungs and liver cystic lesions lowering the likelihood of congenital cystic adenomatoid malformation (CCAM) of the liver. She did not have typical abdominal symptoms including nausea, vomiting, and abdominal pain. Regardless, it remains critical to consider hepatic abscess in a patient with fever of unknown origin, especially those with acute changes in appetite, abdominal or respiratory symptoms, and fatigue.

Poster # 51
Abstract # 84
Name: Vivek Yadala
Level: Fellow
Type: QI
IRB# 1953742-1

Bone Marrow Biopsy, Does CT Guidance Add Value?

Bone marrow aspirate and biopsies (BMAB) remain a corner stone in the diagnosis and management of various hematologic disorders. Specialized testing, such as cytogenetics, immunophenotypic and molecular analysis performed on these specimens, plays a crucial role in diagnosis and staging of Leukemias/Lymphomas, as well as in finding out molecular targets for potential therapeutic benefits. Thus, inadequate, and poor-quality specimens can limit making a precise diagnosis and providing optimal treatment. At our institution, we recognized that a substantial number of non-CT guided BMAB were being reported as suboptimal, although diagnosis was being made. Also, recently more CT guided (CTG) BMAB are being implemented. A drawback with CTG BMAB is scheduling delays, that can potentially result in treatment delays, and fatal outcomes especially in conditions like Acute Leukemias. Additionally, there is concern of higher cost associated with CT guided BMAB. Therefore, we performed a retrospective analysis on BMAB procedures performed at our institution between January 2019 and April 2022.

Purpose:

1. Evaluate and compare the quality of BMAB procedures performed with and without CT guidance (blind procedure) at our institution, and their respective waiting times.
2. Identify potential areas for improvement.
3. Provide data to help guide in choosing the most appropriate procedure.

We retrospectively reviewed all adult BMAB procedures performed at our institution between January 2019 and April 2022, including patient demographics. Pathology reports were reviewed for adequacy of aspirate smears and core biopsies. Samples were deemed inadequate even if one of bone marrow aspirate or core or clot specimens were described by the pathologist as “suboptimal”, “inadequate”, “fragmented”, “crushed”, “hemodiluted”, “no spicules”, or “scant”. Waiting period for the procedure was defined as the duration of time (in days) from the date of placing an order for biopsy (CTG or blind) to the date of procedure. CTG BMAB are typically performed by intervention radiologists (IR) while blind BMAB are usually performed by Oncologists (Fellows or attendings) at our institutions.

A total of 469 posterior iliac crest bone marrow aspirate and biopsy procedures were performed. More patients underwent BMAB procedure under CT guidance (285 procedures - 61% for CTG vs 184 procedures - 39% for non-CTG). More CTG BMAB samples were categorized as adequate (196 samples - 69%), compared to the non CTG (101 samples - 55%), ($p=0.02$). No statistical difference was noted in patient’s age (mean +/- SD) (61 ± 16 years for CTG vs 62 ± 18 years for non CTG with $p=0.639$) or gender (145 males in CTG vs 105 males in non CTG with $p=.22$) or Body mass index (BMI) (34.2 ± 9 kg/m² for CTG vs 33.5 ± 7 kg/m² for non CTG, $p=2.05$). The mean waiting period was longer for CTG procedure (27 days +/- 20 (0-135), compared to non CTG (15 days +/- 17 (0-105) ($p=0.031$)). Although our pathologist described a sample as “suboptimal”, a definitive diagnosis was still able to be made in all cases using the available bone marrow clot, aspirate and core specimens.

CTG BMAB procedures were more likely to result in adequate samples when compared to non-CTG procedures, however with longer waiting period and higher costs. So, we propose that obtaining non-CTG BMAB will improve cost effectiveness and reduce the wait times. To improve the adequacy of non CTG BMAB, we propose some interventions: 1. Provide an organized training during fellowship that includes theory followed by simulation, and practice-based training under supervision. 2. Discuss ICSH (International Council for Standardization in Hematology) guidelines for bone marrow adequacy

criteria with the providers. For example, the length of a core biopsy from an adult should be at least 2cm. As our study suggests significant scheduling delays with CTG BMAB, such orders when requested, may be considered as urgent procedures to avoid potential treatment delays and poor outcomes. Alternately, when an aggressive hematologic disorder like acute leukemia is suspected, blind approach may be undertaken for prompt diagnosis. Interestingly, BMI was not significantly different in the two groups. However, if locating physical landmarks is impaired by body habitus, then CT guided BMAB should be strongly considered. We would like to highlight the importance of having adequate personnel including nurse navigators, technicians who play a vital role in obtaining timely insurance clearance, and procedure scheduling.

Poster # 52

Abstract # 57

Name: Bethany Andrew

Level: Medical Student

Type: Clinical

IRB# #1903494150, #220762173 , and #2207619918

A retrospective, single-center analysis evaluating the influence of cerebral oxygen saturation on outcomes in patients requiring veno-venous extracorporeal membrane oxygenation (ECMO)

Use of non-invasive cerebral oxygen saturation (StO₂) monitoring is consistently used in pediatric extracorporeal membrane oxygenation (ECMO) due to the correlation of low cerebral oxygen saturations and neurological injury. In adult ECMO populations, however, cerebral StO₂ monitoring is only consistently used in the operating room for patients undergoing open heart surgery on cardiopulmonary bypass. Neurological injury is not only poorly understood but poorly recognized even though it is significant in ECMO patients. This study hypothesizes that by detecting cerebral saturation reductions promptly using StO₂ in veno-venous supported patients, irreversible neurocognitive insult can be treated and prevented.

A retrospective, single-center analysis of 12 of our institutional ECMO patients were selected based on the presence of severe acute respiratory failure requiring ECMO. They fulfilled EOLIA criteria for cannulation. Cerebral oxygenation monitoring using the Hemisphere (Edward Lifesciences, Irvine ,CA), ForeSight Elite tissue oximetry system (CAS Medical Systems Inc. Irvine,CA), and FloTrac (Edwards Lifesciences, Irvine, CA) platforms were used for comprehensive tracking of hemodynamics and tissue oximetry on all 12 patients during and after ECMO. Full consecutive time spent with cerebral oxygen saturations (StO₂) <60% ,or maximum duration of cerebral hypoxic events, were evaluated. Association of maximum consecutive time spent with cerebral StO₂ <60% were evaluated against mortality, length of stay, charges, and quality of life (QoL). QoL was evaluated using the 12-Item Short- Form Health survey and quality-adjusted life years (QALYs) derived from SF-12.

Compared to patients who survived, patients who died spent extended maximum consecutive time with cerebral StO₂ levels less than 60%. There was not a strong association observed between SF-12 scores and StO₂.

Patients who spent a longer time with cerebral StO₂ levels less than 60% had a higher mortality than those patients who did not. There was no strong association of SF-12 scores and StO₂ levels. Future goals are to continue to monitor cerebral StO₂ levels on veno-venous ECMO patients to expand sample size.

Poster # 53
Abstract # 137
Name: John Kinney
Level: Faculty
Type: Clinical
IRB# 1906242-1

Motivational Factors of Weight Loss in NAFLD Patients: Data From University Hospital in WV

Determining whether aesthetics or health concern drive weight loss
Retrospective review of patients undergoing EUS guided liver analysis
17 of 24 patients had lost weight (reducers) when they returned for liver biopsy. Average BMI in these patients was reduced by 0.52 and 5 had previous NAFLD diagnoses. 14 reducers met the criteria for Metabolic Syndrome. 13 reducers had a sufficient decrease in liver fat percentage to be classified into a lower stage of liver steatosis.

Health concern is a strong motivational driver in lifestyle modifications

Poster # 54
Abstract # 55
Name: Shannon Morrone
Level: Medical Student
Type: Clinical
IRB# 1778741-1

Analysis of a Division I Athletic Department's Response to COVID-19 Pandemic: 5 Lessons Learned

COVID-19 impacted college athletics. College athletes are partially sequestered but interact with other populations: other students, the community, and opposing teams. Developing detailed safety protocol to protect this population is essential to successful athletic participation in the COVID pandemic. Understanding factors predicting testing frequency and positive tests in athletic departments can inform decisions about testing and staffing for this and future pandemics.

Analysis of positive COVID-19 results within a comprehensive university athletic department protocol will uncover high- and low-risk sports plus relative risk to team-controlled-activities.

Athletic department testing and positive rates were collected from departmental data, Cabell county data was collected from the CDC surveillance, and positive percent rates (PPR) were calculated over a 45-week period. Longitudinal data was analyzed relative to team-controlled-activities. Dynamic time warp calculations assessed dissimilarities, while Granger and Wilcoxon tests assessed causality. A time series model compared county to athletic department data. Detailed agreement scores were generated. A threshold of $p < 0.05$ was used for t-table significance and Fischer Exact testing.

Overall, 201 of 20,633 tests were positive (0.97% PPR). Student-athlete numbers were highest in all categories, then adult then student staff. Differences in PPR occurred between departmental and county (59.52%; $p < 0.05$).

Contact sports were highest risk (53.03%; $p < 0.001$) inside and outside team-controlled-activities. Fomites were insignificant (19.15%; $p = 0.403$). Spring sports had lowest PPR (22.22%; $p < 0.001$). Winter sports had the highest PPR (1.15%) inside and lowest (0.00%) outside team-controlled-time. Indoor sports didn't increase positive rates inside team-controlled-activities ($p = 0.066$). Male sports had the highest percentage team positives (47.69%; $p < 0.001$) and positives outside team-controlled-activities (41.75%; $p < 0.001$).

Changes in local infection rates partially impact athletic departmental positive results, while testing rates are influenced by sport and university schedule. Direct testing resources towards high-risk sports: contact sports, all-male teams, in-season Winter and indoor sports, and sports with extended outside team-controlled-activities.

Poster # 55

Abstract # 31

Name: Mariah Morris

Level: Medical Student

Type: Educational

IRB# 1914511-1

Co-authors: Mariah N. Morris, MS, MS3, Thomas D. Wright, PhD, MS4, Pranav Balakrishnan, MD, Emily Vore, MD, and Semeret Munie, MD FACS

Effect of low-cost laparoscopic cholecystectomy simulation on medical student understanding of anatomical and medical concepts.

Simulation in medical education has been established for enhancing student skills and learning. More specifically, simulations in surgery have been utilized to train residents in both hands-on laparoscopic and VR modalities for cholecystectomy. The results of the cholecystectomy simulation training(s) enhanced clinical learning, faster procedure completion time, and fewer adverse events. Similarly, The University of Ottawa implemented a multifaceted program for medical students that included simulation workshops and educational information regarding the surgical field. The study resulted in decreased anxiety and increased confidence in medical students. One barrier to training third year medical students is cost; many simulators cost several hundred dollars per use. Therefore, we propose a low-cost hands-on laparoscopic cholecystectomy simulation to increase operating room comfort and enhance knowledge of essential anatomy in third year medical students.

Class of 2024 third year medical students at JCESOM from surgery rotations 2 and 3 completed IRB approved pre- and post-laparoscopic cholecystectomy simulation surveys. Students were assessed for their anatomical understanding of cholecystectomy pre- and post-simulation.

There was a statistically significant increase in identification of critical view of safety and its associated anatomical features in post-simulation survey (pre-simulation anatomical identification was corrected 56.25% and improved 68.75% upon post-simulation, $p < 0.05$). Additionally, there was a statistically significant improvement in identifying indications for intraoperative cholangiogram (IOC) post-simulation (pre-simulation identification for indications of IOC was corrected to 56.25% and improved to 81.0%, $p < 0.01$).

Using low-cost cholecystectomy simulation is an effective teaching modality for third year medical students in clerkships.

Poster # 56
Abstract # 72
Name: Zachary Wright
Level: Medical Student
Type: Case Study
IRB / IACUC #: NA

Rare Case of Plasma Cell Infiltration-Induced Cirrhosis

Multiple myeloma (MM) is a type of malignancy that arises from the unorganized replication of plasma cells within the bone marrow. The overproduction of these cells damages systems throughout the body leading to early asymptomatic symptoms that can rapidly progress to systemic signs of disease. Liver involvement with MM is less common and generally occurs through plasma cell infiltration, light chain/amyloid deposition, and biliary obstruction. Though it can occur, the probability of it presenting near the time of diagnosis of MM is very rare and associated with poorer outcomes.

A 59-year-old male presented with generalized weakness, shortness of breath and weight gain. Physical exam showed sign of ascites and hepatomegaly. PMH was significant for esophageal cancer and a recent diagnosis of MM. No history of acute or chronic liver disease or cirrhosis risk factors. CT scan showed cardiomegaly, bilateral pleural effusions, pulmonary edema, and cirrhosis with abdominal ascites. Labs was unremarkable other than normocytic anemia. An echocardiogram showed mild reduced ejection fraction (47%) with speckle tracking suggestive of cardiac amyloidosis.

Abdominal ultrasound confirmed appearance of cirrhosis, ascites, and right pleural effusion. Cirrhosis work up revealed negative hepatitis panel, normal alpha-1 antitrypsin, and normal ceruloplasmin. EGD was performed and ruled out extracellular vesicles (EV) but noted type I isolated gastric varices. Liver biopsy confirmed cirrhosis and showed portal tract damage with severe extensive plasma cell infiltration. Additionally, fragments of hepatic parenchymal showed disrupted lobular architecture by septal fibrosis and nodular formation. Immunohistochemistry was positive for CD3, CD20, CD5, BCL2, CD79a, and CD138 as well as increased lambda light chain compared to free kappa light chain.

Total Protein 5.0 g/dL
SAAG 1.9 g/dL
Left Hepatic Vein Pressure 25 Hg
Left Portal Vein Pressure 29 Hg
Portosystemic Pressure Gradient 5 Hg
EUS Guided Elastography of Liver 27 kPa

Despite extensive treatment including repeated thoracentesis and paracentesis, patient eventually developed in to decompensating liver cirrhosis.

In previous studies, plasma cell infiltration of the liver was seen in about 40% of cases of MM, but rarely lead to cirrhosis. This case is unique in that the patient had liver failure caused by cirrhosis and that it was some of the presenting symptoms. Whether due to masked signs or aggressive onset, the outcome for this diagnosis is poor and more specific factors observing liver function could have provided a more favorable outcome.

Poster # 57

Abstract # 126

Name: Justin West

Level: Medical Student

Type: Basic

IRB / IACUC #: 1912098-2

Co-authors: Nicholas Royce, MS IV; Evan McClanahan, MD; Mitch Shaver, MD; John Parker, MD; Tammy Bannister, MD; Adam M. Franks, MD

Early Surgical Interest May Be Predictive of Performance on a Virtual Reality Surgical Simulator

The use of virtual reality (VR) in orthopaedic surgery has become more prevalent since the onset of the COVID-19 pandemic not only to preserve surgical skills following a decrease in elective surgeries, but it in an effort to discover indicators in translating these abilities to performance in the operating room. Multiple studies have attempted to find significance in surgical interest in a group of medical students at various stages in their training as a possible predictor, however there are no known studies examining this correlation in subjects consisting of exclusively untrained first-year medical students. Therefore, the aim of our study is to determine if there is a significant correlation between students' interest in surgery and their performance on the VR simulator at an early stage in the medical training process.

Based on the current literature, we hypothesize that individuals who are interested in a surgical specialty will have better objective performance measures compared to students who are not interested in surgery.

Twenty-five untrained first-year medical students performed a slipped capital femoral epiphysis (SCFE) pinning on an Osso VR simulator. Subjects were shown a demonstration of the simulated procedure by a third-year resident and completed a pre-interventional survey assessing multiple predictors for performance, including surgical interest, during their orientation. They were provided access to recordings of the procedure and volunteered at various time frames over the course of a month to perform the simulation, after which a post-interventional questionnaire was completed. Participants were scored on proficiency based upon objective measurements provided by the VR simulator. We used Wilcoxon-Mann-Whitney (WMH) tests to compare the outcomes between surgical and non-surgical groups, p -value <0.05 was considered significant.

Due to the limitation in the sample size, we were not able to observe any significant difference in total surgery time (p -value=0.301), C Arm time (p -value=0.348), and Guidewire time (p -value=0.310) among the students whose interest was surgical vs those whose interest was non-surgical. However the number of retries and hints used were significantly lower (p -values= 0.013 and 0.016 respectively) among those whose interest was surgical compared to those whose interest was a non-surgical specialty. The median number of retries and hints among those whose interest was surgical were 0 and 1 respectively while the number of retries and hints among the students whose interest was not surgical were 1 and 2 respectively.

Our findings indicate that students interested in a surgical specialty could perform the procedure with fewer retries and less guidance. These findings may be beneficial in identifying markers of surgical proficiency as early as possible to both use as a screening tool for residency applications as well as introducing a pipeline program for students showing early interest in competitive surgical specialties.

Limitations are that this is a single-site study where data was collected from a batch of students from a single institute. Due to this, the analyses were underpowered and we were not able to see the significance in other outcomes such as total time, c-arm time, etc. We plan to improve the study by including more students in the future.

Poster # 58
Abstract # 87
Name: Nicholas Casingal
Level: Medical Student
Type: Basic
IRB / IACUC #: 1914511-1

Evaluation of surgery clerkship student comfort level in OR

Abstract:

Working in the operating room and performing hands on surgical tasks have been ranked the most stressful aspects of the surgery rotation by third year medical students. The low levels of OR comfort that these aspects provoke create an environment that we think is nonoptimal for student performance and learning. Therefore, it is important to assess what factors correlate with higher levels of OR comfort. In order to assess OR comfort levels, students completed a questionnaire regarding basic demographics and rated their overall comfort level prior to the rotation. It was found that students that had completed a prior OBGYN rotation had statistically significantly higher OR comfort levels than those who did not. This information is important because it can help us to identify strategies to improve comfort levels.

Background:

For many medical students, the third-year surgery clerkship marks their first time in the operating room. A combination of anxiety, nervousness, and excitement contributes to many students feeling uncomfortable. Additionally, third-year students rated going to the operating theatre as a high-stress task when compared to other medical tasks such as presenting on rounds, examining patients in the clinic, and taking histories. Furthermore, “hands-on” tasks such as assisting with a cardiac arrest, placing intravenous lines, and suturing are all classified as high in stress for medical students. Despite the stress associated with these procedures, there is a high motivation among medical students to learn. Therefore, there is a need to assess the comfort levels of medical students in the OR and provide educationally diverse modalities to enhance medical education.

Class of 2024 third year medical students at JCESOM from surgery rotations 2 (n=8) and 3 (n=11) completed an IRB approved questionnaire regarding comfort level in OR. Additionally, medical interest and prior OR experience was measured as well. Questions were graded on a 5-point Likert scale and mean values were determined with Graph Pad Prism 9 software (La Jolla, California). Statistical inference was conducted using an unpaired t test, $p < 0.05$ was considered to be statistically significant.

