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Abstract Booklet

ABSTRACTS

Oral Presentation Abstracts

Presenters are indicated with "*" next to their names.

O.01

COMBINED ELECTRICAL STIMULATION AND STEM CELL TRANSPLANTATION AUGMENTS PERIPHERAL NERVE REGENERATION AND FUNCTIONAL RECOVERY. Huanwen Chen*, Jian Du, and Xiaofeng Jia, Department of Neurosurgery, University of Maryland School of Medicine, Baltimore, MD.

Peripheral nerve injuries often lead to incomplete recovery and contribute to significant disability to approximately 360,000 people in the USA each year. Stem cell therapy holds significant promise for peripheral nerve regeneration, but maintenance of stem cell viability and differentiation potential in vivo are still major obstacles for translation. Using a made-in-house 96-well vertical electrical stimulation (ES) platform, we investigated the effects of different ES parameters on human neural crest stem cell (NCSC) differentiation. We observed optimal cell morphology and differentiation when NCSCs were subject to ES with 20 Hz frequency, 100μs pulse, and 200 mV/mm potential. We then applied these parameters to in vivo NCSC transplantation for repair of 15 mm critical-sized sciatic nerve injuries in nude rats. Sixty animals were used in total, which were randomly assigned into five groups (N = 12 per group): blank control, ES only, NCSC only, NCSC + ES, and autolograft. Optimized ES was applied immediately after surgical repair for 1 h in ES groups, and recovery was assessed by behavioral (CatWalk gait analysis), wet muscle-mass, histomorphometric, and immunohistochemical analyses at 6 and 12 weeks after injury. Gastrocnemius muscle wet mass measurements in ES + NCSC group were comparable to autologous nerve transplantation and significantly higher than other groups ($p < 0.05$). Quantitative histomorphometric analysis and catwalk gait analysis showed similar improvements by ES on NCSCs ($p < 0.05$). A higher number of viable NCSCs was shown via immunochemical analysis, with higher Schwann cell (SC) differentiation in the NCSC + ES group compared to the NCSC group ($p < 0.05$). Overall, ES on NCSC transplantation significantly enhanced nerve regeneration after injury and repair, and was comparable to autograft treatment. Our results showed that ES can be a potent modulator of NCSC survival and differentiation in the context of peripheral nerve repair, significantly augments the efficacy of NCSC transplantation, and may provide an effective and safe approach to cell-based therapy after peripheral nerve repair.

This study was supported by Maryland Stem Cell Research Fund, USA (2013-MSCRFE-146-00, 2018-MSCRFD-4271) (both to XJ) and R01HL118084 from the United States National Institutes of Health (NIH) (to XJ).

O.02

DEVELOPING MODEL SYSTEMS TO INVESTIGATE THE ROLE OF LRP1 PATIENT MUTATIONS ON ABDOMINAL AORTIC ANEURYSMS. Saif Yasin* and Dudley Strickland, Center for Vascular and Inflammatory Diseases, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Aortic Aneurysms account for 1 to 2% of all deaths in Western Countries, increasing the risk of aortic dissection in affected patients. Abdominal Aortic Aneurysms (AAA) are more common, but are generally associated with advanced age and atherosclerosis. No causative gene has been identified for abdominal aortic aneurysms, however, recent work has identified the presence of a 10-year-old

male patient with abdominal aortic and diffuse aneurysms. While an aneurysm gene panel was negative, whole exome sequencing indicated compound heterozygosity for two mutations (V1291I and A3487T) in the low-density lipoprotein (LDL) receptor-related protein 1 (LRP1). LRP1 is a large endocytic receptor found abundantly within vascular smooth muscle that has been implicated in vascular development. We hypothesized that mutations in LRP1 caused a knockout of function which lead to aneurysm development. In order to evaluate the effect of the LRP1 mutation on our patient, mice with a smooth muscle cell (SMC) specific LRP1 knockout were developed. Histological analysis showed SMC LRP1 knock-outs cause fragmentation of the elastic lamina and medial thickening, highlighting a role for LRP1 in vascular health. Therefore, further modeling of the patient mutation must be conducted to evaluate the mechanism of aneurysm formation. We are conducting a three-pronged approach. First, ligand binding to soluble LRP1 mini-receptors is being screened via surface plasmon resonance to assess the affinity to ligands that could accumulate and reduce vessel strength to induce aneurysm formation. Second, we are developing homozygous cell lines of each individual patient mutation via CRISPR editing to evaluate the effect on LRP1 trafficking and function separately. Third, induced pluripotent stem cells are being developed from patient cells to allow for the evaluation of the effects patient mutations have on LRP1's different functions in various cell types. Overall, these methods will offer more sophisticated models to evaluate the specific mechanism of dysfunction caused by the LRP1 patient mutations to help educate the development of therapies and expand our understanding of the genetic risk to AAAs.

This research was supported by the National Institutes of Health, by the American Hearth Association, and by the Medical Scientist Training Program Training Grant.

O.03

EFFECTS OF DYSREGULATED NF-KB ON HEMATOPOIETIC STEM CELLS AND THEIR FUNCTION. Huanwen Chen*, Masahiro Nakagawa[1], and Chozha Rathinam[2], [1]Department of Genetics and Development, Columbia University School of Medicine, New York, NY and [2]University of Maryland School of Medicine, Baltimore, MD.

Hematopoiesis is a process that gives rise to all blood cells through sequential cell divisions and differentiation of progeny originating from hematopoietic stem cells (HSCs). Tight control of quiescence is vital for maintaining the "stemness" and function of HSCs. The decision of whether HSCs are to remain at a quiescent state or enter an actively proliferating state is controlled by a number of factors through both cell intrinsic and extrinsic mechanisms, and a harmony between these factors is essential for proper maintenance of HSCs in the bone marrow niche. NF-kB proteins are crucial transcription factors that act as the master regulators of innate and adaptive immunity, and constitutive activation of NF-kB has been documented in various types of human diseases, most notably in myeloid neoplasms. However, the pathophysiological role of NF-kB activation in hematologic malignancies is largely unknown, and detailed mechanisms through which NF-kB impacts HSC biology remain unexplored. In the present study, we investigate the role of NF-kB in HSC biology through a 'gain of function' approach using mice that express the constitutively active form of IKK2 in HSCs. We showed that HSCs in mice with constitutive activation of NF-kB exhibited a hyper-proliferative phenotype associated with loss of quiescence, leading to a reduction of the HSC pool and compromise of HSC function. Our genome-wide transcriptional profiling studies combined with 'in silico' analysis identified deregulated molecular and genetic signatures of HSCs and 'transcription factor network' in HSCs with constitutive activation of NF-kB. Furthermore, our molecular studies identified deregulated expression of the quiescence factor-p57, and that JunB is one of the key targets of NF-kB in hematopoietic cells. Taken together, these data indicate that NF-kB signaling plays a key role in the determination of

'quiescence' vs. 'active' state of HSCs and that fine-tuning of NF-kB signaling is critical for preserving the molecular and genetic identities of HSCs.

This work was supported by grants from the NHLBI HL132194 (to CR).

O.04

THE HEART-PLACENTAL AXIS: THE RELATIONSHIP BETWEEN TYPE OF CONGENITAL HEART DEFECT AND THE PLACENTA. Gabrielle Siegel*, Elizabeth Cutting, Ozhan Turan, and Shifa Turan, Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, Baltimore, MD.

The heart-placental axis includes many common genes that reflect the parallel development of both organs. Abnormal cardiac growth leading to congenital heart defects (CHD) can be associated with abnormal placental growth. Thus, we aimed to study the heart–placental axis indirectly by analyzing the relationship between type of CHD and 1) placental weight (PW) and 2) placental weight to birth weight ratio (PW/BW). We hypothesized that PW and PW/BW ratios would be significantly smaller in CHD patients. A total of 147 pregnancies with CHD uncomplicated by maternal comorbidities were identified and classified embryologically: (1) right sided defects (pulmonary atresia, tricuspid atresia, Ebstein's anomaly (n=8)); (2) conotruncal defects (Tetralogy of Fallot, double outlet right ventricle, transposition of great arteries (n=45)); (3) left sided defects (Hypoplastic left heart, aortic coarctation (n=25)) (4); atrio-ventricular canal defects (n=16); (5) ventricular-septal defects (VSD (n=53)). Of the CHD patients, 29% had extra-cardiac abnormalities (ECA). Median placental weight was calculated for gestational ages 29-41 weeks using cases without maternal or fetal complications (Normal (n=455)). Placental weight multiples of median values (PW-MoM) and PW/BW ratios were compared between normal and CHD groups using a Mann-Whitney-U. The effect of the presence of ECA was also analyzed. Due to multiple comparisons, p

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O.05

DOES GDF15 KNOCKDOWN ELIMINATE MESENCHYMAL STEM CELL THERAPY FUNCTIONAL PRESERVATION OF THE MYOCARDIUM IN SETTINGS OF PRESSURE OVERLOAD? Gregory Boyajian*, Sunjay Kaushal[1], Gregory Bittle[1], David Morales[2], Rachana Mishra[2], and Sudhish Sharma[2], [1]Division of Cardiothoracic Surgery, [2]Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Hypoplastic Left Heart Syndrome (HLHS) is a congenital heart disease that results in underdeveloped and ineffective left heart structures. The clinical management of HLHS is limited to a surgical palliation that converts the heart into a single-ventricle pump, where the right ventricle (RV) pumps blood to the systemic circulation. Despite this advanced surgical management, the transplant-free survival rate for HLHS remains at just 50-65% at five years of life. This is because single ventricle physiology and systemic resistance cause RV hypertrophy, which ultimately leads to dysfunction. Therefore, current efforts to reduce mortality are focused on finding therapeutics that preserve RV function in settings of pressure overload. Administration of Mesenchymal Stem Cells (MSCs) has recently been shown to preserve RV function in both in vitro and in vivo models of pressure overload. Such regeneration is believed to occur through a paracrine effect mediated by MSC secretions. However, the specific secretome proteins responsible for promoting RV function are still unknown. A prime candidate for investigation is Growth/differentiation Factor 15 (GDF-15), an anti-inflammatory cytokine that is upregulated after myocardial damage and may attenuate hypertrophy. We developed an animal model of RV failure, then administered GDF-15 knockdown (GDF-15 kd) MSCs to the RV free wall. We hypothesized that administration of GDF-15 kd MSCs

would result in failure to recover RV function, while administration of unmodified MSCs would result in recovery of function. RV function was quantified by Fractional Area Change, which was measured using echocardiography. We found that administration GDF-15 kd MSCs yielded no improvement in FAC when compared to controls, but that administration of unmodified MSCs resulted in recovery of RV function. Our results suggest that GDF-15 is critical for MSC-induced myocardial preservation in settings of pressure overload. Future studies should investigate GDF-15 pathways and elaborate the molecular mechanism in order to explore the potential for a GDF-15 based therapeutic.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.06

A POROUS COLLAGEN-GAG SCAFFOLD PROMOTES MUSCLE REGENERATION OF VML INJURED QUADRICEPS MUSCLES IN A MURINE MODEL. Nicole Hays*, Adriana Panayi, Lucindi Smit, Dennis Orgill, and Indranil Sinha, Division of Plastic Surgery, Department of Surgery, Department of Surgery, Brigham and Women's Hospital, Boston, MA.

Volumetric Muscle Loss (VLM) is the surgical or traumatic loss of skeletal muscle tissue that results in functional loss. These wounds do not heal via regeneration, but instead result in fibrosis and the inability for the muscle to return to its previous strength. There are few treatments for VML that result in muscle regeneration that would allow the muscle to regain its functional capacity. The collagen scaffold, Integra®, will be investigated to see if it promotes skeletal muscle regeneration post VML injury. Mice will be split into four groups: wild-type control, sham surgery, VML quadriceps injury, and VML quadriceps injury with Integra®. There will be an exercise protocol run 4 weeks before and 3 weeks after the surgery to test for maximum speed. The muscle tissues will be harvested for histology, ELISA, and PCR to analyze the size of new muscle cells and up/down regulation of different genes.

O.07

ADVERSE EVENTS IN PATIENTS WITH IMPLANTABLE CARDIAC DEVICES UNDERGOING RADIOTHERAPY: IS IT TIME TO REVISE GUIDELINES? Muhammad Hamza*, Pranshu Mohindra, and Stephanie Rice, Department of Radiation Oncology, University of Maryland School of Medicine, Baltimore, MD.

Cardiac mortality and cancer are the two top causes of death in the US. Due to the aging population, the incidence of implantable cardiac devices (ICDs), as well as cancer is increasing. Most cancer patients will receive radiation therapy (RT) as part of their treatment, and the sensitivity of ICDs to damage by radiation poses a unique challenge for these patients. Current radiation guidelines are based on older ICD and RT delivery technologies. Further, the threshold for acceptable radiation doses varies across different ICD manufacturers. We aimed to retrospectively assess the rates of ICD malfunction and cardiac complications in all cancer patients receiving RT at University of Maryland Medical Systems (UMMS) and to correlate the treatment planning system (TPS) estimated ICD dose with actual in-vivo dose measured by an optically stimulated luminescent dosimeter (OSLD). Between 2000 and 2018, 194 cancer patients with an ICD received RT at UMMS. Patient and treatment factors analyzed included patient demographics, ICD details, disease characteristics and treatment characteristics including total radiation dose, distance of ICD from RT site, ICD malfunction, and cardiology visit notes. We found that on average OSLD and TPS doses were strongly correlated ($R=0.88$, $P<.001$), and relative to the RT dose, the absolute difference in OSLD and TPS dose was $0.4 \pm 0.6\%$. There were two adverse ICD related events. Both patients received 50 Gy in 5 fractions and had events occurr 24 months post-RT. The doses to the ICDs

were 5 and 19.2 cGy respectively, the ICDs were outside the RT field and there were no changes in ICD interrogation values pre, mid and post-RT. The timeline of these events seems to preclude RT as a causative factor and our observed malfunction rate is similar to the national average (1.03% vs. 0.65%) but further consideration of confounding factors such as total dose vs. fraction delivered and time of exposure to radiation is needed. Our data show that post-RT cardiac complication rates are low. Further evaluation of existing recommendations for RT of patients with ICDs is warranted and will guide the UMMS Radiation Oncology Pacemaker Policy in the future.