The overall comfort level was nearly identical for both rotations 2 and 3 with values of 2.75 (out of 5) and 2.72 (out of 5) respectively. The students who completed the OBGYN clerkship before surgery reported statistically significantly higher levels of OR comfort ($P < 0.05$).

The survey results demonstrated that students who had completed OR training prior to surgery were more comfortable than those who had not.

Poster # 59

Abstract # 39

Name: Shelley St Clair

Level: Medical Student

Type: Case Study

IRB / IACUC #: NA

Co-authors/Co-presenter: Kristen Sanders, MS1

Resolution of Neurogenic Pruritus with Cervical Epidural Spinal Injections

Treatment of neurogenic pruritus has proven to be difficult due to multifactorial pathology. Underlying causes of neurogenic pruritus are mysterious, but evidence suggests that resolution of symptoms can be achieved via cervical epidural spinal injections. Our aim was to determine efficacy of underutilized treatment modalities in the management of neurogenic pruritus.

Cases involving patients treated for neurogenic pruritus were retrospectively investigated to further strengthen evidence of CESI efficacy.

Of 3 patients, 3 were successfully treated with CESI or TPI. Patients experienced varying levels of relief ranging from significant to complete resolution.

There is a high index of suspicion that the named treatment modalities are effective at treating the resulting neurogenic pruritus caused by various underlying pathology. Results suggest cervical epidural spinal injections are efficacious in symptom resolution and should be further investigated to potentially alter current treatment algorithms.

Poster # 60
Abstract # 132
Name: Lauren Thompson
Level: Fellow
Type: Case Study
IRB / IACUC #: NA

Perinatal stroke- An unusual cause of early myoclonic encephalopathy with a favorable outcome

Case report with literature review

The severe outcome typically seen with early myoclonic epilepsy (EME) makes discussion with caregivers regarding this diagnosis quite delicate. We present a previously unreported etiology of EME that had a more favorable outcome than would be expected from the electroclinical diagnosis alone. This highlights the need for a thorough work-up before providing anticipatory guidance to families. It also serves as a reminder that seizures in neonates often have atypical, subtle presentations and should be considered in the differential for apnea, particularly in a term neonate.

Poster # 61

Abstract # 59

Name: Seth Jude

Level: Undergraduate

Type: Clinical

IRB / IACUC #: 1842315

Co-authors: Dustin Darnell, Mark Timmons Ph.D, and Gary McIlvain, EdD

The Width of the Medial Joint Space Width can be Reliability Measured During the Anterior Medial Rotation Test.

The medial collateral ligament (MCL) provides knee stability in the frontal plane. The deep fibers of the MCL (dMCL) have been shown to provide transverse plane stability. The anterior medial (ANTMED) rotation stress test is used to determine the frontal and transverse plane stability of the knee. An accurate assessment of knee valgus and rotational stability is important in determining the treatment plan for medial knee injuries. The purpose of this investigation was to determine the inter-rater reliability of the ANTMED rotation test. The study tested the hypothesis that the medial joint space width would decrease during the ANTMED rotation test.

Fifty participants without a history of medial knee injury were included in the study. The medial joint space width was measured on ultrasound images of the medial knee taken during the ANTMED rotation test. Two measures of the medial joint space width were made in an unstressed and stressed condition. Both the right and left knees were measured. The intraclass correlation coefficient (ICC), standard error of measure (SEM), and the minimal detectable change (MDC) were calculated for the joint space width measurements.

The mean joint space width in the unstressed condition was 7.42 ± 1.28 mm on the right knee and left side 7.95 ± 1.39 mm. In the stressed condition, the right side medial joint space width was 7.42 ± 1.28 mm and the left side was 7.95 ± 1.39 mm. The ICC values were 0.876 and 0.811 in the unstressed condition and 0.847 and 0.768 in the stressed condition. The mean SEM was .529mm in unstressed conditions and 0.751mm in stressed conditions. The mean MDC was 0.749mm in unstressed conditions and 1.06mm in stressed conditions.

The results of the current study suggest that the width of the medial joint changes during the ANTMED rotation test and that width of the medial joint space during the test can be measured consistently. Future work needs to determine the reliability of the anterior medial knee rotation test in patients with a medial knee injury.

Poster # 62
Abstract # 68
Name: Colby Gresak
Level: Medical Student
Type: Educational
IRB / IACUC #: 585

Cardiometabolic and Behavioral Effects of Vaping and Exercise in Adolescent, Catalase Mice.

The popularity of electronic cigarette usage has skyrocketed in recent years. Research has mainly focused on the cardiometabolic and behavioral effects of vaping in adult users while neglecting to include adolescents. Oxidative Stress that is increased due to vaping plays a role in increasing cardiometabolic risk.

Hypothesis: Lowering oxidative stress by increasing antioxidants such as catalase or by exercising, will lower the harmful effects of vaping.

Our team utilized twelve, adolescent mice that over-expressed catalase to help illustrate the cardiometabolic and behavioral effects of vaping and exercise in adolescents age. The mice were divided into three groups: sedentary, exercise, and vaping. The exercise group ran five times/week, for thirty minutes, at (15m/min). The vaping group was exposed to 6 mg/ml nicotine (passive vaping chamber) for two hours a day, five times/week. Data obtained includes weekly body weights, and behavioral testing performed at baseline and every two weeks. MRI were conducted at 0, 4 and 8 weeks. At the end of eight weeks, blood was collected using cardiac puncture and lipid/glucose profile measured.

The body weights showed a significant decrease in weight for the exercised and vaped mice in contrast to the sedentary mice. The Rota-rod and Open-Field test indicated no significance between groups, but the grip strength showed a decrease in the vape group. There were no significant differences in fat/lean mass or the cardiometabolic panel.

In conclusion, vaping did not appear to have any effects on sedentary groups. But its effects on exercise groups remain to be elucidated. Limitations to the study included no wild-type comparison group, small sample size, utilization of only male mice and a short testing period.

Poster # 63
Abstract # 90
Name: Calyb King
Level: Medical Student
Type: Clinical
IRB / IACUC #: 945673-10

Trauma Service Line Assessment at a Tertiary Academic Health Network System over 12 Years

Trauma is the third leading cause of global mortality and the leading cause of moderate to severe disability with at least 45 million trauma-related cases a year. This study aims to assess the value of the trauma service line in an academic tertiary health network system.

Clinical variables (v=84) from trauma patients (>18yo) were captured from a Health System Warehouse retrospectively (2010-16) and on a dedicated Redcap dataset prospectively (2016-21) using IRB-approved protocols. Subjects were graded by the Injury Severity Score (ISS) into mild/moderate (ISS≤15) and severe (ISS>15) cases. Observed(O)/Expected(E) quality domains were assessed by graded post-operative complications (PC), length of stay (LOS), readmission within 30 days (RA), patient satisfaction (PS), and textbook cases (TB). Total charges (TC) and reimbursement index (RI) were used as surrogates for cost (O/E). Uni/multivariable analyses were performed via SPSS. Scorecards were developed to domain's surrogates.

Of the 38% of the evaluated and admitted injured patients (16,044/41,927), 3.2% required urgent surgical interventions (Laparotomy= 413 and Thoracotomy=115). Although m:f ratio (7:3) was similar, Tho patients were older and had a lower BMI when compared to Lap patients (51.8±19.9 vs. 41.8±19.1 years, and 27.4±7 vs. 28.6±9.9 Kg/m², respectively, p<0.05), as well as a lower ISS (16.2±11.1 vs. 18.3±12.6, respectively, p<0.05). PC, RA, and TB rates for both Lap and Tho were lower than national average, but LOS was significantly prolonged (p<0.05). ISS, medical center, and ASA class predicted PC, whereas ISS and ASA class affected LOS (p<0.05), and BMI and CKD predicted RA. Domain's surrogates are displayed in Table 1.

The service line Trauma holds a high value in our health network system. Protocols to decrease LOS are being implemented.

Poster # 64

Abstract # 128

Name: Eric Mendenhall

Level: Resident

Type: Clinical

IRB / IACUC #: 17261406

Co-authors: Eric Mendenhall, Mary Beth Hogan, Matthew Nudelman, Deborah L Preston, Hayley Weese, Garrett Muckleroy, Jordan Needens, Katherine Addicott, Jessica Dailey Haas, Ashlee Roybal, Dustin Miller, Jesse Cottrell, Cynthia Massey, Balaji Govindaswami

Examination of Cord Blood at Birth in Women with SARS-CoV2 Exposure and/or Vaccination During Pregnancy and Relationship to Fetal Cortisol, Ferritin, Vitamin D, and CRP

SARS-CoV2 is known to manifest a robust inflammatory response, with significant alterations in early immunologic responses. It has been well studied that maternal immunizations can result in higher and longer-lasting SARS-CoV2 IgG transference in neonates as soon as two weeks from maternal immunization. A further increase of this specific antibody occurs as time progresses from infection. Little is known, however, about maternal SARS-CoV2 infection or vaccination and their impact on early immunologic responses or anti-inflammatory mechanisms in the neonate, such as CRP, ferritin, cortisol, vitamin D or ferritin.

Mother-baby dyads (n=97) were prospectively assigned to groups with no SARS-CoV2 or vaccination exposure (control), vaccinated SARS-CoV2 negative mothers, maternal SARS-CoV2 positive/cord blood IgG titer negative, and maternal SARS-CoV2 positive/cord blood IgG titer positive. Quantitative immunoglobulins, SARS-CoV2 IgG/IgM/IgA titers, CBC, CRP, ferritin, cortisol, and vitamin D were measured in cord blood. Student's t-test, Wilcoxon rank-sum, and Chi-squared were used to compare parametric, non-parametric, and categorical data respectively. Multiple imputations were used for data missing complete at random.

Ferritin was higher in cord blood of vaccinated, SARS-CoV2 negative mothers compared to controls (p=.033). Mean Platelet Volume (MPV) was elevated in cord blood of vaccinated, SARS-CoV2 negative mothers (p=.003) as well as unvaccinated SARS-CoV2 positive mothers with IgG titer positive cord blood (p=.007) in relation to the control group. Cortisol was also higher in vaccinated mothers (p=.001) and unvaccinated maternal SARS-CoV2 positive, cord blood IgG titer positive samples (p=.009) as compared to controls. Normal biological variation occurred in the CBC, CRP, and vitamin D in all groups. Cord blood IgG titers were unanimously positive in all vaccinated mothers.

1) Ferritin was higher in cord blood of vaccinated SARS-CoV2 negative mothers, 2) MPV was higher in the cord blood of vaccinated mothers, and unvaccinated mothers with positive cord blood titers, and 3) cortisol also higher in vaccinated mothers as well as unvaccinated mothers with positive cord blood titers. The implication of acute phase reactant and cortisol elevation effects upon fetal development after SARS-CoV2 disease or vaccination is unknown and merits further investigation.

Poster # 65
Abstract # 44
Name: Raleigh Elk
Level: Undergraduate
Type: Clinical
IRB / IACUC #: 1656045

An Acute Bout of Throwing on the Shoulder decreases Shoulder Strength and Subacromial space width in Inexperienced Overhead Throwers.

Background: Athletes that participate in overhead throwing commonly have shoulder pain and injury. These injuries develop over time and are all frequently attributed to muscle fatigue resulting from repeated bouts of throwing. Differences in shoulder strength and supraspinatus thickness have been reported in experienced throwing athletes but little is known about the effects of throwing on the inexperienced thrower.

Study Hypothesis: After a bout of overhead throwing, participants will show decreased shoulder strength, subacromial space width, and increased supraspinatus tendon thickness.

Methods: Nine right-handed participants without a history of shoulder injury took part in the investigation, and all provided their written informed consent. Participants were not experienced throwing athletes. The participants' shoulder strength and range of motion were measured using standard clinical procedures. Ultrasound images of their shoulders were taken to measure tendon width and subacromial space width. The participant then performed 60 overhead throws of a softball. All measurements of strength, range of motion, and ultrasound imaging were repeated.

Results: After the throwing bout decreases in strength of external rotation (difference = 0.7Kg, $p = 0.026$) and mid trap strength (difference = 1.1Kg, $p = 0.002$). No differences in supraspinatus tendon thickness were found. The subacromial space width decreased at 45° arm elevation (difference = 0.55mm, $p = 0.051$). No differences in muscle strength, tendon thickness, or subacromial space were found on the left side after the throwing bout.

Conclusion: This information can help in identifying functional strength issues which with intervention can limit and prevent impingement syndrome and other functional injuries of the shoulder. This ongoing study with inexperienced throwers shows a pattern of strength issues after one bout of throwing which can be used to help athletes subject to repetitive bouts by creating strengthening plans to prevent the fatigue seen in the study and reduced the risk of developing shoulder injury.

Poster # 66
Abstract # 60
Name: Dustin Darnell
Level: Undergraduate
Type: Clinical
IRB / IACUC #: 1822315

Ultrasound Measured Differences in Medial Knee Joint Space Width during the Valgus Stress Test and The Anterior Medial Rotation Test.

The medial collateral ligament (MCL) provides knee stability in the frontal plane. The deep fibers of the MCL (dMCL) have been shown to provide transverse plane stability. The anterior medial rotation (ANTMED) stress test is used to determine the frontal and transverse plane stability of the knee. An accurate assessment of knee valgus stability is important in determining the rehabilitation of the knee. The purpose of this investigation was to determine the difference in the knee joint space width under valgus stress (VS) compared to the ANTMED rotation test.

Fifty individuals without a history of knee injury participated in this investigation. The medial joint space width was measured on ultrasound images of the medial knee taken during the ANTMED rotation test and the VS test. The change in the width of the medial knee joint during the VS test and the anterior medial rotation test was compared. Paired t-tests were used to detect differences between the unstressed and stressed conditions and the difference between the tests.

The width of knee joint space increased under both tests. The joint space increase was less during the ANTMED rotation (right knee=2.77mm, $t=18.332$, $P<0.001$, left knee = 3.52mm in the left) as opposed to pure VS (right knee=3.83mm, $t=25.159$, $P<0.001$, left knee = 4.24mm, $t=27.835$, $P<0.001$). The change in the medial joint space during the ANTMED test was greater during the VS test (right knee=1.07mm, $t = 7.476$, $P < 0.001$, left knee = 1.23mm, $t=5.034$, $P<0.001$).

It was determined that there was a statistical difference in the medial joint space of both knees between the valgus test and the ANTMED rotation test. The observed differences in the width of the joint space are determined to be greater than the minimal detectable change (MDC = 0.794mm) established in conjunction with the current study. The results of the current investigation suggest that the ANTMED knee rotation test could detect differences in joint transverse plane stability associated with injury to the dMCL.

Poster # 67

Abstract # 17

Name: Amber Sturgill

Level: Medical Student

Type: Educational

IRB / IACUC #: 531

Nephrotoxic potential of 1,2,4-trichlorobenzene via oxidative stress induced lipid peroxidation

Trichlorobenzenes (TCBs) are used as intermediates in many industrial processes including use making dyes and herbicides. In addition, TCBs are environmental contaminants in air and wastewater. Toxicity of chlorinated benzenes includes in vivo nephrotoxicity in rats. Previous research in our lab suggested that trichlorobenzenes are directly toxic to isolated renal cortical cells (IRCC) in male Fischer 344 rats. In addition, previous research has suggested that both cytochrome P450 inhibitors and antioxidants had attenuating effects on the toxic potential of TCBs. This finding suggests that metabolites of TCBs are likely involved in nephrotoxicity through oxidative stress or another cytotoxic pathway. The purpose of this study was to evaluate oxidative stress as a potential metabolic pathway impacting the nephrotoxic potential of 1,2,4-TCB.

IRCC (~4 million cells/mL; 3mL) were incubated with shaking at 37°C under a 95% oxygen/5% carbon dioxide atmosphere with 1,2,4-TCB (0.25, 0.5, 1.0mM) or dimethyl sulfoxide (DMSO) for 15, 30, 60, and 90 minutes. Cytotoxicity was determined by assessing trypan blue exclusion of IRCC, measuring changes in lactate dehydrogenase (LDH) release, and protein carbonyl formation (OxyBlot).

1,2,4-TCB toxicity was generally concentration and time dependent with the greatest toxicity occurring with 1.0mM at 90 minutes. However, 1,2,4-TCB exposure did not show significant evidence of oxidative stress through protein carbonyl formation.

This suggests that oxidative stress/lipid peroxidation does not play a major causative role in 1,2,4-TCB nephrotoxicity.

Poster # 68
Abstract # 119
Name: Leandro Barbosa
Level: Post Doc
Type: Basic
IRB / IACUC# 682

Na/K-ATPase Signaling Tonicly Inhibits Sodium Reabsorption in the Renal Proximal Tubule

Two-thirds of the filtered sodium, potassium, chloride, bicarbonate, phosphate, and water, as well as virtually all the filtered glucose and amino acids, are reabsorbed in the renal proximal tubule (RPT). Basolateral Na/K-ATPase (NKA) in the RPT is classically known for driving sodium reabsorption through its enzymatic ion-pumping function, and its stimulation is associated with anti-natriuresis. In contrast, physiological concentrations of cardiotonic steroids (CTS), the specific ligands of NKA, activate non-enzymatic signaling function of NKA that stimulates cellular redistribution of basolateral NKA and apical Na/H-Exchanger (NHE3), resulting in inhibition of transepithelial sodium flux in RPT cells. We tested the physiological relevance of the enzymatic and non-enzymatic functions of NKA in RPT Na⁺ reabsorption using genetic approaches.

RPT LLC-PK1 and PY-17 cells (90% NKA α 1 knockdown in LLC-PK1) cells were used to evaluate the sodium transport in Transwell filter plate and to verify the NHE3 and NBCe1A protein levels. We used SGLT2-Cre/LoxP mice to knockdown NKA α 1 specifically in RPT cells. To evaluate renal function, adult mice were housed in metabolic cage and urine was collected for 24h. Urine output, Na⁺ excretion, and lithium clearance were analyzed. At the end of the study, renal cortex and medulla were collected to perform western blotting and immunohistochemistry experiments to evaluate the protein levels and distribution of the key RPT transporters NHE3 and NBCe1A. To confirm the role of NHE3, we developed a RPT α 1^{-/-}-NHE3^{-/-} double knockout mice and verified the protein levels and urine output and Na⁺ excretion.