This research was supported by the 2018 Radiation Oncology Summer Research Fellowship at the University of Maryland School of Medicine.

O.08

PRIMARY-CARE AND ACUTE CARE ELECTION: NON-URGENT CARE DECISION MAKING IN A PRIMARY CARE PEDIATRIC POPULATION. Shannon Kirby* and Adam Spanier, Division of General Pediatrics, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Non-urgent emergency room (ER) usage contributes to higher costs in the modern healthcare system and disrupts continuity of care; therefore, improving the connection of patients with their primary care providers (PCPs) to both direct treatment and provide guidance in the medical decision-making process has become increasingly important. However, the factors influencing this decision-making process and relationship each are under-explored in pediatric patients who seek care from their PCP. By studying this population, we hope to gain targets for intervention to aid in choosing the appropriate acute care site for all pediatric patients. Specifically, we hypothesized that the relationship between a patient and their PCP has a role to play in this decision-making process, as seen by increased understanding of PCP resources and decreased non-urgent ER visits. We tested this hypothesis using the PDRQ9 questionnaire, a validated instrument that measures the patient-doctor relationship from the patient's perspective on a score from 9 to 45. This is incorporated as a part of the Primary-care Engagement and Acute Care Election (PEACE) study, which records self-reported patient knowledge of PCP office resources and typical care-seeking practices. In addition, we performed a 1-year chart review of demographic factors and the frequency, timing, and use of PCP resources surrounding non-urgent acute visits to the ER. The Emergency Severity Index (ESI) Version 4, a well-documented metric, measured the urgency of acute care visits used in this study. We recruited 220 parent-child pairs who receive care from Pediatrics at Midtown to complete this study, with an average age of 6 years old within the range of 1 to 21. With respect to the PDRQ9, the mean score was 39.8 with a full range of 9-45. Non-urgent, non-referred visits to the ER occurred with 16% of participants during clinic hours, and with 39% of participants outside of clinic hours. With further analysis, we anticipate that those patients who have a higher score on the PDRQ9 will have a lower rate of non-urgent ER use as well as a better understanding of the acute care resources available through their PCP's office.

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O.09

IDENTIFYING THE COMPONENTS OF INFORMED TREATMENT DECISION-MAKING IN PATIENTS WITH PANCREATIC CANCER RECEIVING PREOPERATIVE THERAPY (INFORMED). Christine Server* and Ryan Nipp, Massachusetts General Hospital, Boston, MA.

Pancreatic cancer is highly lethal and surgical resection represents the only option for potential cure. Recently, patients with pancreatic cancer are increasingly receiving preoperative chemotherapy to improve the likelihood of achieving surgical resection. However, preoperative treatment is fraught

with side effects, and mortality remains high. Patients must weigh the risks and benefits of different treatments based on perceptions of their prognosis and the risks/benefits of treatment. Therefore, we sought to explore patients', caregivers', and clinicians' perceptions of the information patients need in order to make informed treatment decisions regarding preoperative treatment for pancreatic cancer. We first conducted focus groups with 15 clinicians from oncology, radiation oncology and surgery. We then conducted one-on-one interviews with 23 patients and 19 caregivers. Two coders independently reviewed all of the qualitative data to categorize the content into themes. Thereafter, four study team members met to discuss our findings, interpret the results, and develop group consensus. Our findings helped us identify the following list of necessary components of informed treatment decision-making in patients with pancreatic cancer receiving preoperative therapy: (1) logistics involved with chemotherapy (e.g. schedule, timing); (2) potential side effects of chemotherapy; (3) the likelihood of needing an urgent visit and/or hospitalization during the time receiving chemotherapy; (4) the likelihood of needing help with daily tasks (such as bathing or dressing) (5) medications to take to manage side effects (such as nausea or diarrhea) (6) other treatment options in addition to the one the clinical team recommended for the patient; (7) why the clinical team is recommending this chemotherapy treatment; (8) the likelihood of getting to surgery and/or being cured for people who receive this chemotherapy treatment. By enhancing our understanding of the information patients need to make informed decisions about their treatment, we hope to improve communication about the risks and benefits of treatment and enhance patient-centered decision-making.

O.10

TANGIBLE BENEFITS: INCORPORATING NEW VARIABLES INTO THE RISK-BENEFIT ANALYSIS OF LIVING ORGAN DONATION DECISIONS. Miriam Robin*, Sarah Rasmussen, Macey Henderson, Madeleine Waldram, Ann Eno, and Dorry Segev, Epidemiology Research Group in Organ Transplantation, Department of Surgery, Johns Hopkins University School of Medicine, Baltimore, MD.

The risk-benefit framework currently used in living organ donation presumes all benefit is afforded to the recipient, whereas the donor only assumes risks. However, additional measurable benefits may be granted to the donor that are neglected in current paradigms of risk-benefit analyses. We conducted in-depth interviews with 56 living kidney donors regarding their decision to donate and any benefits they experienced from donation. Interviews were conducted and recorded over a 5 week period. Qualitative themes were derived from interview transcripts by two independent coders; differences in coding were reconciled until reaching consensus. These themes were then analyzed for common patterns. Participants reported they were motivated to donate a kidney based on a more nuanced understanding of the benefits of donation than accounted for by the current paradigm. Twenty-five were in interdependent relationships with their recipients (i.e. partner, parent and child) meaning they had a shared household and/or significant caregiving responsibilities. Some additional benefits included improvements in caregiving burden, wage earnings, donor independence, and the donor's ability to have children with the recipient. Participants' evaluation of the benefits of organ donation included tangible benefits currently overlooked in live donor transplantation decisions. These additional benefits may alter present risk-benefit calculations so as to allow a greater threshold of acceptable donor risk. This in turn may expand the pool of potential donors which has significant implications for transplant medicine.

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O.11

EFFECT OF TELE-MEDICINE FOR INFLAMMATORY BOWEL DISEASE (TELE-IBD) ON PATIENT ACTIVATION AND SELF-EFFICACY. Zaid Bilgrami*, Raymond Cross, and Ameer Abutaleb, Division of Gastroenterology and Hepatology, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Limitations in inflammatory bowel disease (IBD) care necessitate greater patient activation and self-efficacy, measures associated with positive health outcomes. We assessed change in patient activation and general self-efficacy from baseline to 12 months through our TELEmedicine for IBD trial, a multi-center, randomized controlled trial consisting of a web-based monitoring system that interacts with participants via text-messaging. A total of 222 adults with IBD who had experienced an IBD flare within 2 years prior to the trial were randomized into either a control arm that received standard care (SC) or an intervention arm that completed self-testing through the TELE-IBD system every other week (EoW) or weekly (W). Changes in self-efficacy scores were not significantly different between control and experimental groups. Patient activation scores were significantly different between standard care and the TELE-IBD EOW group only ($p=0.03$). Use of remote monitoring did not improve self-efficacy or patient activation compared to routine care.

O.12

DELAYED PRESENTATION OF BOWEL OBSTRUCTION CAUSED BY BLUNT TRAUMA. Nicholas George* and Siamak Moayedi, Department of Emergency Medicine, University of Maryland School of Medicine, Baltimore, MD.