Knockdown of 90% of NKA α 1 in RPT LLC-PK1 cells activated NHE3 (decreased phospho/total ratio) and increased Na/HCO₃ cotransporter (NBCe1A) expression. In hypomorphic RPT NKA α 1^{-/-} mice, a 70% decrease in RPT NKA α 1 decreased the inhibitory phosphorylation of NHE3 and increased membrane abundance of NHE3 and NBCe1A. Strikingly, a 65% decrease in urine output and absolute Na⁺ excretion was observed, without evidence of renal injury, driven by increased RPT Na⁺ reabsorption as indicated by a 65% decrease in lithium clearance and unchanged glomerular filtration rate (GFR). The hyper-reabsorptive and anti-natriuretic phenotype of these mice was rescued upon crossing with RPT NHE3^{-/-} mice, consistent with a role of NKA/NHE3 coupling.

Hence, NKA signaling exerts a tonic inhibitory action on Na⁺ reabsorption by regulation of key apical and basolateral Na⁺ transporters, which is lifted upon NKA genetic suppression in cells and in vivo. The proposed NKA signaling on RPT Na⁺ transporters and Na⁺ handling is therefore physiologically relevant and functionally dominant. NKA signaling therefore provides a long sought-after mechanism for the natriuretic action of endogenous NKA ligands such as CTS.

Poster # 69
Abstract # 124
Name: Renat Roytenberg
Level: MD/PhD Student
Type: Basic
IRB / IACUC# not required

Vaccine-Induced Immune Thrombotic Thrombocytopenia: what do we know so far?

Vaccine-induced immune thrombotic thrombocytopenia (VITT), also known as thrombosis with thrombocytopenia syndrome, is a severe adverse reaction to coronavirus disease 2019 (COVID-19) vaccines, which occurs disproportionately in response to vaccination with non-replicating adenovirus vector (AV) vaccines. The mechanism of VITT is not well defined and it has not been resolved why cases of VITT are predominated by vaccination with AV vaccines. However, virtually all VITT patients have positive anti-platelet factor 4 (PF4) antibody titers. Subsequently, platelets are activated and depleted in an Fcγ-receptor IIa (FcγRIIa or CD32a)-dependent manner, but it is not clear why or how the anti-PF4 response is mounted. We describe the pathogenesis of VITT and provide insight into possible mechanisms that drive the formation of a PF4/polyanion complex in VITT as an amalgam of current experimental data or hypotheses.

We performed literature searches to compile and infer from laboratory data as well as clinical data. We used government statistics to report epidemiological aspects of VITT.

The formation of a PF4/polyanion complex is essential to the pathology of VITT. PF4 exists as monomeric, dimeric, and tetrameric, but is only pathogenic in its tetrameric state in VITT. PF4/polyanion complex generation is electrochemically driven and size dependent. Possible molecules that act as a scaffold for PF4/polyanion complex formation in the VITT milieu include adenoviral hexon, modified or unmodified spike protein, glycosaminoglycans (GAGs), or von Willebrand factor (vWF) multimers. Once the anti-PF4 response is mounted against PF4/polyanion complexes, multiple cell types become activated, including platelets, neutrophils, monocytes, and endothelial cells, which drive the thrombotic pathology. Blocking FcγRIIa inhibits both thrombosis and thrombocytopenia but blocking NETosis only attenuates thrombosis.

VITT is a multi-stage phenomenon where endogenous tetrameric PF4 exposes neoepitopes through complexing with some polyanion(s) and subsequently an immune response is mounted against these tetrameric PF4/polyanion complexes by marginal zone B cells. The thrombocytopenic and thrombotic sequelae are mediated by a diversity of cells, receptors, and processes, including platelets, neutrophils, FcγRIIA, vWF multimers, and NETs. Thus far, the mechanism of how or why the anti-PF4/polyanion IgG response is mounted is ultimately unresolved in VITT. The experimental data and hypotheses analyzed in this study help paint a mechanistic picture that may elucidate the pathogenesis of VITT, which will not only improve its diagnosis and treatment, but will establish a precedent for rigorous vaccine design as well.

Poster # 70
Abstract # 5
Name: Sasha Zill
Level: Faculty
Type: Basic
IRB / IACUC #: 00002205

What makes walking behavior 'naturalistic'? Feedback signaling the rate of change of force (dF/dt) in serially homologous legs of insects

Animal behaviors can be remarkably fluid and graceful. We have studied how signals from sense organs that monitor forces contribute to feedback control of walking in insects.

Sensory activities of receptors that encode forces via strains in the exoskeleton (tibial campaniform sensilla, CS Groups 6A and 6B) were recorded extracellularly. Forces were applied to the front legs of stick insects using conventional and 'naturalistic' waveforms (joint torques calculated from experiments in freely walking animals, including steps with variance from the mean).

These studies have shown that discharges of front leg 6B sensilla 1) most closely follow increases in the rate of change of force (dF/dt) rather than the force magnitude and 2) show substantial hysteresis to transient force decrements. Firing of 6A sensilla, which can signal large force decreases in middle and hind legs, was longer in duration during front leg stepping, in part due to the smaller forces generated by front legs. Discharges of receptors in front legs, therefore, form a continuum monitoring force variations in walking, and potentially in other behaviors such as tactile exploration. We are currently also characterizing the sensitivities of front leg CS by using waveforms that increase gradually (exponentially) to a level and include transient perturbations: studies to date have confirmed the sensitivities of tibial sensilla to transient force increments and decrements in dF/dt. We have also used these data in tests of a mathematical model of the receptors and replicated the findings for front leg receptors

The model results support the notion that the recorded discharge patterns result from the comparison between one fast- and one slowly-responding component in the system. Dynamic properties such as discharge adaptation in response to constant force and responses to decreasing forces emerge from this single mechanism. Overall, our biological data and modeling studies show that tibial campaniform sensilla in all legs monitor the rate of change of force (dF/dt) and support the idea that these signals can be used to adjust muscle contractions to aid in generating the smooth accelerations and decelerations characteristic of 'naturalistic' movements that occur in walking

Poster # 71
Abstract # 32
Name: Jinju Wang
Level: Faculty
Type: Basic
IRB / IACUC #: 762

MiRNA profiling of exosomes derived from perivascular adipocyte tissue in type 2 diabetic mice

Exosomes (EXs), a major type of extracellular vesicles, are emerging as a novel type of intercellular communicators. MicroRNAs (miRs) are one of the major executors of EXs. The previous study shows that lean and obesity adipocyte tissue EXs could elicit different effects in response to insulin sensitivity, the underlying mechanism is related to their carried miRs. Given EX cargoes and function vary on their cellular status, we speculate the miR profiling of EXs derived from the perivascular adipose tissue (PVAT) is altered in diabetic conditions.

EXs were isolated from the PVAT tissue of type 2 diabetic db/db and control db/c mice. EX size and concentration were analyzed by nanoparticle tracking analysis. The miR profiling of PVAT-EXs was analyzed by mmu-miR miRome profiling kit. The miRs of interest were further validated by qRT-PCR.

1) The PVAT-EXs level was higher in diabetic db/db mice than that in non-diabetic db/c mice; 2) In db/db mice, exosomal miRs profile was changed. The exosomal miRs, miR-223, miR-181a, miR-146a, miR-34a, and miR-210, were either down-regulated or up-regulated > 3-fold when comparing that in db/c mice. Among these candidate miRs, miR-181a, miR-223, miR-210, and miR-146a might be involved in modulating adipose tissue inflammation and/or vascular function. MiR-34a could participate in white adipose tissue browning, macrophage polarization, and glucose tolerance.

Our data have demonstrated that the miR profiling of PVAT-derived EXs is changed in type 2 diabetic conditions, which suggests the functions of these EXs might be altered in diabetic conditions.

Poster # 72
Abstract # 6
Name: Paige Vanaman
Level: Medical Student
Type: Basic
IRB / IACUC #: NA

Effect of increased IL6 levels found in obesity on Triple Negative Breast Cancer

Background: Triple negative breast cancer (TNBC) is an aggressive form of breast cancer that lacks the estrogen (ER), progesterone (PR), and human epidermal growth factor receptor 2 (HER2) receptors. TNBC occurs in 13 out of 10,000 women annually, with obesity being a high-risk factor [1]. Obese patients are in a constant state of inflammation. This chronic state of inflammation is due to excess macronutrients within adipose tissue, resulting in an increase release of inflammatory mediators, linking cancer to obesity [2]. As a result of obesity, adipose tissue secretions are changed, leading to an increased release of multiple proteins, including interleukin 6. Interleukins are cytokines produced by leukocytes that are responsible for regulating the body's immune responses. Interleukin-6 (IL-6) is a multifunctional cytokine that plays a central role in host defense due to its wide range of immune and hematopoietic activities and its potent ability to induce the acute phase response [3]. In a tumor microenvironment, IL-6 signaling acts to encourage proliferation, invasiveness, survival, and metastasis of tumor cells, while strongly suppressing the antitumor immune response [4]. Based on this information, we aim to demonstrate that increased levels of IL6 released from obese adipose tissue increases the migration and invasion in TNBC.

Hypothesis: IL-6 plays a role in the migration of TNBC in obese patients.

Methods: Triple negative breast cancer cells, MDA-MB-231/436, were grown in DMEM + 10% FBS media until 100% confluent. Wound healing assays were then performed in DMEM 0.1% FBS media. Scratch was done in a cross section made with a 200uL pipet tip. The cells were then treated with human recombinant IL-6 at 1 and 10ng/mL (R & D Systems, Minneapolis, MN). Images were taken at 0 hours and 24 hours to visualize wound closure. Analysis was performed using Image J. Fold change was calculated. Treated cells were then succumbed to cell lysis via RIPA with the addition of protease and phosphatase inhibitors, followed by western blot analysis. The following proteins were probed, phosphorylated S6, total S6, phosphorylated NDRG1, total NDRG1 (concentration 1:1000), and β -actin (1:5000) (Cell Signaling Technologies Danvers, MA).

Results: The migration of MDA-MB-231/436 cells was not increased by IL-6 (1 and 10 ng/mL). However, IL-6 did significantly (p -value < 0.05) increase protein expression of the breast cancer cell stem cell marker CD44 in both TNBC cell lines.

Conclusion: These findings show that IL-6 alone is not sufficient to stimulate the migration of TNBC cells, however, the observed increase in CD44 in response to IL-6 suggests the cytokine may play a role TNBC stemness.

Poster # 73
Abstract # 45
Name: Cecilia Sierra-Bakhshi
Level: Doctoral Student
Type: Basic
IRB / IACUC #: 753

Salmonella Infection in Diabetic Mice

Type 2 diabetes (T2D) is a risk factor for bacterial infections including those caused by nontyphoidal *Salmonella*. Individuals with uncontrolled T2D often experience the unusual extra-intestinal spread of *Salmonella* which can lead to life-threatening disorders. The underlying mechanism of this predisposition is not clearly understood. Additionally, studies have shown decreased population of butyrate-producing bacteria in people with T2D, we expect that the profile of microbiota-produced short chain fatty acids (SCFAs), acetate, propionate, and butyrate, is different in the gut diabetic TALLYHO mice. Butyrate is known to reduce inflammation in the gut and to be important in protecting intestinal tight junctions and the integrity of the mucin layer. We hypothesize that supplementation with tributyrin (butyrate prodrug) would decrease extra-intestinal spread of *Salmonella*.

8-week-old male TALLYHO (TH) mice were maintained on a standard chow, or on a high fat (HF) diet (45% fat) for an additional 8 weeks to promote diabetes development. Diabetic status was determined by measuring levels of glucose in blood, measurements >300 mg/dL was considered diabetic. At 16 weeks TH mice from each diet groups were orally infected with 10^6 CFU (colony forming units) of a fully virulent bioluminescent *Salmonella* Typhimurium strain, pathogen spread in individual animal was followed using in vivo imaging. The intestinal profile of short chain fatty acids (SCFAs), acetate, propionate, and butyrate in TH mice was analyzed by GC-MS (Gas Chromatography Mass Spectrometry). Post-infection, mice in both groups were given a daily dose of tributyrin (100 μ L) orally.

Salmonella spread in mice with diabetes had an unusual pattern compared to the healthy animals. Concentrations of SCFA, including butyrate were reduced in the gut of animals on HF diet compared to TH mice maintained on the standard chow. Butyrate supplementation reduced bacterial burden in animals maintained on a standard diet, but not on HFD.

A model for the study of *Salmonella* pathogenesis in diabetic host was established. We found that butyrate supplementation reduced bacterial burden in animals maintained on a standard diet, but it did not decrease the spread of *Salmonella* in diabetic mice.

Poster # 74
Abstract # 85
Name: David Shore
Level: Doctoral Student
Type: Basic
IRB / IACUC #: 751

Investigating a Novel Role for GPR68 in Oral Dysplasia

Esophageal cancer is the seventh most common malignancy worldwide and accounts for 3% of cancers in the U.S. Despite advances in therapies, survival rates for SCCHN have not significantly improved in several decades. The tumor microenvironment is associated with acidosis ($\text{pH} < 7.0$), which regulates cancer cell growth and survival, as well as inflammation. GPR68 is a proton-sensing receptor that is activated by extracellular acidification, and previously found to be expressed in SCCHN.

Here, we studied a potential role for endogenous GPR68 expression in SCCHN progression using a murine model. Age-matched control (GPR68^{+/+}) and GPR68-deficient (GPR68^{-/-}) mice were placed on drinking water containing 4-Nitroquinoline N-oxide (4NQO; 50ug/mL) for 10-12 weeks, followed by normal water for 12 weeks. To investigate the impact of GPR68 on cell growth in vitro, head and neck cancer cell lines were treated with siRNA targeting GPR68.

There were no significant differences in body weight between GPR68^{+/+} and GPR68^{-/-} mice, although there was a trend towards lower survival rates in GPR68^{-/-} mice prior to week 20. No difference was observed in the total number of tongue lesions beyond week 20; however, histological examination revealed that GPR68^{-/-} mice were more likely to have severe tongue dysplasia (45%; n=20) compared to GPR68^{+/+} (11%; n=19). Our results show that knock down of GPR68 had no significant effect on annexin-V or sulforhodamine B staining, suggesting that severe dysplasia scores were not due to intrinsic effects of GPR68 on tumor growth or survival. Further, pH had no significant effect on GPR68 gene expression in vitro.

endogenous GPR68 expression may protect against chemical-induced oral carcinogenesis. Overall, our data suggest that GPR68 may protect against oral dysplasia in a tumor-extrinsic manner.

Poster # 75
Abstract # 33
Name: Harshal Sawant
Level: Doctoral Student
Type: Basic
IRB / IACUC #: 760 and 763

The protective effects of exercise on cerebral ischemia injury in diabetes

Ischemic stroke (IS) causes neurological dysfunction due to a loss of cerebral blood flow with exaggerated cerebral damage in diabetes. Exercise has shown beneficial effects on the vascular system and diabetes by mediating inter-organ communications. However, whether and how exercise contributes preventatively to the brain after IS in type 2 diabetes (T2D) is undefined. Here, we aimed to determine the effects of exercise on the metabolism, cerebral injury, neurological function, and protein expression in the brain after IS.

T2D diabetic mice (db/db, 7-8 wks), and age/sex-matched controls (db/c) were subjected to exercise (10 m/min, 5 days/wk for 8-wks) or sedentary. Body weight and blood glucose were recorded once a week. One day after exercise, middle cerebral artery occlusion surgery was performed to induce IS. Sensorimotor deficits were assessed by the adhesive removal and corner tests two days after surgery. Afterward, the brain samples were collected for measuring the infarct size by cresyl violet staining. The proteins from the ipsilateral and contralateral brain were used for Western Blot to measure the levels of endothelial nitric oxide synthase (eNOS), neuronal NOS, NADPH oxidase (Nox2), Nox4, nuclear factor-kappa B (NF- κ B), NF- κ light polypeptide gene enhancer in B-cells inhibitor, alpha (I κ B α).

1) exercise could stabilize the blood glucose in male db/db mice and have effects on preventing blood glucose increase at the early age of female db/db mice; 2) exercise could improve sensorimotor deficits by reducing tape contact and removal time and balancing the corner turning times ($p < 0.05$); 3) the infarct size is decreased in exercised group in both db/c (18.5 \pm 2.2% and 22.2 \pm 2.5%), and db/db mice (25.6 \pm 3.1% and 35.6 \pm 3.8%, exercise vs. sedentary, $p < 0.05$); 4) proteins related to oxidative stress and inflammation were downregulated in the brain of exercised diabetic IS mice.

exercise could provide protective effects on stabilizing metabolism, improving neurological function, and reducing brain injury by downregulating the protein expression related to inflammation and oxidative stress in the brain.

Poster # 76
Abstract # 118
Name: Neema Saadevandi
Level: Medical Student
Type: Basic
IRB / IACUC #: NA

Clarifying the role of Thymidine phosphorylase on the expression of Pyruvate Kinase M2

Metabolic disorders are high-risk factors for the development of obesity and atherosclerotic cardiovascular disease. Pyruvate kinase M2 (PKM2), which catalyzes the final and rate-limiting step of glycolysis, plays a key role in regulating cell metabolism. A recent study from Wei Li's laboratory has revealed that thymidine phosphorylase (TYMP), an enzyme in the pyrimidine salvage pathway, possesses signaling functions in cells and is essential for platelet activation and thrombosis. They also found that TYMP deficiency significantly reduced PKM2 expression in mouse liver; however, the mechanism is not clear. Since TYMP is present in nuclei, we hypothesize that TYMP acts as a transcription factor or enhancer and induces PKM2 expression.

Based on mouse PKM2, transcript variant 3 (NM_001378866.1), we identified a 10 kb promoter region (PR) upstream of the start codon ATG, which is located in exon 3, and analyzed the regions conserved among different species using UCSC Genome Browser. The highly conserved regions were amplified by PCR using primers containing restriction enzyme digestion sites at their 5'-end and cloned into the PGL2-basic Luciferase plasmid. The purified plasmids were transfected into COS-7 cells using FuGene® 6 transfection reagent and the promoter activity of the cloned DNA segments was assessed by Luciferase assay with the cell lysates. Renilla Luciferase plasmid was co-transfected in all conditions as a control. Data were presented as the ratio of luciferase signal intensity to the Renilla signal intensity. To test if TYMP has promoter or enhancer activity, in some conditions, the luciferase plasmid was co-transfected with a plasmid encoding human TYMP.

Five highly conserved PRs were successfully cloned. PR #1 to #4 are located in the intron between exons 1 and 2. PR #5 is about 3 kb upstream of exon 1. Among them, only PR #5, the farthest region from the start codon, had promoter activity, which is about 70-fold higher than the control, the empty PGL-2 plasmid transfected cells. By co-transfection of PR#5 with plasmid pCDNA6B or pCDNA6B/TYMP, unfortunately, we found TYMP did not affect the promoter activity of PR#5.