Blunt abdominal trauma (BAT) is a common injury seen in the emergency department. A majority of such injuries are the result of motor vehicle collisions (MVC) There are a number of acute and chronic sequelae of BAT. Blunt abdominal trauma leading to bowel obstruction is a rare entity and is most often seen acutely caused by bowel wall hematomas and chronically caused by post-traumatic strictures. In this report, we describe our management of delayed intestinal obstruction resulting from bowel wall hematoma caused by blunt abdominal trauma. As emergency departments often care for patients both in the immediate aftermath of trauma and later in their lives, emergency physicians must recognize the more subtle, sub-acute effects of trauma, in this case, blunt abdominal trauma.

O.13

PROSPECTIVE, RANDOMIZED CONTROLLED COMPARISON OF A FLASH-TIP CATHETER AND A TRADITIONAL IV CATHETER IN AN URBAN EMERGENCY DEPARTMENT. Nicholas George*, Michael Witting[1], Jon Mark Hirschon[1], Alise Burke[2], Stephen Schenkel[1], and Siamak Moayedi[1], [1]Department of Emergency Medicine, [2]University of Maryland School of Medicine, Baltimore, MD.

Emergency Department (ED) patients often require rapid, short-term intravenous (IV) access for diagnosis and treatment of emergency medical conditions. Timely and safe IV access is critical for the practice of emergency medicine. There are a number of peripheral IV catheter systems available on the market, with various features to improve first-stick success and reduce clinician blood borne pathogen exposure. In this study we compare the rates of first-stick success and blood spillage among two commercially available peripheral IV catheters. We randomized emergency department patients requiring IV access to receive either a flash-tip catheter flash-tip catheter (SurFlash Plus, Terumo Medical Corporation, Somerset, New Jersey) or a widely used control catheter (Insyte Autoguard; Becton, Dickinson and Company, Franklin Lakes, New Jersey). We compared frequency of first-stick success and blood contamination between catheters using chi-squared analysis. We enrolled 600 patients, randomizing 309 to the flash-tip catheter and 291 to the

control catheter. The first-stick success rate of each device was 79%. Blood contamination, defined as spillage of blood on the patient's skin, bedding, or the inserter, occurred in 8 of 309 cases (2.6%) with the flash-tip catheter versus 92 of 291 cases (31.6%) for the control catheter. The two catheters tested in this study had comparable rates of first-stick success, but the flash-tip catheter was associated with significantly less blood contamination during insertion attempts.

This study was supported by an investigator-initiated grant from Terumo Medical Corporation.

O.14

EFFECT OF TELEMEDICINE ON QUALITY OF LIFE AND DEPRESSIVE SYMPTOMS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE. Matthew Schliep*, Raymond Cross, and Kenechukwu Chudy-Onwugaje, Division of Gastroenterology and Hepatology, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Inflammatory bowel disease (IBD) is a chronic debilitating condition involving the gastrointestinal (GI) tract. Depressive symptoms (DS) are common in affected patients and overall, they have poor quality of life (QoL) scores. Telemedicine is the use of information technology to remotely deliver health care, and it is poised to gain widespread use in the care of IBD patients. However, its effect on DS and QoL is unknown in IBD. We investigated the impact of telemedicine on DS and QoL over time. This was a one-year, multicenter, randomized clinical trial evaluating disease activity and QoL in IBD patients using text message-based telemedicine. Participants were randomized to three groups: standard of care and telemedicine weekly or every other week (EOW). Using mobile phones, telemedicine participants relayed information on their clinical features, and treatment plans were similarly conveyed to them. DS and QoL were measured using the Mental Health Inventory (MHI-5) and Short Form (SF-12) respectively. The SF-12 score has a physical component score (PCS) and a mental component score (MCS). Change in MHI-5 and SF-12 scores from baseline to 12 months was assessed, and comparison was made between the intervention and control groups. Of the 217 study participants, 59% were woman and 69% had Crohn's disease. The number of participants in the control, telemedicine weekly and EOW groups were 71, 74 and 72, and the baseline PCS, MCS and MHI scores across all participants were 46.9, 48.6 and 74.9 respectively. After controlling for confounders, there was no significant difference in the mean change in MHI, PCS and MCS scores between the telemedicine and control groups. Text message-based telemedicine does not lead to improvement of depressive symptoms or QoL when compared to standard of care in IBD patients. Although telemedicine has been shown to reduce costs and improve access to care, caution should be exercised in overstating its benefits with regards to important outcomes such as DS and QoL. Future studies should explore the impact of other telemedicine modalities on DS and QoL.

O.15

SURGERY IS ASSOCIATED WITH OPIOID OVERDOSE AND NEW-ONSET OPIOID USE DISORDER AMONG US VETERANS. Jonathan Siglin*, Khodadad Namiranian[1], and John Sorkin[2], [1]Department of Anesthesiology, Veterans Affairs Medical Center Fresno, Fresno, CA and [2]Veterans Affairs Medical Center Geriatrics, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

The opioid epidemic is exceedingly and increasingly costly to both patients and the health care system. Two adverse outcomes that drive significant morbidity and mortality are opioid use disorder (OUD) and opioid overdose (OD)— the former a chronic-and-relapsing condition, and the latter acute. Data suggest that up to 86% of patients with diagnosed OUD began with the use and subsequent misuse of opioid narcotics, which are the current standard of care in postoperative pain control. Surgery, which often exposes patients to opioids, may be implicated in the development of

OUD and OD. Through a retrospective cohort study of more than 1.5 million U.S Veterans enrolled in the VA Health Care System, we assessed the relationship between surgery and OUD/OD in the first postoperative year. OD was significantly more common among the surgical group compared to the control group (0.725% versus 0.053%; $P < 0.001$), as was diagnosis of new-onset OUD (0.842% versus 0.430%, respectively; $P < 0.001$). A multivariate logistic regression model controlling for demographics, medical comorbidities, and preoperative drug use showed that surgery is a significant risk factor for opioid overdose (OR = 9.57, 95% CI = 8.72-10.50) in the first postoperative year, compared to patients who did not have surgery. Among patients with no history of opioid abuse, surgery is a significant risk factor for diagnosis of new OUD (OR = 1.61, 95% CI = 1.52-1.70). The data further suggest the profile of a patient more likely than most to suffer an opioid-related adverse event: a history of bipolar disorder, depression, or substance abuse, as well as preoperative use of benzodiazepines or gabanoids (pregabalin or gabapentin), was associated with increased risk of OD and OUD. In sum, surgery is strongly associated with postoperative OD and OUD. The perioperative variables that further augment risk may be used by clinicians as they seek to balance adequate pain control with the risk of adverse events.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.16

PREDICTIVE FACTORS OF REPORTED SEXUAL ABUSE AND REVICTIMIZATION FOR AN URBAN CHILDREN'S ADVOCACY CENTER. Gabriella Miller*, Cydney Nguyen*, and Wendy Lane, Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, MD.