We conclude that one PR located 3 kb upstream of PKM2 exon 1 has promoter activity, which is not affected by TYMP overexpression. Additional studies are needed to clarify how TYMP deficiency reduced PKM2 expression.

Poster # 77
Abstract # 79
Name: Cheston Porter
Level: Medical Student
Type: Basic
IRB / IACUC #: 753

Telomere Length Dynamics in Male TALLYHO Mice

Telomeres are protein-DNA complexes that cap linear eukaryotic chromosomes, promote genome maintenance and regulate cellular lifespan. Maintaining proper telomere length has important implications for aging, stem cell-related diseases, and cancer. In humans, telomere length shortens in response to psychological, environmental, and oxidative stress, but telomere length response to other types of stress or disease, such as obesity, diabetes and bacterial infection, is less well-understood.

TALLYHO mice are a well-known polygenic model of type 2 diabetes with moderate obesity. In this study 8-week-old male TALLYHO (TH) mice were maintained on a standard chow, or on a high fat (HF) diet (45 kcal% fat) for additional 8 weeks to promote diabetes development. As expected, animals on HF diet gained weight faster. At 16 weeks of age most mice on HF diet developed hyperglycemia (>300 mg/dL) while animals maintained on the standard chow remained normoglycemic. The analysis of circulating peripheral blood leukocyte telomere length (PBL-TL) using qPCR showed that the adult TH mice have telomeres with an average length between 2 to 8 kb. A subsequent analysis of PBL-TL on the DNA samples collected from the same animals at 10 weeks of age and 16 weeks of age showed that the telomere length decreased in mice on HF diet but remained stable in animals maintained on a standard chow. Interestingly, the difference in blood glucose levels did not affect the PBL-TL. At 16 weeks of age TH mice from the HF group were either orally infected with 10⁶ CFU (colony forming units) of fully virulent *Salmonella enterica* serotype Typhimurium or left untreated. Animals were monitored daily for the weight loss and the change in physical appearance

The infected mice fell into two distinct subgroups: a fraction of the animals quickly lost more than 10 percent of body weight and became severely sick within 4 to 7 days post infection. The remaining animals were able to maintain the body weight despite *Salmonella* presence. Surprisingly, the analysis of PBL-TL on the DNA samples collected from the same animals pre- and post-infection showed that the telomere length was significantly increased in *Salmonella*-susceptible mice but remained stable in *Salmonella*-resistant or uninfected animals.

These data indicate that while telomeres in obese mice undergo shortening, bacterial infection can cause telomeres to elongate in susceptible but not resistant mice. Thus, our study uncovered an anticipated effect of obesity and pathogen infection on telomere length.

Poster # 78

Abstract # 10

Name: Marlena Pigliacampi

Level: Medical Student

Type: Basic

IRB / IACUC #: 558

Co-authors: Alli Beverlin and Marlena Pigliacampi

Cassandra A. White, Lacey J. Keeley-Cain, & Dr. Maria A. Serrat

Multiplexed immunostaining of IGF signaling components in growth plate cartilage

Insulin-like growth factor (IGF)-I is the primary regulator of chondrocyte proliferation and bone elongation in growth plates. Previous work by our lab has shown that environmental factors such as temperature and diet can alter IGF-I signaling in cartilage by modifications in IGF binding proteins (IGFBPs), which bind and inhibit IGF-I. IGFBP-4, the most abundant in bone, is cleaved by the protease, PAPP-A, which allows free IGF-I to bind to its receptor. STC2 inhibits PAPP-A, and thus bone elongation, by preventing the release of IGF-I. We developed a triple immunostaining protocol for IGFBP-4, PAPP-A, and STC2 in skeletal growth plates using direct fluorescently-labeled primary antibodies. We hypothesized that triple-label immunostaining would be viable for multiplexed detection and quantification of IGFBP-4, PAPP-A, and STC2 in growth plates of juvenile mice subject to different environmental conditions.

Paraffin-embedded proximal tibial growth plates of juvenile mice (N= 44) were subject to standard antigen unmasking and blocking. Commercially available fluorescently-conjugated primary antibodies against IGFBP-4 (FITC, 1:200), PAPP-A (Alexa 647, 1:100), and STC2 (Alexa 350, 1:100) were applied and incubated overnight. Fluorescence images (20x) were captured in the epiphysis, growth plate, and metaphysis.

All three fluorophores were detected in the growth plate. Surprisingly, the most robust expression of PAPP-A was in the epiphysis and metaphysis, suggesting its primary source may be local osteoblasts and not growth plate chondrocytes as expected. We are using these novel results to assess the role of PAPP-A in heat- and diet-enhanced bone elongation.

Results support our hypothesis that triple-labeled immunostaining is an effective method for simultaneous detection of IGFBP-4, PAPP-A, and STC2 in growth plates. Our multiplexed method will allow us to isolate the mechanisms of heat- and diet-enhanced bone elongation through IGF signaling pathways.

Poster # 79
Abstract # 40
Name: Nathen Olszewski
Level: Doctoral Student
Type: Basic
IRB / IACUC #: No.979435-1

NICOTINE SELF-ADMINISTRATION IS INVERSELY RELATED TO MEDIAL HABENULAR NEURONAL EXCITABILITY

Over 23 million people in the United States are dependent on nicotine. However, of the over 70% that wish to quit, only around 7% are successful. One key reason for poor cessation from nicotine is the strong withdrawal and craving that occur after nicotine abstinence. These symptoms have been increasingly attributed to activity in the habenular-interpeduncular nucleus circuit. We hypothesize that activity in the medial habenula is altered by changes in nicotine self-administration.

Using C57/B6 adult male and female mice, we employed an e-Vape® self-administration (EVSA) assay using either 6 mg/mL nicotine, 6 mg/mL nicotine + 15 mg/mL menthol, or 60 mg/mL nicotine (with or without menthol). Mice were assigned to fixed ratio 1 (FR1), fixed ratio 3 (FR3), and progressive ratio (PR) responding to measure reinforcement-related and motivation-related behaviors. Following EVSA, brains were extracted for electrophysiology. Neurons in the medial portion of the MHB were identified via $\alpha 6$ nAChR tagged fluorescence and excitability was measured via ex vivo whole-cell patch-clamp electrophysiology. Neuronal excitability was measured through rheobase (minimum current necessary to elicit an action potential) and maximum spikes then correlated to FR3 EVSA behavior.

We observed that as mice increased their reinforcement-related behavior (FR3 active nose pokes), there was a decrease in the firing frequency and increased rheobase (current required to trigger an action potential) of medial MHB neurons. Similarly, we observed a significant correlation where increased motivation-related behaviors (PR active nose pokes) were accompanied by a decrease in firing frequency (and increase in rheobase) of medial MHB neurons. Together, these data suggest that as self-administration increased, excitability of medial MHB neurons decreased.

Our results point to an inverse relationship between nicotine self-administration and neuronal excitability in the medial portion of the medial habenula. These results shed light on the cellular consequences of nicotine dependence. Our results could also implicate medial MHB neurons as key modulators for nicotine intake and show that more excitable neurons in this region result in a decreased nicotine intake.

Poster # 80
Abstract # 36
Name: Kaustav Mukherjee
Level: Resident
Type: Basic
IRB / IACUC #: NA

Wastewater Surveillance: Use of Digital Polymerase Chain Reaction to detect Sars-CoV 2 in Wastewater.

The global pandemic of coronavirus disease 2019 (COVID-19) caused by the respiratory virus (SARS-CoV-2) was first reported in Wuhan, China in late 2019. The World Health Organization declared the outbreak a pandemic in March 2020. The surveillance of COVID-19 to assess its prevalence is crucial for the governmental agencies to mitigate the spread and to implement measures to treat the infected. Initially surveillance relied principally on clinical testing. Recently testing of community wastewater has provided a means of not only testing large numbers of individuals but in gaining a greater understanding of the epidemiology of COVID-19. Here we describe the development of a digital polymerase chain reaction protocol to measure Sars-CoV-2 levels in wastewater.

Wastewater samples collected from area wastewater treatment plants are initially processed in the Marshall College of Science Laboratory. The wastewater concentrate is then processed for RNA by the Forensic Science Department via Qiagen EZ1 virus RNA extraction protocols. Levels of Sars-Cov-2 are determined using digital PCR on a BioRad Droplet Digital PCR System (QXDx AutoDG ddPCR). Digital PCR provides an ultrasensitive method of absolute RNA quantification as compared to the standard quantitative PCR. For each sample, TAQMan® probes are used to detect two regions of the Sars-CoV-2 spike protein (N1 and N2 per 2019-nCoV CDC Probe assays) and a probe for Human RNaseP serves as a positive control.

The digital PCR assays yields Sars-Cov-2 values ranging over four orders of magnitude from less than 1 genome copy/ μ l to over 200 genome copies/ μ l. This is estimated to represent from 1000 genome copies/L to over 2.5 million copies/L in community wastewater samples.

The Droplet digital PCR assay for N1 and N2 targets of the SARSCoV-2 genome provide consistent reproducibility and good correlation with community levels of COVID-19 testing.

Poster # 81
Abstract # 42
Name: Preeya Modi
Level: Medical Student
Type: Basic
IRB / IACUC #: 1639871

The Intersection Of Alcohol, Glia And Behavior: Can Astrocytes Influence Anxiety-Like And Reward-Motivated Behavior Following Adolescent Ethanol Exposure?

Previous studies demonstrate that adolescent binge ethanol exposure results in persistent changes in neuronal structure, function, behavior. Recent work has implicated glial processes in the development of these long-term alcohol-induced changes. However, the role of detrimental neuroimmune-related astrocyte activation has not been fully investigated. There are three critical factors involved in microglia-astrocyte activation that result in downstream neuroimmune activation; IL-1, TNF-, and C1q. We hypothesize that loss of IL-1, TNF-, and C1q proinflammatory signaling reduces astrocyte activation and attenuates adolescent binge ethanol-induced behavioral deficits.

We used C57BL/6J and triple knockout (3KO = IL-1 $-/-$, TNF- $-/-$, and C1q $-/-$) mice and administered ethanol (EtOH) or H₂O (i.g.) intermittently beginning on postnatal day 30. Mice then underwent a battery of behavioral tests that included conditioned place preference, open field, and the light-dark assay to assess reward sensitivity to nicotine and anxiety, respectively. Mice were then prepared for immunohistochemistry to quantify changes in protein expression specifically associated with various types of astrocyte activation.

Genetic deletion of TNF α , C1q, IL-1 α reduced locomotor activity, anxiety-like behavior, and increased reward sensitivity to nicotine in female but not male mice. In the open field, C57BL/6J+H₂O females showed increased locomotor activity when compared to female 3KO+H₂O mice. C57BL/6J+EtOH females spent more time in thigmotaxis compared to 3KO+EtOH females. In the light-dark box C57BL/6J+H₂O exposed female spent less time in the light than 3KO+H₂O females. Genotype differences continued to be observed in the CPP, with deletion of TNF α , C1q, IL-1 α increasing nicotine reward sensitivity in female mice when compared to C57BL/6J controls.

In summary, deletion of TNF- α , IL-1 α , and C1q in female mice reduced anxiety and increased reward sensitivity to nicotine, suggesting a critical role for microglia-astrocyte communication in the modulation of reward. It is possible that the elimination of detrimental microglial-induced astrocyte reactivity through the TNF- α , IL-1 α , and C1q pathway results in a shift towards pro-synaptogenic/neuroprotective astrocyte reactivity, driving synaptic remodeling and contributing to the increased nicotine sensitivity that we have observed. Studies are ongoing to confirm this hypothesized shift in astrocyte reactivity.

Poster # 82
Abstract # 129
Name: Hunter Mitchell
Level: Undergraduate
Type: Basic
IRB / IACUC #: NA

Preparation and physical properties of dyes based on 2H,10H-anthra[1,9,8-c,d,e,f]-2,7-naphthyridine-1,6,11-trione

The discovery of new heterocycles increases the candidates that are available for various applications in medicine, sensors, stains, pigments, optics, and organic electronics. Based on literature data, similar compounds have been found to have applications as ion sensors and inhibitors of Apoptosis Signal-Regulating Kinase 1 (ASK1).

Polycyclic aromatic dyes based on a naphthyridine core are prepared in four simple steps from commercially available starting materials. The final step involves a nucleophilic aromatic substitution reaction to form a thioether.

The optical and electronic properties of the new derivatives are measured by absorption spectroscopy and computational analysis. The HOMO-LUMO gap is investigated using cyclic voltammetry.

Future work may involve collaborating with another research group that can assist in testing for devices, sensors, or biological activity

Poster # 83
Abstract # 19
Name: Cora Miracle
Level: Md/PhD
Type: Basic
IRB / IACUC #: NA

Obese Adipose Derived secretome drives Triple Negative Breast Cancer via stimulation of the mTOR pathway

Background: Breast cancer remains the most common cancer among women with multiple risk factors including smoking, genetics, environmental factors, and obesity. Smoking and obesity have been shown to be the top two risk factors for development of breast cancer, with smoking increasing the risk of development by 21% [1] and obesity by 20-40% [2]. This link has been thoroughly proven in the luminal breast cancer but remains understudied in triple negative breast cancer. Triple negative breast cancer (TNBC) is a form of breast cancer characterized by the absence of the estrogen receptor and progesterone receptor [3]. Recent retrospective patient studies have shown that majority of patients with TNBC were obese at the time of diagnosis. In addition, obese patients had a higher tumor grade and a higher staging [4]. While the reason for this remains unstudied in TNBC, it is thoroughly explored in estrogen receptor positive breast cancer. The role of obese adipose derived secretome (OADS) was previously shown to increase the migration and invasion of estrogen receptor positive breast cancer cells. Based on this information, we hypothesize secretions from obese ADS fuel the increased aggressiveness seen in obese patients with TNBC via the mTOR pathway.

Methods: Human breast fat was obtained from deidentified peritumor breast samples at Edwards Comprehensive Cancer Center. Fat was cultured in DMEM for 24 hours, media containing secretions was collected. Fat obtained from a patient with a BMI > 30 was deemed Obese ADS, conversely, BMI < 30 was deemed Lean ADS (LADS). Triple negative breast cancer cells MDA-MB-231 and MDA-MB-436 were treated with OADS or LADS in serum free media. Scratch assay was performed on treated cells. Images were taken at time 0, and 24 hours. Analysis was performed using image J. Treated cells were then succumbed to cell lysis and western blot analysis was performed.

Results: MDA-MB-231 and MDA-MB-436 cells treated with OADS were able to close the wound produced at a significantly higher rate compared to cells treated with LADS (p-value < 0.05). In addition, OADS treated cells demonstrated increased levels of phospho-S6

Conclusion: Obese Adipose Derived secretome increases the migration of triple negative breast cancer cells through an increase in mTOR signaling.

Poster # 84
Abstract # 80
Name: Esther Mensah
Level: Masters Student
Type: Basic
IRB / IACUC #: 726

Influence of Western Diet on Peripheral Blood Cells in Myelodysplastic Syndromes-susceptible Mice.

Myelodysplastic syndromes (MDS) are a group of diverse clonal hematopoietic disorders characterized by ineffective hematopoiesis. MDS is characterized by morphologic dysplasia in hematopoietic cells and can lead to bone marrow failure, refractory peripheral cytopenia(s), and increased acute myeloid leukemia (AML). Obesity has been correlated with the incidence of MDS/AML. However, there is little data on how diet-induced obesity affects peripheral blood cells in MDS-susceptible individuals. To address this shortcoming, we hypothesized that Western diet alters the production of various peripheral blood cell types in MDS-susceptible mice.

To test our hypothesis, we utilized an established mouse model of del(5q) MDS. These double knockout (DKO) mice have a combined deletion of TIFAB and miR-146a, making them susceptible to MDS-like phenotypes. DKO mice were placed on a control low fat diet or Western high fat diet for 15 weeks. Blood samples were collected and analyzed on a hematological analyzer for complete blood counts.

Findings indicate that peripheral myeloid blood cells in mice fed a high fat diet were significantly higher than those fed on a low fat diet.

The study's outcome revealed that high fat dietary intake induces myeloid cell production in MDS-susceptible mice. Further understanding of the mechanisms underlying this phenomenon may inform future therapeutics for MDS-susceptible individuals who partake in a Western diet.

Poster # 85
Abstract # 23
Name: Yogesh Meka
Level: Masters Student
Type: Basic
IRB / IACUC #: 738

In-vitro Pharmacodynamic Interactions of Vancomycin and Disulfiram (Antabuse®) in Staphylococcus aureus

Intravenous vancomycin (VAN) is used to treat systemic infections by methicillin-resistant *Staphylococcus aureus* (MRSA). The pharmacokinetic and pharmacodynamic (PK/PD) target indices for VAN are more difficult to attain for MRSA isolates with an intermediate level of VAN resistance (VISA). Therefore, the addition of an antibiotic adjuvant may enable VAN to reach the PK/PD targets recommended by clinical practice guidelines. This study hypothesizes that the addition of disulfiram (DSF) to VAN results in increased bactericidal effects in *S. aureus*

The antimicrobial interaction of VAN/DSF was assessed by differential analysis using checkerboard assays, time-kill studies, flow cytometry, and the post-antibiotic effect (PAE) experiment. Ten MRSA strains with minimum inhibitory concentrations (MICs) ranging from 1 to >256 µg mL⁻¹ for VAN were evaluated. The VISA reference strain Mu50 (VAN MIC 8 µg mL⁻¹) was used in a comprehensive assessment of the VAN/DSF interaction

The addition of DSF lowered the MIC and minimum bactericidal concentration (MBC) of VAN in either a synergistic or additive manner. Bactericidal effects and suppression of Mu50 growth were observed with a 4/8 µg mL⁻¹ combination of VAN/DSF, but not the individual drugs. Flow cytometry further confirmed the enhanced killing effects on a cellular level

This research established that DSF confers increased bactericidal effects in multiple MRSA strains treated with a sub-MIC of VAN. The cellular mechanism for this interaction will be the focus of future investigations.

Poster # 86
Abstract # 88
Name: Erin Mcgrady
Level: Medical Student
Type: Basic
IRB / IACUC #: NA

ELISA Analysis of Cytokine Expression in Intracerebral Hemorrhage

Intracerebral hemorrhage (ICH) is defined as the rupture of blood vessels within the brain parenchyma, leading to neuroinflammation and a varying cascade of neurological dysfunction. Neuroinflammation plays an important role in post-ICH pathophysiological changes and could be a biomarker for disease progression and outcomes. One potential factor influencing cytokine levels in the plasma is the presence of extracellular vesicles (EVs), small particles that are released from all types of cells and have shown to be upregulated in disease situations. EVs can carry molecular information and mediate cell-to-cell communications. Here, we aim to determine the pro-inflammatory cytokines [Tumor necrosis factor- α (TNF- α) and interleukin-4 (IL-4)] and an anti-inflammatory cytokine (IL-10) in the plasma with or without EVs from ICH patients.