First-time victims of child sexual abuse have an increased risk for repeated victimization during childhood (Arata CM, 2002) and adolescence, as well as increased lifetime risk of repeated victimization (Widom CS, 2007), as compared to those who were not victims of child sexual abuse. It is well established in the literature that individuals who are victims of multiple child sexual abuse crimes have worse psychological (Classen CC, 2005) and somatic health outcomes than those who were sexually abused once (Arata CS, 2002). In a retrospective observational cohort study examining intake information forms, summaries of forensic interviews, and medical records of children presenting to Baltimore Child Abuse Center (BCAC) in 2007 for first time evaluation of child sexual abuse, we seek to identify a list of determinants that identify children at a higher risk for revictimization as compared to members of the same cohort who were not revictimized. On bivariate analysis we found that child age ($p=0.03$), number of children in the home ($p=0.026$), prior out-of-home placement ($p=0.04$), prior child protective services (CPS) history ($p=0.01$), identity of the perpetrator ($p=0.036$), and humping behavior of the perpetrator (0.01) were predictive factors for revictimization of children. On multivariable logistic regression analyses we found that child age (OR=0.88; 95% CI 0.81-0.97; $p=0.009$), prior CPS history (OR=4.84; 95% CI=2.17-10.80; $p<0.001$), humping behavior of the perpetrator and remained significant predictors (OR=4.22; 95% CI=1.54-11.53; $p=0.005$). We hope that these findings will help to inform the creation of a clinically useful tool for predicting which children are at an increased risk for revictimization.

O.17

BURDEN OF GUN VIOLENCE IN PEDIATRIC INTENSIVE CARE UNITS (PICUS) IN THE UNITED STATES. Jessica Lee*, Cortney Foster, and Dayanand Bagdure, Division of Pediatric Critical Care Medicine, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

In the United States, firearm-related deaths are the third leading cause of death among children under 18 years of age. Not only do firearm injuries lead to mortality, but they can also result in lasting disability and high use of medical resources. Although previous studies have investigated the burden of gun violence among children in emergency departments specifically as well as hospitalizations in general, there is lack of comprehensive data for children in the Pediatric Intensive Care Unit (PICU) setting. The goal of this study was to examine outcomes of fatal and non-fatal, firearm-related injuries among children in PICU's in the United States from 2009-2017. Specifically, we aimed to identify trends in hospital mortality among children in the PICU who have firearm-related injuries from different causes. This research was a retrospective, multi-center data analysis using The Virtual PICU Systems (VPS, LLC), a national PICU database. We included patients under 18 years of age who were admitted to participating ICUs with firearm injuries during 2009-2017, and identified cases based on external cause of injury E codes and ICD-9 and ICD-10 codes. We analyzed outcomes after we classified cases based on the intent of the firearm injury: suicide, assault, unintentional, or unidentified. We identified 1447 patients with firearm-related injuries in the PICU's. 78% (n=1122) of these injuries occurred in males, and 45% (n=646) occurred in African Americans, while 27% (n=390) occurred in whites and 12% (n=178) occurred in Hispanics. 90% of cases were due to unintentional and assault causes of firearm injury. 12% (n=175) of the children died in the PICU, which is five times the baseline mortality of all PICU admissions. Among the children who died in the PICU, 55% were 13-18 years of age. Children attempting suicide with a firearm were more likely to die in the PICU, compared to other causes of firearm injury. We hope our research will provide insight into the nature and health impact of firearm injuries in the PICU, which can be used for the design of public health interventions that decrease premature death, illness and disability of children in the United States.

O.18

ANALYSIS OF MALARIA INFECTION AND DISEASE IN THE FIRST TWO YEARS OF LIFE. Kieran Tebben* and Miriam Laufer, Division of Associate Director for Malaria Research, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

The most severe form of the blood-borne illness malaria is caused by P. falciparum parasites. Malawi is a high-risk zone for malaria, experiencing countrywide parasite transmission. Infants in their first year have been overlooked as a high-risk group because of passive immunity in their first 6 months. Little reliable data exist about malaria in infancy, but infants comprise up to 10% of Malawian pediatric malaria hospitalizations. I measured prevalence of malaria infection and incidence of malaria disease in Mfera, Malawi in 6-month intervals for 24 months. Prevalence of infection was expected to be lower in the first 6 months and increase thereafter. Incidence of disease should decrease as the immune system matures. To determine prevalence, dried blood spots (DBS) were collected quarterly and upon illness. Ultra-sensitive qPCR identified DBS samples positive for P. falciparum. Individuals with a positive PCR result without symptoms were considered to have asymptomatic infection; infants with positive PCR and blood smear were considered to have malaria disease. 30% of samples were PCR positive; 7.8% met criteria for disease. The mean time to first infection was 10.7 months. Malaria disease diagnoses significantly increased at sick visits from the 7-12 month group to 13-24 month group; diagnoses at routine visits did not. Rates of malaria infection did not differ significantly by age. Placental malaria may also impact infant risk of malaria. Infants born to mothers with placental infection were expected to have higher risk for malaria than those without placental infection, but there was no significant increase in infection or disease after 6 months among placental-exposed infants. There was no significant difference in number of episodes of disease between infants with or without placental exposure, indicating that risk for disease may be independent of placental exposure, although the study should be repeated on a larger sample. More

complete data about the dynamics of infant malaria are important as malaria vaccines are targeted to this age range.

This research was supported by the Infectious Diseases Society of America Medical Scholars Program.

O.19

IDENTIFICATION OF HOST TARGETS FOR INFLUENZA A VIRUS USING A YEAST SCREEN. Alexandra Vlk*, Stuart Weston, and Matthew Frieman, Department of Microbiology and Immunology, University of Maryland School of Medicine, Baltimore, MD.

Influenza A virus causes approximately 12,000-56,000 deaths annually in the US, according to the CDC. Following infection and development of symptoms, effective therapeutics are essential for improving quality of life. Other than the seasonal flu vaccine there are limited anti-influenza treatments. Identification of directly acting anti-viral drugs is critical in the development of effective therapeutics against both seasonal influenza strains as well as strains with pandemic potential. A novel technique to identify potential therapeutics against a wide range of viruses has been developed using an inducible yeast expression system. We have found that overexpression of certain viral proteins in yeast can cause the yeast to grow more slowly. We used this slow growth phenotype as a reporter in yeast knock-out library screens to identify genetic suppressors of the slow growth phenotype. Influenza virus genes that cause slow growth in yeast include NS1 (an interferon antagonist) and PA (an RNA polymerase subunit). Suppressors of this slow growth were identified from yeast knock out libraries. SKI3 and SKI8 were identified as suppressors of slow growth induced by Influenza NS1 expression. These proteins are part of the RNA exosome complex which is involved in binding, delivery and degradation of cytoplasmic RNA molecules. Future studies include drug screens to identify existing compounds that target the SKI complex and/or RNA exosome pathways. Additionally, RNA interference experiments in mammalian cells will be conducted to ensure these results translate for human significance. This platform can be used to discover potential antiviral targets for the development of effective therapeutics.

This research was supported by Emergent Biosolutions, "Yeast-based Screening Platform to Identify Anti-Viral Compounds and Novel Targets for Respiratory Syncytial Virus (RSV) and Human Norovirus (NV)."

O.20

RISK FACTORS FOR INCREASED SHOULDER *CUTIBACTERIUM ACNES* BURDEN. Samir Kaveeshwar*, Derek Jones, and Mohit Gilotra, Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

Cutibacterium acnes (*P. acnes*) is a pathogenic bacteria known to be a major culprit in post-shoulder surgery infections and can lead to chronic pain, surgical arthroplasty failure, prosthetic instability, and sepsis. This bacteria lives within dermal sebaceous glands and can seep into wounds during surgical transection, forming a biofilm and contributing to infection. It is unclear what predisposes certain individuals to larger *C. acnes* counts and a higher risk for infection post-operatively. The goals of this study were to quantify how gender, age, amount of shoulder hair, diabetes, smoking, and BMI impact endogenous *C. acnes* burden and to compare bacterial counts among the anterior, posterior, lateral, and axilla shoulder locations. 173 participants were enrolled and *C. acnes* counts were quantified via a modified detergent scrub technique at the four locations. Univariable and multiple linear regression statistical analyses were run to investigate all risk factors of interest after natural-log transformation. Gender, degree of shoulder hair, age, BMI, diabetes, and smoking status were indicated via univariable analysis to be statistically significant in predicting higher counts and were included in a regression analysis. Location was separately analyzed with the posterior location

containing the highest average *C. acnes* burden. The multiple regression analysis confirmed that male individuals below the age of 40 had independent risk for higher burden. Hairiness was also indicated to be a statistically significant risk factor for the male gender only. The analysis further clarified that positive diabetes and smoking status were nonsignificant in predicting burden. In summary, this study indicates that surgeons should be aware of the infection risk associated with young males with significant shoulder hair, in addition to posterior surgical approaches. These results can be used during discussions between patients and providers to accurately approximate an individual's risk of *C. acnes* burden and thus postoperative infection.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.21

COMORBIDITY AND SEVERITY OF ILLNESS RISK ADJUSTMENT FOR HOSPITAL-ONSET *CLOSTRIDIUM DIFFICILE* INFECTION. Stephanie Cabral*, Kerri Thom, Lisa Pineles, Natalia Blanco, Yuan Wang, and Anthony Harris, Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, MD.

Clostridium difficile infection (CDI) is a healthcare-associated infection that increases patient morbidity and mortality. Hospitals publicly report CDI rates, which are used to inform pay-for-performance metrics by insurance carriers. To enable more accurate interpretation of infection rates, risk adjustment that accounts for differences among hospital and patient-level factors is needed. Currently, the Centers for Disease Control and Prevention does not incorporate patient-level risk factors in its risk adjustment, and the knowledge as to which patient factors should be used for risk adjustment is incomplete. The objective of this study is to analyze whether electronically available comorbid conditions and electronically obtained patient characteristics representing the construct domain of severity of illness are risk factors for CDI and can improve future risk adjustment. A retrospective cohort study was performed on all patients admitted to the University of Maryland Medical Center (UMMC) and the UMMC Midtown Campus between January 1, 2016 and January 1, 2018. Comorbid conditions were assessed by the Elixhauser Comorbidity Index and severity of illness measurements were obtained from laboratory values within 24 hours of admission. Bivariate analyses between CDI and selected covariates were performed using log binomial regression. Multivariable log binomial regression was conducted using covariates that were significant ($p < 0.1$) in the bivariate analysis. At both hospitals, the Elixhauser Comorbidity Index and an abnormal leukocyte result were significant risk factors for CDI after controlling for age, antibiotic use, and antacid use. There were increased risks of 1.27 (95% CI: 1.21, 1.32) and 1.38 (95% CI: 1.24, 1.54) for every one-point increase in Elixhauser Score at UMMC and UMMC Midtown Campus, respectively. Similarly, there were increased risks of 1.37 (95% CI: 1.09, 1.73) and 2.78 (95% CI: 1.47, 5.24) when a leukocyte value was abnormal at UMMC and UMMC Midtown, respectively. Patient comorbidities and laboratory values upon admission are important risk factors for CDI and should be considered for future risk adjustment.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.22

GLUCOSE-6-PHOSPHATE DEHYDROGENASE ACTIVITY IN BIPOLAR DISORDER AND SCHIZOPHRENIA: RELATIONSHIP TO MITOCHONDRIAL IMPAIRMENT. Joseph Puthumana* and William Regenold, Department of Psychiatry, University of Maryland School of Medicine, Baltimore, MD.

Glucose-6-phosphate dehydrogenase (G6PD) is the first and rate-limiting enzyme of the pentose phosphate pathway that is essential to maintaining cellular redox balance. G6PD deficiency has been linked to mood and psychotic disorders including bipolar disorder (BPD) and schizophrenia (SCZ). This study examined G6PD activity in postmortem, parietal somatosensory association cortex tissue and determined its relationship to mitochondrial impairment as evidenced by detachment of hexokinase 1 (HK1) from mitochondria. We measured G6PD activity by colorimetric assay in brains from individuals with BPD (n = 15), nonpsychotic unipolar major depression (UPD) (n = 15), SCZ (n = 15), and controls without psychiatric illness (CON) (n = 15). We report the first findings of G6PD activity in brains of individuals with these disorders. G6PD activity did not differ by brain group; however, it correlated significantly and inversely with percent of hexokinase 1 (HK1) in the tissue homogenate mitochondrial fraction as determined previously in another set of tissue samples obtained from the same brains and brain region in BPD and SCZ brains but not in UPD or CON brains. This finding indicates a positive relationship between HK1 mitochondrial detachment, an indicator of mitochondrial impairment that is associated with oxidative stress, and G6PD activity in BPD and SCZ.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.23

IMPACT OF PHAGOCYTOSIS ON MICROGLIAL ACTIVATION IN THE INJURED BRAIN. Alexa Ciesinski*, Rodney Ritzel, and David Loane, STAR-ORC, University of Maryland School of Medicine, Baltimore, MD.

In the central nervous system (CNS), traumatic brain injuries (TBI) cause not only short-term inflammatory responses, but also elicit chronic neurodegeneration which can affect cognitive capacity and motor function. The sequence of acute inflammatory events following TBI have been studied in depth, including the vital role for the brain-resident immune cells known as microglia. Among the more important repair functions that microglia have in the aftermath of TBI involve the clearance of apoptotic neurons and extracellular debris1. However, the long-term impact of this debris removal on the restoration of microglial homeostasis is not understood. Recently, microglia have been shown to be chronically activated following TBI, closely resembling that seen in other age-related neurodegenerative diseases2,3. This dysfunctional microglial phenotype is characterized by altered morphology and distribution, reduced phagocytic capacity, and elevated production of inflammatory cytokines and proteases, all of which may disrupt CNS homeostasis and contribute to chronic cognitive impairments post-TBI. The goal of this study is to explore the contribution of phagocytosis on generating dysfunctional microglial activation. I hypothesize that enhanced microglial phagocytic activity will elevate reactive oxygen species (ROS) production and DNA damage, increase production of inflammatory mediators, and chronically alter their activation state. Utilizing techniques such as in vitro microglial phagocytosis assays, flow cytometry, and in vivo two-photon microscopy, I will begin to elucidate the molecular mechanisms that promote this continued pro-inflammatory activation. Exploration of putative maladaptive responses to phagocytosis will further illuminate the role of microglia in maintaining the inflammatory milieu post-TBI, as well as facilitate the development of preventative and therapeutic interventions for long-term neurological deficits in TBI patients.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research and by the American Academy of Neurology.