Plasma samples were collected via venipuncture from 39 total ICH patients within 48 hours of symptom onset. In the present study, two sets of plasma samples were collected before and after removing EVs [microvesicles (MVs) and exosomes (EXs)] by ultracentrifuge methods. Enzyme-linked immunosorbent assay (ELISA) was employed to determine the amount of TNF- α , IL-4, and IL-10 in the collected plasma samples. Colorimetric analysis at 450 nm was used to quantify the concentration of cytokines.

The plasma sample absorbance readings were analyzed using the equation generated from a standard sample curve. The results showed that both TNF- α and IL-10 levels were higher in the samples with MVs and EXs when compared to the plasma samples without MVs and EXs. As expected, cytokine levels (IL-4 and IL-10) incrementally elevate with rising stroke severity. Cytokine levels with ICH volumes less than 30 mL are greater than the cytokine levels with ICH volumes greater than 30 mL.

In conclusion, ELISA analysis of IL-10, IL-4, and TNF- α post-ICH demonstrates a significant increase in all three cytokines in proportion to stroke severity. The presence of MV and EX also increases cytokine levels, suggesting these inflammation modulators are transported to areas of damage via cellular messengers. Future studies should be undertaken to elucidate the relationship between cytokines and MV and EX.

Poster # 87
Abstract # 120
Name: Zachary McConnell
Level: Medical Student
Type: Basic
IRB / IACUC #: 744

Discovery of genetic mechanisms driving stress-induced potentiation of novelty and anxiety phenotypes using genetically diverse mice

Substance use disorder (SUD) is driven by interactions among genetic and environmental factors. A critical environmental factor predisposing some individuals to SUD is chronic stress. The genetic mechanisms which predispose individuals to develop SUD following chronic stress are unknown.

These mechanisms can be identified using experimental mouse populations in the context of a systems genetics approach. In this study, mice from the Collaborative Cross (CC) panel and their founder strains (n = 8 strains total) were housed in isolation or enrichment conditions for 10 weeks starting from wean; isolation housing was used as a mouse model of chronic environmental stress. Isolated mice were housed alone without enrichment items in standard mouse cages. Enriched mice were housed in large rat cages with mice of the same-sex and with enrichment items including running wheels and nesting materials. Following 10 weeks of differential housing, mice were tested on a battery of behavioral assays including novelty reactivity, novelty preference, and light/dark anxiety. We used these assays because they predict drug use and addiction-like behaviors in mice; consequently, these phenotypes provide a relatively high-throughput index of addiction vulnerability.

Preliminary data suggest that isolation-housing strain-dependently potentiates novelty and anxiety related phenotypes.

These findings reveal that the genetic mechanisms underlying stress-induced addiction vulnerability can be identified in mice using the full Collaborative Cross mouse panel.

Poster # 88
Abstract # 29
Name: Olivia Lim
Level: Medical Student
Type: Basic
IRB / IACUC #: 737

Development of Vancomycin HPLC Methodology for Analysis of Microliter Plasma samples Using HPLC

Staph. aureus infections were reported to occur in almost 120,000 individuals in 2017. A very serious staph infection is caused by Methicillin-resistant Staphylococcus aureus (MRSA). MRSA infections were reported in over 20,000 cases in the United States in 2017. MRSA is a difficult infection to treat due to resistance to numerous antibiotics. Vancomycin is a glycopeptide antibiotic administered parenterally. Vancomycin is an effective antibiotic for the treatment of MRSA. The long term goal of this project is to investigate vancomycin kinetics in a mouse model to explore potential agents that may enhance the effectiveness of vancomycin and reduce antibiotic mediated side effects.

A waters Alliance HPLC system with dual wavelength detection was used to first develop a method for detection of vancomycin. Vancomycin is more stable in an acidic environment. Consequently, a potassium phosphate buffer was run at varying pH to provide the most stable peak for vancomycin. The best resolution occurred with potassium phosphate at a pH 4.0 with a mobile phase flow of 0.8

ml/minute. A standard curve was run with varying levels of vancomycin.

Vancomycin was prepared in 4% albumen solution to mimic plasma proteins. Plasma protein precipitation was done by adding 3 volume excess of methanol. The samples were vortexed for 1 minute and centrifuged at 2,000 xg for 6 minutes. The supernatant was retained for HPLC analysis. Volumes of 5-75 ul were injected into the HPLC for analysis of vancomycin.

Mouse blood was collected via a lancet with a total volume of 20 ul. The sample was collected using Neoteryx microsampling devices. These devices accurately collected a predetermined volume of 20 ul which was air dried prior to processing. The tips were extracted with methanol and water followed by vortexing for 1 minute and centrifuging to isolate the extracted vancomycin. A 5-25 ul sample of the extracted samples was injected into the HPLC for analysis.

Vancomycin was detectable using a Waters Alliance e2695 system with a Model 2489 Detector at both 200 and 224 nm. The level of detection was at least 5 ng. The optimal conditions for the mobile phase were (85:15) 0.1 M potassium phosphate buffer: methanol with a flow rate of 0.8 ml/minute.

The extraction efficiency from albumen was 100%. The albumen extracted samples were clear following extraction suggesting proteins were precipitated. There was no build up of pressure with multiple injections of volumes from 5-75 ul. All samples were injected into the HPLC using a 100 ul injection loop.

The Neoteryx microsampling devices allowed for precise collection of a known volume of 20 ul. Following air drying for 1 hour the tips were removed using forceps. The tips were immediately added to a (4: 1) water:methanol mixture to precipitate proteins. Samples were detectable on the HPLC and extraction was over 95%. The red coloration from blood did not interfere with the HPLC detection of vancomycin.

Vancomycin has a relative short half life in plasma. The low doses and rapid clearance of vancomycin provide several challenges for measurement of vancomycin plasma levels. This study successfully developed an HPLC system with good sensitivity. Vancomycin was detected at two wavelengths of 200 and 224 nm allowing better verification of the compound. The analysis only required a 20 ul sample of blood which allows for greater flexibility in sampling.

Poster # 89

Abstract # 111

Name: Michael Leonardo

Level: Doctoral Student

Type: Basic

IRB / IACUC #: 744

Co-authors: J. COMSTOCK², S. A. TOWERS², S. BRUNTY¹, J. HUFFMAN¹, J. FAN¹, D. A. PRIMERANO¹, A. Q. NATO, Jr¹, J. DENVIR¹, D. B. LESTER², P. E. DICKSON¹

¹Marshall Univ., Marshall Univ., Huntington, WV; ²Univ. of Memphis, Memphis, TN

Effects of isolation housing stress on the striatal transcriptome in male and female C57BL/6J and DBA/2J mice

Stress is a critical factor driving drug addiction in humans, and the genetic mechanisms underlying this effect are unknown. Isolation housing, a preclinical model of chronic environmental stress, has been shown to potentiate intravenous drug self-administration and behavioral phenotypes that predict intravenous drug self-administration. The genetic mechanisms underlying these phenomena are unknown but can be identified using a systems genetics approach in mouse recombinant inbred panels such as the BXD and Collaborative Cross. In this regard, we have recently shown that isolation housing stress produces strain- and sex-dependent potentiation of addiction-predictive behavioral phenotypes in the C57BL/6J and DBA/2J mouse strains (BXD founders). It is unknown whether the striatal transcriptome is similarly strain- and sex-dependently influenced by isolation housing stress. This question is crucial to understanding isolation-induced effects on addiction-relevant behaviors because the striatum and its subregions are critically involved in addiction. Evidence of strain- and sex-dependent behavioral effects (previous study) and striatal transcriptomic effects (present study) following chronic isolation housing stress in the BXD founder strains would confirm that the full BXD panel could be used to discover genetic and epigenetic mechanisms underlying these addiction-relevant phenomena. To this end, the goal of the present study was to determine if striatal gene expression is influenced by strain, sex, housing condition, or interactions among these variables in C57BL/6J and DBA/2J mice. Mice were ordered at three weeks of age from The Jackson Laboratory and, upon arrival, immediately transferred to one of three housing conditions: isolation, standard, or enrichment. After housing in these conditions for 10 weeks, striatum was collected, RNA was extracted, and bulk RNA-Seq was performed. FASTQ files were evaluated for quality, genome alignment was performed, genes differentially expressed among experimental groups were identified, and these gene sets were characterized. Findings from the present gene expression study and previous behavioral studies indicate that the full BXD panel can be used to identify genetic and epigenetic mechanisms underlying isolation-induced effects on addiction-relevant behaviors and the striatal transcriptome.

Mice were ordered at three weeks of age from The Jackson Laboratory and, upon arrival, immediately transferred to one of three housing conditions: isolation, standard, or enrichment. After housing in these conditions for 10 weeks, striatum was collected, RNA was extracted, and bulk RNA-Seq was performed. FASTQ files were evaluated for quality, genome alignment was performed, genes differentially expressed among experimental groups were identified, and these gene sets were characterized

Differential expression of genes were found to vary on a housing and strain specific level. This differential expression suggests strain based resilience, and susceptibility, to environmental alterations.

Findings from the present gene expression study and previous behavioral studies indicate that the full BXD panel can be used to identify genetic and epigenetic mechanisms underlying isolation-induced effects on addiction-relevant behaviors and the striatal transcriptome.

Poster # 90
Abstract # 75
Name: Karlie LaFauci
Level: Undergraduate
Type: Basic
IRB / IACUC #: NA

Methamphetamines and the Radiation Effects on the Heart

The heart is one of the most important parts of the human body because it pumps blood throughout our bodies. The heart valves assist efficient blood flow. The AV valves (between the atria and the ventricles) are connected through the chordae tendineae and papillary muscles, which are anchored to the inside of the ventricles. The AV valves are closed to prevent back flow after the heart contraction. Because methamphetamine stimulates the body function including the heart, the astronauts use it during space flight to simulate daytime of the day-night cycle. However, it is not well-known the effects of methamphetamine and radiation on the heart during space flight.

We hypothesized that there would be damages on the chordae tendinea by radiation and methamphetamine.

Rat hearts were obtained from the previous research (Dr. Hambuchen). Rats were split into the experimental and control groups. Only rats in the experimental group were radiated prior to the methamphetamine administration. Methamphetamine was administered to rats in both groups 3 times daily for 4 days at a dose of 1 mg/bw kg. At the end of experiment, rats were euthanized. The hearts were collected, instantly frozen with liquid nitrogen, and then stored at -80°C. The hearts were defrosted and cut to open for visual examination. The pictures of the hearts were also taken by digital camera for morphological analyses.

Considerable weakening, ruptured chordae, and a significant absence of chordae tendinea were discovered in all hearts. The higher the radiation dosage, the more primary chordae were damaged, as well as the significant of cardiac hypertrophy.

It is known that methamphetamine usage causes cardiovascular complications, such as an accelerated heart rate, an irregular pulse, and elevated blood pressure. Radiation can also harm the heart's heart valves, the cardiac muscle, the tissue that covers the heart, and coronary arteries. Six-Gy radiation followed by methamphetamine injections caused to higher body weight loss but more cardiac muscle hypertrophy. The results from this study indicate severe cardiac failure due to methamphetamine use and radiation exposure. This finding gives the important information to the astronauts and indicates the needs of the caution possible drug screening prior to radiation therapy.

Poster # 91

Abstract # 81

Name: Lahari Kondeti

Level: Masters Student

Type: Basic

IRB / IACUC #: WVU#1602000797

Unique bone marrow cytokine signatures are produced following Bordetella pertussis whole cell or acellular vaccination in mice

While vaccines play a significant role in preventing many diseases, little is understood regarding mechanisms by which hematopoietic stem and progenitor cells (HSPCs) impact vaccine efficacy. It has been demonstrated that vaccine-induced alterations in HSPC populations contribute to host protection upon subsequent encounters with particular pathogens. While genetic signatures within these cells have been studied, there is little knowledge regarding cytokine influence on these cells in the bone marrow following vaccination.

We hypothesized that following immunization, unique cytokine signatures within the bone marrow influence the fate of HSPC number and function.

We performed cytokine analyses on media flushed through the bones of mice vaccinated with PBS (vehicle control), acellular, or whole cell Bordetella pertussis vaccines.

Our results indicate that unique cytokines signatures are present in the bone marrow following immunization.

We postulate that these cytokine signatures ultimately contribute to HSPC fate and vaccine efficacy. Our long-term goals include informing the formulations of future vaccines to address their impact on HSPC number and function.

Poster # 92
Abstract # 63
Name: Vinitha Joseph
Level: Medical Student
Type: Basic
IRB / IACUC #: IACUC #484

Antinociceptive Effects of Chemokine Receptor Antagonist on Formalin-Induced Pain

Chemokines play a major role in inflammation and neuropathic pain in several diseases. When released chemokines bind to their respective receptor, and these molecules propagate inflammatory pathways, for example leading to the activation of leukocyte adhesion and migration. These chemokines can also lower the efficacy of analgesics, for example, cannabinoids or opioids. Hence, it is hypothesized that blocking these chemokine interactions with their receptors will prevent nociceptive pathways and decrease pain.

This study was approved by Marshall University's IACUC. This study evaluated the antinociceptive role of a fractalkine receptor antagonist against formalin-induced inflammatory pain in female mice. Four groups of naïve female C57BL/6J mice were injected with either 0 (vehicle), 30, 50, or 70 μmol of fractalkine receptor antagonists intraperitoneally in an injection volume of 10 ml/kg 30 minutes prior to implanter injection of 10 μL of 2.5% formalin into the right hindpaw. Following formalin administration, mice were assessed for 60 minutes and assessed for acute (Phase I: 0-15 minutes) and inflammatory (Phase II: 15-60 minutes) pain responses, including evidence of paw lifting, shaking, licking, biting, and/or grooming which was then quantified. The composite pain scores were calculated across each phase of the formalin test and represent the combined area under the curve (AUC).

While the fractalkine receptor antagonist did not alter acute pain during the first phase of the formalin test (Phase I), doses of 50 and 70 μmol attenuated pain responses elicited during the inflammatory phase (II) of the formalin test compared to mice that were treated with vehicle alone.

In conclusion, inhibiting chemokine receptor activation with the fractalkine antagonist exhibits anti-inflammatory properties, hence targeting chemokine receptors may be a new therapeutic option for managing chronic pain-associated diseases. In addition to the behavior tests, biochemical tests will also be conducted to support our findings.

Poster # 93
Abstract # 64
Name: Christopher Grahe
Level: Masters Student
Type: Basic
IRB / IACUC #: 764

Effects of Prenatal Opioid Exposure on Cerebellum White Matter Development.

In the United States and West Virginia in particular, opioid addiction has become a prominent medical and social issue. Consequences of opioid abuse are serious and devastating, especially when abuse occurs in pregnant women. Short-term consequences of maternal abuse include neonatal abstinence syndrome (NAS), a condition in newborn infants triggered by opioid withdrawal. Prenatal opioid exposure can also have serious long-term effects including sensory defects, hyperactivity, and cognitive and emotional problems. We hypothesized that prenatal opioid exposure alters central nervous system white matter development, contributing to long-term effects.

We examined cerebellum samples from rat pups whose mothers had been treated with buprenorphine (2 mg/kg/day po) and compared these to vehicle control rats at 3, 7, 10, 14, 17, 22, and 25 days postnatal (PN). We examined expression of the axonal protein, KIF5A (microtubule-dependent axon transport), and the oligodendrocyte/myelin proteins NG2 (oligodendrocyte precursor cell marker), CNPase (oligodendrocyte marker), and MBP (myelin marker) using Western blotting. Protein expression was normalized against total protein loaded (ponceau stain) and expressed as percentage of control.

Preliminary results (n=2-14 samples per time point) suggest reduced expression with buprenorphine treatment at specific time points: KIF5A on PN 3, 7, 14; NG2 on PN 7; CNPase on PN 7, 14; MBP on PN 17. Protein expression was either equal to or greater than control at all other PN timepoints.

These findings may help explain some of the developmental problems caused by prenatal opioid exposure, paving the way for future treatment options.

Poster # 94
Abstract # 65
Name: Saaman Ghodsi
Level: Medical Student
Type: Basic
IRB / IACUC #: 664

Chemical flavorants contribute to reinforcement-related behavior and directly alter midbrain dopamine neurons

While smoking has always been a health crisis, the introduction of electronic nicotine delivery systems (ENDS) has led to increased adolescent smoking. Out of all adolescent ENDS users, more than eighty percent state they use flavored varieties, which has led to concerns about what effects the vape flavorants might have.

To test these flavorants, mice were genetically modified with fluorescent proteins placed on nicotinic acetylcholine receptor (nAChR) subunits. These mice were then trained to self-administer vaporized nicotine with or without chemical flavors (menthol or green apple). Using a confocal microscope, the nAChR subunits of dopamine neurons in the ventral tegmental area were imaged, and then analyzed using ImageJ.

Of the studied flavors, green apple was shown to have the greatest impact on reinforcement-related behaviors. We also observed that the green apple flavorants led to an increase in the raw integrated density of nAChRs on VTA dopamine neurons.

While the FDA has begun to regulate ENDS more rigorously, further research has shown vape flavors can impact the behavior and brain chemistry of smokers. These data provide additional evidence that flavors alter neurons relevant for addiction and justify additional studies in this field.

Poster # 95

Abstract # 71

Name: Ashley Dague

Level: Masters Student

Type: Basic

IRB / IACUC #: NA

Co-authors: Ashley Dague, Natalie McCann, Dr. Shakirov and Dr. Bogomolnaya

IDENTIFICATION AND ANALYSIS OF ANTIMICROBIAL COMPOUNDS FROM A MODEL MOSS CERATODON PURPUREUS

The emergence of bacterial drug resistance, especially in hospital settings, represents the next great health crisis of our time, as drug-resistant bacterial diseases kill around 700,000 people each year. Despite the clear need for more antimicrobial agents, very few new antibiotics are reaching the market. To increase the arsenal of tools in the fight against bacterial drug resistance, we aim to identify and characterize novel antimicrobial natural products from a model moss, *Ceratodon purpureus*.

Ceratodon purpureus is a model moss species that has a male (R40) and a female (GG1) strains. These strains were grown in a liquid medium and moss secondary metabolite were collected from secreted moss exudates. Metabolites from moss exudates were tested using a qualitative test, the disk diffusion method (DDM), and a quantitative test, the broth microdilution method, to determine Minimum Inhibitory Concentration (MIC).