O.24

EXPANSION OF TRAUMATIC HEMORRHAGIC CONTUSION IN CERVICAL SPINAL CORD INJURY. Noah Lessing*, Harry Mushlin[1], Timothy Chryssikos[1], Jeffrey Oliver[1], Bizhan Aarabi[2], and Gary Schwartzbauer[3], [2]Division of Neurotrauma and [3]Program in Trauma, R. Adams Cowley Shock Trauma Center, [1]Department of Neurosurgery, University of Maryland School of Medicine, Baltimore, MD.

Limited studies exist on the natural history of traumatic hemorrhagic contusion (THC) in spinal cord injury (SCI) and factors that influence progression. Previous work has focused primarily on preclinical animal models and here, for the first time we studied THC patients and the risk of expansion of THC lesions. A retrospective single-institution chart review was performed from 2005-2016 to identify cervical SCI patients with at least two cervical MRIs within 7 days of injury and evidence of T2 signal/contusion on either MRI. Mean arterial pressure (MAP) goal was >85mmHg for 7 days for all SCI patients. Two groups were identified for analysis. Group 1 showed evidence of THC expansion and Group 2 had no expansion of THC. Initial coagulation labs, platelet count, and history of anti-platelet/coagulation medication was recorded. Blood pressure and calculated MAPs were recorded for each patient between the time of the first and second MRI. Ninety-four patients were identified for analysis with 47 consecutive patients in Group 1 (expansion) and Group 2 (no expansion). The mean MAP between the two groups trended towards being higher in the expansion group ($p=0.06$), while the median MAP was significantly higher (87.2 vs 90.0 mmHg, $p=0.048$). Anti-platelet/coagulation medication, coagulation parameters, and platelet count were not significantly different between the two groups. A younger age was strongly significant for THC expansion (35.4 vs 53.1 yrs, $p<0.01$), and the presence of ongoing compression of the spinal cord in the initial MRI correlated to expansion of THC (23 vs 8.5% of patients, $p=0.05$). In this study we examined expansion of THC in cervical SCI patients. Importantly, a higher median MAP was found to correlate to THC expansion indicating that time spent at higher MAP, or "MAP load" may increase this risk. This risk may be particularly important in younger patients that show ongoing compression in initial MRI, perhaps indicative of higher energy trauma in this trauma age group. These results highlight a potential deleterious effect of elevated MAP and the possible need for strict blood pressure parameters in select SCI patients.

O.25

ALTERATIONS IN PARIETAL LOBE RESTING STATE FUNCTIONAL CONNECTIVITY CORRELATE WITH STRESS PERCEPTION IN TYPE 1 DIABETES. Muhammad Hamza* and Janice Hwang, Division of Endocrinology, Department of Medicine, Yale University School of Medicine School of Medicine, New Haven, CT.

Type 1 diabetes mellitus (T1DM) patients who report higher stress levels display increased glycemic variability and increased severity and frequency of hypoglycemia. Whether T1DM patients who are aware of hypoglycemia (AW) or unaware (UA) experience stress differently has not been closely studied. To investigate, we administered the Perceived Stress Scale (PSS), which measures the degree to which individuals judge different life situations as stressful, to 10 healthy controls (HC) (7F/3M, age 35±10 years, BMI 23.1±1.8 kg/m^2, HbA1c 5.0±0.2), 15 AW by Clarke score (10F/5M, age 30±7, BMI 24.5±3.1, HbA1c 7.1±0.9), and 10 UA, (7F/3M, age 44 ±12, BMI 26.5±4.2, HbA1c 7.1±0.8). PSS scores were different across groups (HC: 22.1±2.7, AW: 24.1±1.6, UA: 14±2.0, $P=0.004$). Notably, UA patients had lower PSS scores compared to HC ($P=0.001$) and AW patients ($P=0.03$). Further, a subset of participants (n=24) underwent BOLD fMRI scanning for analysis of the Intrinsic Connectivity Distribution (ICD), which is a measure of synchronous regional brain activity, during a two-step euglycemic-hypoglycemic clamp (90-60 mg/dl). Significant connectivity changes were noted in the angular gyrus (AG) of the inferior parietal lobe which plays a role in

conscious awareness via multisensory integration to give meaning to the external world. Consistent with the PSS, UA patients had lower connectivity in AG at euglycemia and hypoglycemia compared to HC (P=0.039, P=0.005) and AW patients (P=0.001, P=0.027). Moreover, PSS scores positively correlated with increased activity in the AG at euglycemia (r^2=0.594, P=0.002) and hypoglycemia (r^2=0.542, P=0.006). The ability to sense stress is crucial for protective and regulatory processes. Compared to AW patients, UA patients have a blunted perception of stress which can be detected via altered brain connectivity in interoceptive and sensory neurocircuits. These findings may have implications for understanding how hypoglycemia unawareness may impact patients' abilities to sense and thus respond appropriately to stress.

O.26

OBSERVATION OF ERYTHROCYTE DYNAMICS IN THE GLAUCOMATOUS OPTIC NERVE USING ERYTHROCYTE MEDIATED ANGIOGRAPHY. Victoria Chen*, Christopher Le*, Breanna Tracey[1], Lakyn Mayo[2], Ginger Thompson[2], and Osamah Saeedi[2], [2]Department of Ophthalmology and Visual Sciences, [1]University of Maryland School of Medicine, Baltimore, MD.

Glaucoma is a leading cause of vision loss around the world. Current treatments for primary open-angle glaucoma (POAG) target reduction of intraocular pressure (IOP) with medications and surgery. However, many patients experience worsening of the disease despite treatment or develop glaucoma without elevated IOP, suggesting that other factors play a role in its pathogenesis and progression. Prior research points to a vascular component of the disease, though measurements of ocular blood flow have been inconsistent using traditional imaging technologies. In this study, erythrocyte mediated angiography (EMA) was utilized to measure the flow and dynamics of individual erythrocytes in glaucoma and control eyes. 24 participants from the glaucoma and optometry services at the University of Maryland (Baltimore, MD) were recruited into this pilot study. Inclusion criteria included patient age of at least 40 years and at least three prior visits with documented IOP. Angiograms were taken in room air and oxygen conditions to assess vascular autoregulation in these groups. Erythrocyte velocity was measured manually from the angiograms using MATLAB. For the 100 measured vessels, the average arterial diastolic velocity (5.2mm/s) was significantly higher than the average venous diastolic velocity (4.57mm/s) (p=0.03). We anticipate these data from this novel imaging technique will refine our understanding of ocular blood flow changes and vascular mechanisms that underlie glaucomatous disease and its progression.

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O.27

CILIARY BODY CHANGES IN PEDIATRIC PATIENTS WITH GLAUCOMA. Joy Li*, Mona Kaleem[1], Osamah Saeedi[1], Moran R. Levin[1], Azam Qureshi[2], and Janet Alexander[1], [1]Department of Ophthalmology and Visual Sciences, [2]University of Maryland School of Medicine, Baltimore, MD.