Exudates from the female *C. purpureus* strain GG1 did not exhibit inhibitory activity against gram-positive or negative bacteria. However, exudates from the male moss strain R40 exhibited strong inhibitory properties against several species of gram-positive bacteria, though they did not inhibit growth of gram-negative bacteria. Antibacterial activity levels in *C. purpureus* GG1 exudates significantly increased over four weeks of moss cultivation in liquid culture. Size fractionation experiments indicated that the secreted bioactive compounds are very small, less than <1 kDa, suggesting that its chemical nature can be relatively simple. Furthermore, thermostability and sensitivity to proteinase K assays indicated that the secreted bioactive compounds are unlikely to have proteinaceous nature.

Our analysis identified potentially useful antimicrobial compounds from the moss *Ceratodon purpureus* (strain R40) that exhibit specificity against gram-positive bacteria.

The chemical nature of these compounds remains to be determined. Overall, our results suggest that bioactive compounds present in model moss exudates can potentially be used for treating infections caused by antibiotic resistant bacteria, such as methicillin-resistant *Staphylococcus aureus* (MRSA) or vancomycin-resistant *Enterococci*.

Poster # 96
Abstract # 49
Name: Samuel Crow
Level: Medical Student
Type: Basic
IRB / IACUC #: NA

HSP90 Inhibition reduces Phenotypic Plasticity in H1437 Lung Cancer Cells

A major challenge in the treatment of cancer is the incidence of recurrence following initial treatment and remission. The recurrence of cancer is often much more aggressive than the primary tumor, due to selection of the most genetically fit cells that survive primary treatment. These cells will utilize phenotypic plasticity, up-regulating proteins and markers that enable survival and down-regulating proteins and markers that make them more susceptible to destruction. The Sollars laboratory has discovered that Heat-shock protein 90 (HSP90), an intracellular chaperone protein, plays a role in phenotypic plasticity via epigenetic modifications. Our hypothesis is that inhibition of HSP90 in lung cancer cell line H1437 will reduce their ability to undergo the epithelial to mesenchymal transition (EMT), an important phenotypic change associated with tumor progression.

H1437 cells were cultured and treated with AUY-922 for 48 hours, and subsequently treated with 2 doses of TGF-beta over the course of 2 days to induce EMT. Cells were harvested and studied for expression of proteins associated with EMT via flow cytometry. A549 cells were used as a control.

H1437 cells responded to the TGF-beta dose regimen by transitioning to a mesenchymal state as seen by microscopic examination and loss of MUC1 and E-cadherin protein expression. We also found that inhibition of HSP90 with AUY-922 induced a transition defect in H1437 shown by accumulation of cells expressing intermediate levels of CD24 and CD44.

Reducing phenotypic plasticity of solid tumor cells will potentially increase their susceptibility to chemotherapeutic treatment and reduce the recurrence of high grade tumors following primary remission.

Poster # 97
Abstract # 121
Name: Jessica Crislip
Level: Medical Student
Type: Basic
IRB / IACUC #: NA

Can primitive neurology translate into advanced insight? An investigation into the potential of using tardigrades as the next model organism.

In the past decade, emerging fields of research have begun to utilize the tardigrade *Hypsibius exemplaris* as a model for studies on extremotolerance and metabolic regulation under environmental stress, with several studies indicating neuroscience applications for ionotropic signaling and memory. However, the literature lacks investigation into pathways that contribute to substance use disorders, for which the tardigrade presents as an ideal model to further our scientific understanding of the biochemical foundations of tolerance and precipitation of withdrawal to supplement the aim for the long-term development of new therapeutics.

We propose that exposure of exogenous stimulants will result in apparent increases in motor activity and energy, as well as a relative increase in intracellular calcium production reflective of dopaminergic pathways. Likewise, we propose that application of selected depressants will oppositely lead to both decreased motor activity and intracellular calcium.

To examine the behavioral impact of stimulant and depressant substance exposure, groups of 30 *H. exemplaris* tardigrades were exposed to varying concentrations of the stimulants nicotine (nicotine hydrogen tartrate salt) and caffeine, as well as the depressant ethanol to assess for motor activity changes over time, an indicator of neurologic functioning. These optimized concentrations and times were then used in conjunction with the fluorescent calcium indicator Fluo-4 AM (Thermo Fisher Scientific) to study intracellular calcium flux.

Incubation over time in exogenously applied ethanol revealed that a concentration of 400 mM resulted in both a significant decrease behaviorally in *H. exemplaris* motor activity, as well as survival. Oppositely, survived significant increases in motor activity were seen in tardigrades exposed to 1 μ M nicotine and 1 mM caffeine. This evidences the tardigrade's potential as an effective neurologic model. Ongoing experiments are assessing physiological effects of substance applications on intracellular calcium abundance to further understand neurologic impacts.

Early evidence shows potential for the tardigrade *H. exemplaris* to be used as an effective model in neurologic studies involving substance abuse disorders and reward pathways.

Poster # 98

Abstract # 34

Name: Alex Ashley

Level: Medical Student

Type: Basic

IRB / IACUC #: 948500-1 (IRB), 1172875-1 (IRB)/662 (IACUC), 741 (IACUC)

Co-authors: Alex Ashley¹⁻², Utibe-Abasi S. Udoh¹⁻², Pradeep Kumar Rajan¹⁻², Yuto Nakafuku¹⁻², Sandrine V. Pierre² and *Juan Ramon Sanabria¹⁻³

1Department of Surgery, Marshall University Joan Edwards School of Medicine, Huntington, WV, USA. 2 Marshall Institute for Interdisciplinary Research, Marshall University Joan Edward School of Medicine, Huntington, WV, USA. 3Department of Nutrition and Metabolomic Core Facility, Case Western Reserve University School of Medicine, Cleveland, OH, USA.

PLASMA BIOLOGICAL/METABOLOMICS LIVER-MARKERS CORRELATION WITH LIVER FIBROSIS PROGRESSION AND PRIMARY MALIGNANCY DEVELOPMENT IN NASH.

Hepatocellular carcinoma (HCC) is the second most lethal malignancy in the world with a rising prevalence in the US population. Nevertheless, there is gap of biological markers for its early detection on high-risk communities. The purpose of this study is to develop a scoring system that predicts early HCC development.

Plasma protein concentrations (Smac-DIABLO, Survivin), apoptotic activity (Cytokeratin18-fragments), and metabolomics using ELISA and HLPC/MS-MS, respectively were added to AFP for modeling a score system for the prediction of HCC. Plasma was obtained from NASH related HCC mice model, human HCC lines xeno-transplanted on the SCD mice, and subjects with NASH, HCC, and liver transplantation. Principal Component Analyses and SPSS were used for the modeling construct.

Apoptotic activity and glucose intolerance correlated with NASH progression (liver fibrosis). Survivin, Hydroxy-butyrate and lactate correlated with NASH related HCC. Survivin, Glutathione depletion and metabolomic profiles appears to have higher sensitivity and specificity to discriminate HCC in livers with advanced fibrosis when compared to AFP. We are in the process of validating the score system.

Survivin, apoptotic activity, and metabolic profile discriminate the presence of HCC in livers with advanced fibrosis.

Poster # 99

Abstract # 97

Name: Jakob Adkins

Level: Doctoral Student

Type: Basic

IRB / IACUC #: NA

Co-authors: Jakob Adkins (primary), Olivia Boskovic, Alejandro Martinez, Eugene V. Shakirov

Identification of HIRA and ATRX as Novel Genes Controlling Telomere Length

Telomeres are evolutionarily conserved repetitive DNA sequences at the ends of eukaryotic chromosomes that guard genome integrity. In humans, telomere length is a biomarker of cellular aging and shortens during each DNA replication cycle. Accelerated telomere shortening in stem cells leads to diseases of premature aging, while inappropriate telomere lengthening is a hallmark of cancer. Telomere length set point is species-specific and is controlled genetically, but the nature of these genetic factors is largely unknown.

To identify novel genes establishing proper telomere length, we utilize the model plant *Arabidopsis thaliana*. Previously, our lab used a genome-wide association study (GWAS) in 653 *Arabidopsis* lines (strains) to identify several candidate genes involved in telomere length control. We used knockout lines to define the role of each candidate gene in telomere biology. Southern blotting was used to measure telomere length in these lines. In this technique, genomic DNA from each plant is digested by a restriction enzyme, separated by agarose gel electrophoresis, transferred to a membrane, and telomeric DNA is detected by a specific probe.

To verify inactivation of each gene, we used PCR genotyping and confirmed the presence of homozygous or heterozygous T-DNA insertions in the genes of interest. Interestingly, knockouts of two candidate genes, HIRA and ATRX, showed ~30% shorter telomeres than in the wild type.

In humans, HIRA and ATRX genes are essential for epigenetic chromatin modifications. HIRA is an evolutionarily conserved H3.3 histone chaperone, and our data provide the first evidence that this gene positively regulates telomere length in any system. ATRX is part of another pathway that also deposits histone variant H3.3 at telomeres and other repetitive elements and is recognized as a central cancer suppressor of the human genome. Our identification of the HIRA and ATRX genes as major regulators of telomere length opens up new avenues to explore its roles in human telomere biology.

Poster # 100
Abstract # 142

Kayla DeSchepper, Malabika Maulik, Courtney Lulek, Angela H Redmond, Daniel J Morgan
The Neuropeptide ProSAAS and its Involvement with Low and High Fat Diet, Body Weight, and Glucose Levels

Background and Hypothesis: The rise in the prevalence of obesity and diabetes has been linked to the consumption of high fat Western diets indicating a need to discover and develop preventative treatments. The neuroendocrine signaling peptide precursor protein ProSAAS is involved in body weight and food intake. Weight increases leading to the development of obesity and diabetes have been observed in mice expressing excessive levels of ProSAAS, while ProSAAS knockout mice show a decrease in weight. This provides a possible target for a diagnostic biomarker, treatment, and prevention of obesity and diabetes metabolic disorders. This study aims to understand the effect of ProSAAS mediated neuropeptide signaling in diet induced obesity.

Hypothesis: Knockout of ProSAAS decreases high fat diet food consumption, along with glucose intolerance, insulin insensitivity, and diet-induced obesity.

Methodology: Two cohorts of male ProSAAS wildtype and knockout mice were randomly placed in either low fat diet (LFD) or high fat diet (HFD) groups. Cohort 1 consisted of 25 mice that started feeding at age eight weeks old (early adulthood) and cohort 2 consisted of 23 mice that started feeding at age six weeks old (early adolescence). Mice had ad libitum access to either low fat diet (10% fat) and high fat diet (60% fat). At the beginning of each new week, Fridays for cohort 1 and Mondays for cohorts 2 and 3, the new food for the next week was given and recorded after weighing the body weights of the mice. Food consumed was measured three days a week (Mondays, Wednesdays, and Fridays). Animal weight and food consumed from the end of each week was used for data analysis and graphed in Prism. Food was given and weights taken for 20 weeks followed by glucose tolerance measurements, then animals were sacrificed, and hypothalamus was collected for gene expression analysis of 'feeding related' genes.

Results: Preliminary results from our studies show that there are no significant differences between body weight and food consumed in the animals exposed to diet from the early adulthood stage (Cohort 1). Interestingly, the ProSAAS WT and KO animals when exposed to diet from early adolescence stage (Cohort 2) showed decreased consumption of HFD and lower body weight in the KO animals supporting our hypothesis. Also, higher glucose levels were observed in the glucose tolerance test in both the WT and KO animals fed HFD.

Conclusions: It is still too early to make conclusions from our data as this study is still ongoing, but our early results point to having the ProSAAS neuropeptide knocked out lowers body weight and food consumption when exposed to HFD during early adolescence. HFD also leads to higher levels of glucose in both genotypes. Some of our initial findings form a basis for further investigating the role of ProSAAS peptides as a biomarker in metabolic diseases such as obesity.

Funding: R01

Poster # 101
Abstract # 143

Authors: Sarah Evans, Eric Blough, Hongwei Yu

The Use of a Cannabinoid-based Drug on Acute Lung Injury and COPD

Chronic obstructive pulmonary disease (COPD) is a complex disease with no cure. The current treatment for exacerbated COPD is typically centered on the use of corticosteroids including Dexamethasone. Corticosteroids come with several serious side effects, especially after long term use. Cannabinoids have been evaluated for their anti-inflammatory properties. A drug labeled RS001, which is a form of cannabinoid, was tested in this project for its anti-inflammatory effects on acute lung injury. This would mimic an acute episode of COPD during which a corticosteroid like Dexamethasone would be used. *Escherichia coli* LPS (O55:B5 L2880, Sigma-Aldrich, St. Louis, MO) was delivered into the lungs of CF-1 mice intranasally. After an 8 h recovery period, either RS001, the vehicle, or Dexamethasone were administered. Cytokine levels were evaluated from lung homogenates to determine the level of inflammation. The results indicated that RS001 generally diminished LPS induced cytokine expression in the CF-1 mouse lung. The comparison between the drug groups and 2 doses of dexamethasone showed mixed results, with the drug generally being a better option. An inferiority test will be done, because cannabinoids have fewer side effects than steroids. This means as long as the drug is on a similar level to the corticosteroids, it will be a better treatment option. Although additional drug development and testing is required, this proof of concept pilot study clearly demonstrates that RS001 may be a viable treatment option for exacerbated COPD.

Poster # 102

Abstract # 28

Name: Caleb Spainhower

Level: Medical Student

Type: Quality Improvement and Educational

IRB / IACUC #: NA

Assessing Medical Student Knowledge and Satisfaction for Residency Specialty and Subspecialty Exposure Before and After Intervention

Upon entering medical school, the baseline knowledge that medical students have on various residencies and fellowship opportunities is limited. This has been noticed within the last several years at Marshall University with annual ACGME surveys. Through these surveys the collection of findings have trended toward unsatisfactory in terms of medical student exposure to various residencies and eventual fellowship opportunities at their disposal. This baseline inadequacy of knowledge thereby has the plausible effect to limit students and their future career choices.

For this study we have utilized a series of questions through surveymonkey to conduct a survey to test the knowledge of medical students entering their third year of medical school. We also will hold a mandatory specialty speed dating where members of each specialty including physicians, program coordinators and associated staff will conduct a brief presentation to provide knowledge specific to their specialty and the road map to all subspecialties within. After this meeting, we will then hold a second survey conducted through surveymonkey of the same questions (TABLE 1) to elucidate the positive/negative correlations made from each meeting. The results will then be recorded and the annual ACGME survey that will be completed will be compared to prior years to ascertain medical student satisfactory reports.

this is a prospective analysis that will be elaborating on the expected results that we believe we will attain from after introducing the intervention of mandatory meet and greet/speed dating for each residency specialty and the associated subspecialties in comparison to before the intervention is introduced.

Once the results are obtained they will be analyzed based on previous years of medical student satisfactory reports per ACGME annual surveys. Furthermore, the surveys conducted before and after the intervention will be compared to ascertain the positive/negative correlation made on baseline medical student knowledge of residency specialties.

Once these results are analyzed we will make appropriate recommendations and changes to the curriculum in order to enhance medical student knowledge and opportunities for residency.

The conclusions will be made once the surveys are conducted and compared from the initial survey. Furthermore, this prospective poster presentation will provide the information on our plans to introduce appropriate medical education and quality improvement towards each medical school class from now on. We hypothesize that the introduction of the interventions will enhance medical student knowledge at baseline, provide further insight into residency specialties, provide satisfactory exposure to each specialty per ACGME guidelines and to elucidate weaknesses within the current medical student curriculum for residency exposure and enable changes to and within the curriculum to strengthen these weaknesses.

Poster # 103

Abstract # 115

Name: Osa Benjy

Level: Medical Student

Type: Quality Improvement

IRB / IACUC #: 1929249-1

Barriers to Orthopedic Care in Rural Areas of West Virginia

The objective is to understand better the barriers rural West Virginia patients face that may impact their decision to present for orthopedic care. Healthcare professionals can use the study results to help lessen patient barriers, encouraging earlier presentations to clinics before morbidities manifest into serious risk factors for poor surgical outcomes.

This study will highlight barriers to accessing and receiving orthopedic care by distributing an anonymous online survey to orthopedic patients in rural counties. The survey will consist of 15 questions allowing patients to express the barriers they face regarding orthopedic care openly. The survey will be given to a patient by a representative healthcare provider at the clinic via computer. The representative can also assist patients with reading or comprehending the survey if needed. The questions will consist of open-ended and scaled-response questions with a predefined list of options. The survey outcomes are expected to highlight but are not limited to responses detailing distance traveled for care, access to high-speed internet, healthcare literacy, trust in the healthcare system, and financial constraint/insurance issues. In addition, the clinic's representative would provide an incentive of a \$20 gas card to each participant upon completion of the survey.

Surveys have been sent out to predetermined rural orthopedic clinics throughout West Virginia, and collections are ongoing. Approximately 200 survey responses are expected by the end of the year, with the hopes of receiving at least 100 responses by the end of 2022. Statistical analysis of the survey will begin as soon as an adequate number of surveys are received.

The grant sought with this application will fund our study and highlight rural orthopedic barriers in rural West Virginia communities. The survey results can enlighten healthcare professionals about some of the issues patients face and potentially work toward lessening these issues over time. Once the change has been implemented, if at all, further studies using outside grants could analyze if these changes improved patient orthopedic outcomes and access to care. Submission to an appropriate journal for publication will follow the analysis.

Poster # 104
Abstract # 56
Name: Charles Byrum
Level: Medical Student
Type: Quality Improvement
IRB / IACUC #: 1504002-5

VALUE ASSESSMENT OF SERVICE LINE APPENDECTOMY AT A TERTIATRY HEALTH NETWORK SYSTEM OVER A DECADE WITH PRELIMINARY RESULTS OF A RCT FOR PERFORATED APPENDICITIS.

INTRODUCTION. Over 200 million appendectomies are globally performed per year with a lifetime prevalence of developing acute appendicitis at 8.6% in men and 6.7% in women. Although originally an open technique was used for treatment of acute appendicitis, laparoscopic and non-operative treatments have become the most common options. This study aims to identify the value of the service line appendectomy in our Health Network System, as well as determining modifiable processes for improving its value.

METHODS. Value assessment of service line was performed through quality and cost surrogates. Quality domain surrogates included post-operative complications (PC), Length of Stay (LOS), Readmission (RA), Textbook Cases (TB), and a Net Promoter Score for patient satisfaction (PS). Cost domain surrogates included Total Hospital Charges (TC) and Reimbursement Index (RI). Pre, intra-, and post-operative variables (n=81) were retrieved from adult patients (≥ 18 years) diagnosed with clinical and imaging presentation of acute appendicitis retrospectively (Health Network Warehouse from Jan 2010- Aug 2016) and prospectively (RedCap from Sept 2016-Sept 2021), under IRB approval. For subjects diagnosed pre-operatively with perforated appendicitis, a protocol was introduced. Patients were randomized into interval appendectomy (IA) vs. observation (O) with no further intervention, after 12 weeks of medical management. Binomial logistic regression was used for uni/multivariate modeling by SPSS.

RESULTS. Appendectomy by MI (95% with 3% converted to open) or open (2%) approaches was performed on 1,664 patients with an averaging age of 38 ± 16 years and BMI 30 ± 10 kg/m². Multivariate analysis showed that patients >50 years old and perforated cases were predictors for PC ($p < 0.05$). Total PC was higher in the perforated appendicitis group in comparison with the non-perforated (54.8% vs. 14%, $p < 0.05$). A trend towards lesser complications and shorter LOS in comparison to the observational group, was observed in the ongoing RCT. Value assessment surrogates are display in Table 1.

Conclusions. Service line appendectomy holds a high value in our Health Network System. Preliminary results of RCT for perforated appendicitis showed lower PC rate and LOS following interval appendectomy after initial medical management.

Poster # 105

Abstract # 138

Name: Warda Farifi

Level: MD/PhD

Type: Quality Improvement

IRB / IACUC #: 1778610-2

Usefulness of TSH screening after acute ischemic stroke

TSH is regularly checked as a part of post stroke work up. However, it's utility is not clearly defined.

We queried our hospital database to identify all patients admitted with acute ischemic stroke over 9 months (Oct 2021 to June 2022). In total, 182 patients were identified. Patients with known history of thyroid disease were excluded from our study.

A total of 97 patients were included. TSH was checked as a part of stroke work up in 88 (90.72%) of these patients. Abnormal TSH level was seen in 16 patients (18%). Subsequent T3/T4 levels were checked in only 6 (37%) of these patients. No modifications or interventions were made to patients' medications or management based on TSH levels upon discharge from the hospital except in 1 patient where methimazole was started.

TSH levels were not useful in the management of acute ischemic stroke patients. We recommend that TSH levels are not routinely obtained as part of the workup in acute stroke patients.

Poster # 106
Abstract # 96
Name: Hannah Hudson
Level: Medical Student
Type: Quality Improvement
IRB / IACUC #: 1309545

Nutritional Literacy and Application in Rural West Virginia Parents and Children

Childhood obesity rates continue to rise in West Virginia. Obesity and related medical conditions increase the morbidity and mortality of our patients. Obesity is multifactorial, but is related to caloric intake and nutritional choices. Nutritional education may be provided to children and parents at routine visits with their primary care providers, school programs, and other sources. Although nutrition is important to the health of our patients it is not clear if parents are implementing the nutritional education that they have received.

Primarily, data collected will be categorical. It will be analyzed in two separate ways. The preliminary survey will be used to establish a baseline in nutrition knowledge, and possibly correlate this baseline specifically to some of the socioeconomic information collected. Also, the data collected with the preliminary survey in questions 6, 7 and 8 (Parental Survey) will be compared to data listed in "Addressing Obesity and Related Chronic Illnesses" to show if in two years there has been any change in Wayne County to the state wide data available for West Virginia.

Study results are still pending

The data collection duration will be two years, with the initial surveys being implemented shortly after school is in session. Six months after the initial survey, data will be analyzed and our findings will determine an appropriate intervention.

Poster # 107
Abstract # 122
Name: Rachel Maddox
Level: Medical Student
Type: Quality Improvement
IRB / IACUC #: 1935044-1

Improving Medical Student Understanding of Journal Articles using the PICO Method

Throughout a career as a physician there are many skills that are necessary to obtain; one being the ability to read and analyze a medical journal article. This is an efficient way to remain updated on the continually changing information in the medical field. One way to teach this imperative skill is to conduct journal clubs. These provide an efficient and unique opportunity for future physicians to analyze medical articles with the perspectives and input of those around them. Many postgraduates who participated in journal clubs in school stated that the activity benefitted them, yet there is a lack of literature pertaining to journal article assessment in medical students. We devised a quality improvement research project to assess medical student confidence while analyzing a journal article using the PICO method. The PICO method uses four main criteria (population, intervention, control, outcome) to analyze articles. It is hypothesized that providing a tool to help medical students analyze journal articles will lead to higher confidence in the student. This project will assess the effectiveness of the PICO tool and the benefit of learning how to analyze a medical journal article.

Third year medical students in their pediatrics rotation were given a pre survey, a post survey, a medical journal article to read, and a tool to assist them (PICO analysis sheet). Students were instructed to take the pre survey which inquired about confidence in reading medical journal articles, they then ranked their confidence in different areas on a scale of 1-10. The students were then told to use the tool they were given to analyze the article. This tool followed the PICO method which is a structured system used for journal analysis. After completing the task students took a post survey which was essentially identical to the pre survey. Results were compared.

The internal validity of the scale was established using Cronbach's alpha. For this 14-item scale, the Cronbach's alpha measured .943, higher than the accepted standard of greater than .80, and the scale is considered internally valid. As such, individual scale items were averaged, and a mean score that reflects the students' confidence in their ability to understand and apply academic literature was used as a variable for analysis.

Differences in the pre and post-test values were determined by regressing the student's self-confidence, as measured by the mean score of each individual scale item and the average of the mean scores for all scale items, on a dichotomous variable which represented if the survey was collected before or after the journal club. Differences were considered significant if the p-value was less than or equal to 0.05 (95% confidence level).

Overall, participating in the journal club where students learn the PICO method is associated with moderate increases in student confidence in their ability to understand and apply academic literature.

Prior to participating in the journal club, students (n=63) self-rated their confidence in completing tasks related to understanding and applying academic literature in medicine as a 6.4 on a 10-point scale, where 0 = "Cannot do at all" and 10= "Highly certain can do." After participating in the journal club, students (n=38) self-rated their confidence as a 7.1, on average. These differences are statistically significant (P-value = .008). When considering individual factors within the overall scale, significant differences in self-rated confidence are observed for 7 of the 14 factors within the scale. Critically, participating in journal club is associated with an almost 1-point increase (0.960) in the average self-rating of confidence to use evidence from a research study to change clinical practice (p-value=0.007).

Only 25% of students (n=63) had ever participated in a journal club prior to this program, and only 5% had ever heard of PICO. After participating in the journal club, almost all students (92%) found the PICO method at least somewhat useful in helping them understand clinical journal articles, and over half the students (53%, n=38) feel highly confident that they can use this method to analyze a clinical question.

The results of this research experiment found that participation in the journal club using the PICO method led to increased confidence in medical students analyzing articles. The data presented shows a statistical rise in confidence from the pre and post tests that were given. This leads to the conclusion that there is a benefit of hosting journal clubs within a class; and brings forward the idea that more schools should incorporate this into their curriculum. The presentation of this data leads to other inquiries that may be explored in future projects such as what analytical method is most beneficial to medical students. Although only the PICO method was tested here in future experiments other analytical methods could be attempted and results compared.

Poster # 108

Abstract # 11

Name: Aryana Misaghi

Level: Medical Student

Type: Quality Improvement

IRB / IACUC #: NA

Can a smartphone application improve change management, medical education, attending satisfaction, and patient outcomes?

Digital information been increasingly integrated into medical practice, and this extends to clinical education (Chreiman et al.). However, the plethora of information contained in various digital platforms – email, electronic health records, websites, online forums – has outpaced the ability of trainees to organize this information efficiently.

Online technologies that share information across websites and provide for collaboration may provide an answer to this quandary. Wikis, for example, are websites that allow group authorship of a set of webpages through a browser (Crotty et al.). Increased access to clinical information and productivity has been linked with adoption of mobile devices and apps. Important considerations in choosing a platform for providing mobile information include ease of use and ability to provide quick access to important information. A wiki is a hypertext publication collaboratively edited and directly managed by its own audience. The term wiki is derived from the Hawaiian word for "fast." Wikis have been studied as a platform for residents to collaborate on building and sharing information about clinical sites (Chreiman et al.).

At the Psychiatry Residency Program at the Marshall University Joan C. Edwards School of Medicine, the diversity of training sites provides both excellent exposure to psychiatric inpatient and outpatient practice as well as a challenge orienting to new sites when switching rotations. Psychiatry residents serve at four different local hospitals (both public and private) and two outpatient clinics. Each site has a different electronic health records system, work culture, and other unique challenges. As a solution, we initially proposed to develop a mobile app that contained training information for each of the five psychiatry sites. After further literature review and surveying our residents, we adapted this idea to the development of a wiki that would allow for residents to easily update information as it changed over time. Since information for each site is ever-changing, and each resident has valuable perspective to share, the idea of creating a living document for shared knowledge emerged.

Before the study, onboarding for rotations included written manuals disseminated via email, Google Docs, and New Innovations. Any information not included in these documents was filled in by face-to-face interactions prior to March 2019. Amid COVID-19 restrictions, trainees faced face greater barriers integrating into clinical sites, delaying their ability to provide quality patient care.

Residents were asked to complete an online survey through Qualtrics. Invited participants included 22 psychiatry residents in all levels of training. The survey asked the following about current onboarding information:

- o How easy is information to access?
- o How up-to-date is information about training sites?
- o How smoothly does the first day on a rotation go?
- o How prepared do trainees feel the first day of a new rotation?

A wiki website was then created using the popular project management software, Notion. The first iteration of the website was made using existing onboarding documents that were previously distributed for each of the clinical sites. The information was converted to an easy-to-navigate and

interactive format on the website and was made available to all residents.

Residents were once again surveyed after one month of using the wiki, focusing on the same dimensions as the first survey. Residents were also asked to provide written feedback about potential improvements to the format, design, and distribution of the website.

The data was exported to an Excel spreadsheet. Raw data was converted to percentages and then used to create 100% stacked bar graphs. The data, graphs, and written feedback were reviewed to interpret whether the wiki had improved resident onboarding experience.

Before implementing the wiki website, most residents felt that information about rotation sites was not easy to access. There was also several residents that felt the information was not up to date, did not help their first day go smoothly, and did not help them feel prepared for their first day (Figure 1A). After one month of using the wiki, 100% of residents responded “strongly agree,” “agree,” or “neutral” to the statements in the survey, thus completely eliminating all “disagree” and “strongly disagree” responses. The majority of residents felt that the wiki made information easier to access. Residents also all agreed or felt neutral that the wiki information was more up-to-date, helped their first day go smoothly, and feel prepared on the first day at a new clinical site (Figure 1B). The impact of this improvement can be seen in Figure 2.

Over 50% of residents who responded to this survey believe that the lack of familiarity with training sites caused delays in their clinical work (Figure 2A). After use of the website for one month, approximately one-third of resident respondents felt that it helped them provide patient care more promptly than before; other responders felt neutral (Figure 2B).

All of the residents surveyed who used the website said they would recommend it to other residents to help orient them to new rotations and training sites (Figure 3). It is worth noting that all of the “neutral” responses regarding this recommendation came from residents who had not yet utilized the website.

Delivering patient care during the COVID-19 pandemic has required adaptation at every level of the medical system, and this includes medical education.

Changes to the fabric of medical education and communication methods in general due to the COVID-19 pandemic presented a new challenge to information transfer among residents and their programs. We ventured to find a solution for the delay in patient care and overall confusion that our residents face when changing rotation sites. Although we initially proposed to create a smartphone app, feedback from the residents led to the creation of a wiki website instead. This format allows residents to quickly access and share valuable information with each other for the benefit of their education and their patients.

Resident engagement with the website was not as robust as we hoped; however, response was overwhelmingly positive and shows great promise for future development. The website’s utility will likely prove most useful at the beginning of the new academic year, and we expect the incoming psychiatry interns will benefit from it. We also plan to make a version of the website available to medical students at the beginning of their psychiatry clerkship, giving them easy access to learning resources while in the clinical setting.

Written feedback from residents has directed our future efforts as well. We set out to improve ease of information accessibility, but residents reported a similar barrier as before: they couldn’t find the link when they needed it. To resolve this, we plan to place QR codes linking to the website everywhere a resident might need it: hanging on the wall in all offices, on business cards, and on stickers that residents can keep on their person.

In conclusion, we believe this was a worthwhile effort and look forward to continue improving and expanding this collaborative wiki for the future of medical education.

Poster # 109

Abstract # 73

Name: Yuki Nakao

Level: Resident

Type: Case report

IRB / IACUC # NA

Perforated jejunal diverticulitis, important differential of acute abdomen in elderly patients

Cases of small intestinal diverticulosis are rare and mostly asymptomatic. Occasionally, a small bowel diverticula may perforate. We experienced an 80-year-old male who presented with abdominal pain and signs of localized peritonitis. The Computed Tomography (CT) scan of the abdomen revealed pneumoperitoneum with fat stranding around jejunum diverticula. The patient underwent emergency laparotomy with resection of 10 centimeters of small bowel and a primary anastomosis. The patient's post operative course was uncomplicated. Pathological examination confirmed the diagnosis of perforated jejunum diverticula. Perforation of the jejunal diverticulum should be considered as part of the differential diagnosis of acute abdomen in elderly patients, and appropriate treatment options, ranging from early surgery to conservative treatment, should be tailored to the patient's presenting condition and his/her overall physiology.

Poster # 110
Abstract # 101
Name: Cherishma Nagisetty
Level: Medical Student
Type: Quality Improvement
IRB / IACUC #: NA

Demographic Analysis of the Maternal Addiction & Recovery Center (MARC) Program

Background: The prevalence of substance use disorder in pregnant women in West Virginia is estimated to be 10-20%. Co-occurring mental disorders increase the risk for poor maternal and fetal outcomes such as shorter gestation, lower birth weight and impaired fetal neurodevelopment. In 2012, the Maternal Addiction & Recovery Center (MARC) program was created to promote healthy pregnancies and postpartum experience by providing medications to reduce cravings and both one-on-one and group therapy for mental health support.

Hypothesis: Demographic differences in patient's enrolled in maternal addiction recovery program will demonstrate correlations in history of substance use disorder (SUD) and mental health for a rural West Virginian population.

Demographic data that was collected from patients upon program intake via entrance surveys and tracked through the pregnancy. Patient data from 2018-2021 collected including maternal age, gestational age, age at first use, substance of choice, psychiatric comorbidities, and level of preparedness to quit.

Overall, 81 patients were included in this retrospective analysis. At enrollment, they were 30.0 years old with an age of first use of 15.9 years old. Preferred substances were opioids (97.5%) and cannabis (30.9%) and anxiety (50.0%), depression (44.4%), PTSD (28.4%) were the most frequent mental health comorbidities. Multidrug users were more likely to use benzodiazepines ($p=0.001$), stimulants ($p<0.00001$), and cannabis ($p<0.00001$). Using 2 substances led to lower rates of rates of depression ($p=0.03$). Those with one mental health comorbidities were less likely to have Anxiety ($p=0.0001$) and PTSD ($p<0.00001$) than those with multiple comorbidities. When examining PHQ-9 scores, a number of the patients who self-reported no mental health issues had scores that fell in the moderate to severe category suggesting they have undiagnosed depression.

Women entering the MARC program overwhelmingly utilized opioids at early ages. No significant correlation was found for either number of substances utilized nor number of comorbidities with preparedness to quit while in the program, but some trended toward significance. Likely a larger sample size will demonstrate actionable trends. A large portion of the participants in the study (74.1%), reported at least one mental health issue which is consistent with the higher rates of mental health comorbidities in women who suffer from SUD.

Poster # 111

Abstract # 52

Name: Jenna Zuzolo

Level: Medical Student

Type: Educational

IRB / IACUC #: NA

Co-authors: Jenna Zuzolo, Adam Whitmore, Alexa Pigliacampi, Anisha Valluri

Quality of Life and Burnout in Future Physicians

Many studies have reported higher rates of burnout in physicians and workers in healthcare. As a part of the Gold Humanism Honor Society JCESOM Chapter, one of our initiatives is to improve the well-being and overall mental health of future physicians and spread awareness about burnout. Our goal is to address the signs of burnout as well as strategies to combat burnout using the book "Doctor, Heal Thyself" by Diane Ansari-Winn, MD, MPH, and a series of roundtable discussions with current GHHS fourth-year medical students.

We hypothesize students will be better prepared to recognize burnout and the necessary steps to mitigate burnout.

Students will be given a pre-quiz before reading the book or participating in discussion sessions (listed above). Students will read the book and have Gold Humanism Honor Society members lead discussions on burnout and quality of life. At the end of our sessions, students will be given a post-quiz to assess the impact of the book and roundtable discussions.

This is a prospective analysis presentation where we will focus on students becoming better prepared to recognize burnout and the necessary steps to mitigate burnout. The methods of doing so will be done by having the students complete a pre-quiz before reading the book or participating in discussion sessions (listed above). Students will read the book and have Gold Humanism Honor Society members lead discussions on burnout and quality of life.

This is a prospective analysis presentation where we will focus on students becoming better prepared to recognize burnout and the necessary steps to mitigate burnout. The methods of doing so will be done by having the students complete a pre-quiz before reading the book or participating in discussion sessions (listed above). Students will read the book and have Gold Humanism Honor Society members lead discussions on burnout and quality of life. With the prospective analysis, we expect to find that students will feel more comfortable recognizing and mitigating burnout. With the results obtained at this time, we will decide on how to make extracurricular and supplemental education sessions to enhance medical student education based on our hypothesis and expected outcomes.

Poster # 112
Abstract # 21
Name: Tori Miller
Level: Medical Student
Type: Clinical
IRB / IACUC #: 1821176-2

Discontinuation of Routine Postpartum Complete Blood Count in Uncomplicated Vaginal Deliveries

A postpartum complete blood count (CBC) is currently obtained on all obstetric patients to assess for postpartum anemia and the need for blood transfusion regardless of mode of delivery or risk factors. In this study, we hypothesize that routine postpartum CBC is not indicated following uncomplicated vaginal delivery if Hgb on admission was >10 and if estimated blood loss during delivery was <500 mL. This is a prospective study looking at women that delivered at Cabell Huntington Hospital. We will be looking at maternal demographics (age, weight, etc), delivery outcomes (blood loss at the time of delivery), and post-partum complications. We will institute a protocol whereby a postpartum-day-one CBC will only be collected from patients meeting certain criteria, including cesarean delivery; operative vaginal delivery; PPH (estimated blood loss of >500 mL for vaginal delivery); admission hemoglobin of <10 g/dL; chorioamnionitis; preeclampsia; and signs or symptoms of anemia.

Comparison of blood draws, transfusions, and adverse outcomes will be compared prior and following the institution of the protocol.

With the review charts of patients who delivered at Cabell Huntington Hospital we noted that it provides no clinical benefit to obtain routine postpartum CBCs with an uncomplicated vaginal delivery. This is noted with appropriate statistical evidence that is noted in the paper in development and will be noted on the poster during presentation.

We propose that it provides no clinical benefit to obtain a routine postpartum CBC following uncomplicated vaginal delivery. Our recommendation for the OB service at CHH is to remove CBC as a routine postpartum order. Instead, postpartum CBC should only be collected under certain criteria and should not be collected for patients experiencing vaginal delivery with a starting Hgb of >10 and an EBL of <500 mL.

Poster # 113
Abstract # 62
Name: Jacob Loggins
Level: Medical Student
Type: Clinical
IRB / IACUC #: 119644

Sex-specific differences in epicardial fat secretome from patients with and without coronary artery disease

Epicardial fat is the fatty tissue that is found between the pericardium and the heart. This fat serves multiple purposes under healthy conditions, such as protecting the heart or serving as another energy reserve. Epicardial fat is also strongly correlated with several diseases: one of these is coronary artery disease (CAD). This fat increases in thickness and changes in function during CAD. It is therefore hypothesized that the secretome profile of the epicardial fat is altered in CAD compared to subjects without CAD.

This study was IRB approved by Marshall University. Epicardial fat was obtained from consented patients with or without CAD (male and female) during their cardiac surgical procedure at St. Mary's Medical Center (Huntington, WV). Secretomes from the fat tissues were obtained by incubating in RPMI media for 48 hours. The presence of inflammatory proteins in the secretome (n=4/group) was determined using the Proteome profiler Human Adipokine Array (R&D systems). Graphpad Prism was used for statistical analysis.

A significant increase in expression of Lipocalin-2/NGAL was found in the females with CAD versus males without CAD groups. Lipocalin-2/NGAL is a transport protein for small and hydrophobic molecules in circulation. It is a biomarker for early-stage renal disease and is present in increased levels when there is a metabolic disorder, such as obesity. The protein CCL5/RANTES also showed a significant increase in the females with CAD compared to females without CAD and in males with CAD compared to those without CAD. CCL5/RANTES is a proinflammatory cytokine that contributes to the activation of NK cells, basophils, and eosinophils.

Our studies showed sex-specific increases in inflammatory markers in the epicardial fat secretome in patients with CAD. A more significant number of patients need to be tested to confirm our results. The role of these proteins in the altered epicardial fat function in CAD requires further exploration.

Poster # 114
Abstract # 140
Name: Jared Reed
Level: Resident
Type: Case Study
IRB / IACUC #: NA

Co-authors: Dr. Abraham Titus and Dr. Hesham Awadh

Disseminated infection with Mycobacterium bovis following BCG therapy

Mycobacterium bovis is closely related to *Mycobacterium tuberculosis* and is one of the 11 member species of the *Mycobacterium tuberculosis* complex. It is rarely associated with active diseases in immunocompetent hosts, with most diseases reported in the setting of ingestion of contaminated, unpasteurized, dairy products, and less commonly through direct contact with open wounds. Intravesical BCG therapy is an infrequent cause of disseminated infections in a susceptible host. We describe a case of *Mycobacterium bovis* osteoarticular and vascular infection following administration BCG therapy in a host that might have been more susceptible due to therapy with corticosteroids.

We present a case of a 70-year-old male with a remote history of testicular cancer treated with orchiectomy and bladder carcinoma who complained of progressive and chronic lower back pain after completing BCG therapy for bladder cancer. He had received many steroid injections to the back and knee for history of advanced osteoarthritis. Initial laboratory workup was unremarkable. Further imaging with Magnetic Resonance Imaging (MRI) of the lumbosacral spine revealed L5 vertebral body and S1 endplate enhancement consistent with a possible infectious process. Two months after the initial MRI an image-guided biopsy was done and showed no evidence of an active infectious process. Given persistent symptoms, five months after the initial biopsy he underwent a repeat biopsy, which disclosed noncaseating granulomas and with initially negative Acid-fast Bacilli (AFB) and Grocott's Methenamine Silver (GMS) stains. Repeat MRI showed progressive changes with L5-S1 osteomyelitis as well as right-sided psoas abscess and thin L5-S1 ventral epidural abscess. Repeat disc biopsy and abscess drainage sample were obtained and tested positive for *Mycobacterium Tuberculosis* Complex Polymerase Chain Reaction (MTB complex PCR). In about four weeks, cultures started to grow Acid-fast forms, further subspeciation identified *Mycobacterium bovis*. After being initially exposed to broad-spectrum antimicrobials he was transitioned to rifampin, isoniazid, pyrazinamide, and ethambutol (further subspeciation not available at the time), and after 8 weeks this regimen was stepped down to isoniazid and rifampin. Repeat imaging showed decreasing abscess burden, however, it showed evidence of a pseudoaneurysm in the thoracic aorta, concerning for a possible mycotic aneurysm. Surgical intervention was deemed necessary, and the patient underwent open descending thoracic mycotic aneurysm repair with a graft, which he tolerated well.

We describe a case of disseminated *M. Bovis* infection involving multiple organ systems following intravesical BCG immunotherapy. Infrequent cases of vertebral osteomyelitis because of the BCG vaccine have been described in the literature. However, the additional presence of a mycotic aneurysm is an even rarer phenomenon which has only been described twice. We theorize the presence of a vascular tumor in the bladder lead to the insemination of the BCG therapy into the vasculature. We encourage clinicians to consider this diagnosis in the setting of culture-negative discitis and a mycotic aneurysm.

Poster # 115
Abstract # 141
Name: Khurram Anwar
Level: Fellow
Type: Case Study
IRB / IACUC # NA

Hiding in Plain Sight; Advanced, HER-2 Positive Gastro Esophageal Junction Adenocarcinoma presenting with the Sign of Leser-Trelat- A Case Report

The Sign of Leser-Trelat is described as the explosive development of multiple pruritic seborrheic keratotic lesions. It is an ominous sign which is classically associated with internal malignancy. It is a type of paraneoplastic dermatosis which presents with clinical features of hyperkeratosis and epidermal proliferation. Classically, the Sign of Leser-Trelet has commonly been associated with gastrointestinal adenocarcinoma. The underlying pathology is likely driven by cytokines and growth factors related to the neoplasm.

We report a case of a 75-year-old man with no known past medical history who presented to our hospital with three months history of progressive weakness and weight loss. Our Patient used to live alone and smoked around 10-15 cigarettes per day for the last forty years. He noticed difficulty swallowing food for the last several weeks prior to admission leading to a significant reported weight loss of around 50 lbs. His physical examination demonstrated extensive seborrheic keratotic lesions on his back which were pruritic and were first noticed several months prior to this presentation. The lesions were treated symptomatically. During work-up for pathological weight loss, the patient underwent CT imaging which demonstrated a large tumor in the region of the Gastro Esophageal (GE) Junction. He was also found to have a T9 vertebral body pathological fracture with an underlying lesion on an MRI scan. Upper Endoscopy with biopsy confirmed a large, partially obstructing friable mass in the GE junction. The pathology of the mass revealed a HER-2 + invasive, poorly differentiated adenocarcinoma of the GE junction. The patient was offered palliative treatment options for his advanced malignancy, however, the patient opted for hospice and best supportive care only after informed decision-making.

Cutaneous manifestations of internal malignancies are important clinical signs which are well studied in the literature. These signs are often clinically subtle and can be missed on routine clinical examinations. It is of paramount importance for health care providers to maintain a high index of suspicion for any new, unexplained skin lesions in their patients and consider the possibility of malignancy, thus potentially leading to earlier detection of an underlying neoplasm. Our case demonstrates the strong association of paraneoplastic dermatoses like the Sign of Leser-Trelet with GE junction adenocarcinoma and that it may present as a clinical sign for this malignancy months before the actual presentation of the patient to the health care services.

Poster # 116
Abstract # 60
Name: Dustin Darnell
Level: Undergraduate
Type: Clinical
IRB / IACUC # 1822315

Ultrasound Measured Differences in Medial Knee Joint Space Width during the Valgus Stress Test and The Anterior Medial Rotation Test.

The medial collateral ligament (MCL) provides knee stability in the frontal plane. The deep fibers of the MCL (dMCL) have been shown to provide transverse plane stability. The anterior medial rotation (ANTMED) stress test is used to determine the frontal and transverse plane stability of the knee. An accurate assessment of knee valgus stability is important in determining the rehabilitation of the knee. The purpose of this investigation was to determine the difference in the knee joint space width under valgus stress (VS) compared to the ANTMED rotation test.

Fifty individuals without a history of knee injury participated in this investigation. The medial joint space width was measured on ultrasound images of the medial knee taken during the ANTMED rotation test and the VS test. The change in the width of the medial knee joint during the VS test and the anterior medial rotation test was compared. Paired t-tests were used to detect differences between the unstressed and stressed conditions and the difference between the tests.

The width of knee joint space increased under both tests. The joint space increase was less during the ANTMED rotation (right knee=2.77mm, $t=18.332$, $P<0.001$, left knee = 3.52mm in the left) as opposed to pure VS (right knee=3.83mm, $t=25.159$, $P<0.001$, left knee = 4.24mm, $t=27.835$, $P<0.001$). The change in the medial joint space during the ANTMED test was greater during the VS test (right knee=1.07mm, $t = 7.476$, $P < 0.001$, left knee = 1.23mm, $t=5.034$, $P<0.001$).

It was determined that there was a statistical difference in the medial joint space of both knees between the valgus test and the ANTMED rotation test. The observed differences in the width of the joint space are determined to be greater than the minimal detectable change (MDC = 0.794mm) established in conjunction with the current study. The results of the current investigation suggest that the ANTMED knee rotation test could detect differences in joint transverse plane stability associated with injury to the dMCL.

Poster # 117

Abstract # 8

Name: Ryan Churma

Level: Medical Student

Type: Educational

IRB / IACUC # NA

Altered Enteroendocrine Cell Function in Obesity and Potential Therapeutic Role of Gut Microbial Metabolites

Background: Enteroendocrine cells (EEC) are one of the secretory cell lineages of the intestinal epithelium that are differentiated from intestinal stem cells (ISC) located at the crypt base. EECs play a key role in metabolic homeostasis via producing and releasing different kinds of hormones. Glucagon-like peptide 1 (GLP1), an incretin hormone secreted by L-type EEC in response to food intake regulate glucose and energy homeostasis via stimulating pancreatic insulin secretion and reducing appetite. GLP1 secretion is known to be altered in obesity affecting metabolic homeostasis which could be due to impaired EEC differentiated from ISC and/or defective GLP1 secretion by EEC. Conversely, specific gut microbial metabolites are known to stimulate GLP1 secretion. The studies undertaken for the Summer Research Program were aimed at (1) determining EEC differentiation in lean versus obese animals and (2) measuring secreted and intracellular levels GLP1 in a model EE cell line in response to treatment with probiotic bacterial metabolites of tryptophan. Hypothesis: EEC differentiation and function are altered in obesity and gut bacterial metabolites of tryptophan exert an ameliorating effect.

Methods: mRNA and protein levels of the EEC marker chromogranin A in the mucosa of chow diet (CD) and high fat diet (HFD) fed Sprague-Dawley rats were measured by real-time QRT PCR and Western blot, respectively. Cellular and secreted GLP1 levels in mouse EE cell line STC1, following treatment with culture supernatants of probiotic Lactobacilli species grown overnight in media containing tryptophan, were measured by ELISA and QRT PCR, respectively.

Results: mRNA and protein levels of chromogranin A in the rat small intestinal and colonic mucosa were significantly decreased ($P < 0.001$, $N = 5$) in response to HFD, compared to CD. In the mouse intestinal cell line STC1, tryptophan metabolites in the culture supernatants of various probiotic Lactobacilli species differentially stimulated cellular and secreted levels of GLP1

Conclusions: Enteroendocrine cell differentiation is decreased in obesity, which could alter the production and secretion of the incretin hormone GLP1. Gut bacterial metabolites of tryptophan could be effective in counteracting EEC dysregulation via stimulation of GLP1 synthesis and/or secretion.

Poster # 118
Abstract # 108
Name: Caroline Putnam
Level: Doctoral student
Type: Clinical
IRB / IACUC # 726

During simulated infection, loss of Irgm1 contributes to kidney disease phenotypes in mice.

Irgm1 is the mouse homolog of human immunity-related GTPase protein M (IRGM). Irgm1 is known to play a role in immune response by regulating autophagy and may function to regulate pro-inflammatory cytokine production. While Irgm1 function is well-characterized in preventing susceptibility to Crohn's disease, little is known about Irgm1 function in preventing disease phenotypes of the kidney, especially during systemic infection. We hypothesize that loss of Irgm1 during simulated systemic infection results in kidney disease phenotypes.

We injected subsets of wild type, heterozygous, and Irgm1 knockout mice with lipopolysaccharide (LPS) to simulate systemic infection. At various time-points following infection, mice were euthanized and the kidney was examined.

Upon dissection, we discovered that a subset of heterozygous and homozygous Irgm1 knockout mice display hydronephrosis or related kidney disease phenotypes. In some instances, the liver also appeared abnormal in color and/or texture.

Our studies warrant further investigation into the roles of Irgm1 in kidney function. Future work will include examining enzymes associated with kidney and liver function in this mouse model.

Poster # 119
Abstract # 4
Name: Andrea Lauffer
Level: Faculty
Type: Case Study
IRB / IACUC # NA

A Case of Bilious Worm Emesis in a Pediatric Patient Secondary Intestinal Helminthic Infection

A five year old male presents to the emergency department with abdominal pain and emesis. Labs were significant for hyponatremia, elevated alkaline phosphatase, mild hyperproteinemia, and leukocytosis with neutrophilia. Urinalysis showed ketones present. A plain film of the kidneys, ureter, and bladder showed distension of the transverse colon and stool in the rectum. Social history taken was limited to patient living with his siblings and parents. He received 2 normal saline boluses and was admitted to the pediatric floor for suspected viral gastroenteritis.

On hospital day 1, the patient developed bilious emesis. An upper gastrointestinal/small bowel follow through study showed mildly delayed passage of contrast through the duodenum. The patient had another episode of bilious emesis containing a 22 centimeter live worm. It was determined the bilious emesis was due to a parasite burden. Patient underwent conservative management which included the placement of a nasogastric tube with suction, intravenous fluids, and electrolyte correction before administering anti-helminthic therapy. To further induce worm relaxation, mineral oil was administered through his nasogastric tube.

Investigation by the infectious disease team revealed that the patient's social history included living on a farm with daily exposures to various animals. Infectious disease team felt that the elevated alkaline phosphatase and the hyperproteinemia were a reflection of an acute helminthic infection. Patient received one dose of mebendazole in the hospital. The patient clinically improved. He did have stool passage of worms prior to discharge. Laboratory analysis identified the emitted worm as *Ascaris lumbricoides*.

A. lumbricoides is the largest of the intestinal nematodes affecting humans, measuring 15-35 cm in length in adulthood. Infection is more common in developing countries with poor sanitation and areas where human feces are used as fertilizer. Adult worms may live in the gut for 6-24 months where they can cause partial or complete bowel obstruction and migrate into the appendix, hepatobiliary system, pancreatic ducts, and rarely other organs such as the kidneys or brain. Male children are thought to be infected more frequently due to a greater propensity to eat soil. *A. lumbricoides* provokes eosinophilia principally during the initial stage of larval migration through the lungs. Adult worms residing in the lumen of the gut typically do not cause an eosinophilic response.

While dehydration secondary to gastroenteritis is one of the most common inpatient pediatric diagnoses, a high suspicion of index should have been present for a parasitic infection in this patient due to exposure history. Obtaining a thorough social history is essential in creating a meaningful differential diagnosis. Eosinophilia does not necessarily need to be present as one may expect for ongoing parasitic disease. Correct identification and treatment with confirmation of cure is needed to prevent long term adverse effects in children.

Poster # 121
Abstract # 139
Name: Abraham Titus
Level: Resident
Type: Case Report
IRB / IACUC # NA

iatrogenic Reversible Hypofibrinogenemia in the Setting of Using a Direct Thrombin Inhibitor for Treatment for Recurrent Deep Vein Thrombosis

Fibrinogen is an essential and abundant peptide synthesized by the liver. It is required for clot formation while providing a matrix and mesh network essential for clot strength. It is used in the diagnosis and monitoring of multiple coagulopathies. The gold standard for measuring fibrinogen is the Clauss method which uses citrated plasma to which thrombin is added, and the clot formation time is recorded via spectroscopic analysis. Hypofibrinogenemia is defined as fibrinogen of less than 150 mg/dL and is primarily treated with supplementation with cryoprecipitate, or a fibrinogen concentrate. Acquired hypofibrinogenemia may occur due to disseminated intravascular coagulopathy (DIC), liver failure, after cardiac surgery or after massive transfusions. There have also been reports of hypofibrinogenemia associated with the use of direct thrombin inhibitors and tPA. We present a case of acquired hypofibrinogenemia while being treated for recurrent deep vein thrombosis (DVT) which was able to be reversed with the cessation of the direct thrombin inhibitor.

A 28-year-old female presented to the emergency department with left lower extremity pain, swelling and cyanosis. She was diagnosed with an extensive DVT of the left lower extremity and started on a heparin infusion. She subsequently underwent mechanical thrombectomy, IVC filter placement and iliac vein stenting due to extensive clot burden. She was transitioned to therapeutic enoxaparin and discharged home. However, she continued to have worsening left lower extremity pain and swelling and was found to have a persistent DVT. She was then tried on apixaban but failed therapy and required a repeat thrombectomy. Her initial hypercoagulability workup for anti-phospholipid syndrome was unremarkable. She then underwent catheter-directed tPA and was started on an argatroban infusion. She remained on the argatroban infusion for 7 days. While on argatroban infusion therapy, routine blood work noted her fibrinogen levels to be less than 50 mg/dL. Despite the initial concern for DIC, the hypofibrinogenemia was ultimately attributed to prolonged argatroban exposure after literature review. The decision was made to not replace the fibrinogen, but instead to transition the argatroban to fondaparinux. The repeat fibrinogen level one day after discontinuing argatroban was back to normal limits at 351 mg/dL and the patient was subsequently discharged on fondaparinux with subsequent clinical improvement.

Multiple studies advocate for maintaining fibrinogen levels with supplementation for acquired coagulopathies. However, in this clinical situation, removing the offending agent was the key to correcting the patient's fibrinogen level. With the patient's history of recurrent DVTs, giving her fibrinogen replacement may have led to worsening thrombosis. It is imperative that clinicians be aware of the many causes of hypofibrinogenemia. Before reflexively replacing fibrinogen, a physician must consider all reversible causes and make an informed clinical decision.