To compare ciliary body (CB) structural changes and differences in pediatric patients with primary congenital glaucoma (PCG) and glaucoma following congenital cataracts surgery (GFCCS) to healthy individuals. This is a prospective, multi-center comparative study that utilizes ultrasound biomicroscopy (UBM) to visualize CB and ciliary process (CP) structure in pediatric patients who have either PCG or GFCCS and compare them to those in healthy individuals. UBM images were obtained from 9 pediatric glaucoma patients and 20 healthy age-matched controls. 15 eyes were analyzed from the glaucoma patients, and 25 eyes were analyzed from the healthy individuals. 6 reliable parameters within the CB were identified and measured using ImageJ software. CP

integrated density and CP area were significantly lower in glaucoma patients (PCG and GFCCS combined) when compared to healthy individuals (p=.0428 and .00485, respectively). Among the pediatric glaucoma subtypes, GFCCS patients had significantly higher CP thickness and integrated density than PCG patients (p=.000024 and .0041, respectively). However, PCG patients had significantly higher CB thickness than GFCSS patients (p=.01129). This is the first study analyzing quantifiable differences in CB morphology between pediatric glaucoma patients and healthy individuals. Insights into these morphological differences may provide an avenue for possible surgical interventions for glaucoma patients.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.28

STRUCTURAL CHANGES FOLLOWING EARLY CHILDHOOD LENSECTOMY AND THE RISK FOR SECONDARY GLAUCOMA. Libby Wei*, Sachin Kalarn, Osamah Saeedi, Moran Roni Levin, and Janet Alexander, Department of Ophthalmology and Visual Sciences, University of Maryland School of Medicine, Baltimore, MD.

Childhood cataracts are an avoidable cause of blindness and visual impairment, responsible for 5-20% of pediatric blindness worldwide. Early intervention with cataract surgery (lensectomy) is imperative to prevent irreversible amblyopia; however, glaucoma after pediatric cataract surgery is a severe complication and its etiology is not well-understood. Ultrasound biomicroscopy (UBM), a high-frequency ultrasound technique, has been used to image structural details of the ocular anterior segment. Few studies have used UBM to analyze the anterior segment pre-and post-childhood lensectomy. Structural changes in the anterior chamber due to lensectomy may affect drainage of aqueous humor, resulting in increased intraocular pressure and glaucoma development. This project aims to analyze these changes in children 8 years and under before and after cataract surgery. In this prospective, observational study, 43 eyes in 24 patients age 5 weeks to 8 years were enrolled and UBM images were collected bilaterally pre- and post-lensectomy. 27 parameters involving the cornea, anterior chamber, angle, iris, lens, and ciliary body were measured using ImageJ, an image processing program among four groups: cataract, control, post-lensectomy aphakic, and post-lensectomy pseudophakic eyes. Statistical analysis was conducted controlling for age using the Mann-Whitney U test comparing pre- versus post-lensectomy groups. Analysis found significant differences in children under 1 year old, including central corneal thickness 638 ± 53 vs. 755 ± 61 nm, $p = 3.88 \times 10^{-14}$, paracentral corneal thickness 647 ± 63 vs. 734 ± 89 nm, $p = 7.83 \times 10^{-8}$, iris-lens angle at pupil 23.76 ± 6.66 vs. 10.91 ± 8.79 degrees, $p = 3.59 \times 10^{-12}$, fractional area of iris under mid-iris plane 0.0942 ± 0.15 vs. 0.499 ± 0.27, $p = 3.25 \times 10^{-13}$ and iris-ciliary process vertical distance 206.5 ± 132 vs. 89.27 ± 91 nm, $p = 1.96 \times 10^{-10}$. Compared to pre-lensectomy eyes, post-lensectomy eyes in children under 1 year had thicker corneas, smaller iris-lens angles at pupil, and posteriorly shifted iris planes closer to the ciliary processes. Further studies are needed to determine the clinical significance of these findings.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

O.29

STRESS IN A DISH: MODELING PRECONCEPTUAL STRESS IN MOUSE EPIDIDYMAL EPITHELIAL CELLS. Nickole Kanyuch*, Christopher Morgan[1], Jennifer Chan[1], Weiliang Huang[2], Maureen Kane[2], and Tracy Bale[1], [1]Department of Pharmacology, University of Maryland School of Medicine and [2]University of Maryland School of Pharmacy, Baltimore, MD.

Paternal experiences, like stress, have been linked to increased neuropsychiatric disease risk in offspring. Studies in animal models propose that these intergenerational effects may be transmitted to offspring via sperm. While the mechanisms encoding paternal experience in sperm are unknown, evidence suggests that this process occurs during sperm maturation in the epididymis. We have recently developed an in vitro system to model this process using corticosterone treatment of immortalized mouse caput epididymal epithelial (DC2) cells. Preliminary data suggest corticosterone treatment of DC2 cells alters the miRNA content and decreases the size of secreted extracellular vesicles (EVs), whose cargo is required for post-testicular maturation of sperm. Decreased EV size may suggest altered EV composition and function in response to corticosterone. Given these novel findings, we hypothesized that the protein composition of EVs secreted by corticosterone treated DC2 cells would differ from EVs from vehicle treated cells. To test this hypothesis, DC2 cells were cultured to monolayer confluency and treated with a physiological concentration of corticosterone (500 ng/mL) daily for 3 or 6 days. Media and cells were collected at 0, 3, 6, and 9 days after reaching confluency. EVs were isolated from media by differential centrifugation and sent to the Mass Spectrometry Center at the University of Maryland for proteomic analysis. Hierarchical clustering and principle component analyses of these data segregated protein composition of EVs collected from corticosterone treated cells from those of vehicle treated cells. To better understand these changes, we characterized DC2 cells' response to corticosterone by analyzing glucocorticoid (GR) and androgen receptor (AR) expression at each time point. As expected, GR expression decreased with treatment. Interestingly, AR expression increased with treatment, which may indicate increased rate of differentiation in response to corticosterone exposure. Future work will investigate how cellular changes influence EV biogenesis and whether changes in EV composition mediate the encoding and transmission of paternal experience to sperm.

This research was supported by NIMH: MH108286, T32 MSTP grant.

O.30

SURGICAL MANAGEMENT OF DIASTASIS RECTI: A SYSTEMATIC REVIEW OF INSURANCE COVERAGE IN THE UNITED STATES. Carly Rosen*, LediBabari M. Ngaage[1], Erin Rada[1], Sheri Slezak[1], Stephen Kavic[2], and Yvonne Rasko[1], [1]Division of Plastic Surgery and [2]Division of General Surgery, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

As elective surgery becomes more popular, the stringency of insurance coverage policies has increased exponentially. Many patients with Diastasis Recti (DR) are denied coverage of corrective surgery despite showing improved function and quality of life following the procedure. Plastic surgeons are frustrated by the lack of guidelines and sparsity of coverage for surgical correction of Diastasis Recti. In this study, 54 US insurance companies and Medicare were reviewed to determine their policies of coverage. These policies were compared to the guidelines set forth by the American Society of Plastic surgery and current literature on DR. Insurance company policy for DR repair is not clear nor well established, based on this review. Of the 55 policies reviewed in this study, 51 had an established policy. 78% (40) of these companies would not cover abdominoplasty to repair DR under any circumstances. The remaining 22% (11) required preauthorization to ensure that the patient met the requirements of medical necessity. These requirements differed greatly between companies. Insurance company policies do not recognize the spectrum of patients with DR and the necessity of abdominoplasty to relieve symptoms of patients with severe debilitation. The current common procedural (CPT) coding classifies abdominoplasty to repair DR solely as a cosmetic procedure. Policies for diastasis recti repair should be amended to include a functional procedure reimbursement for severe DR. We include a detailed summary of preauthorization requirements for DR repair requested by insurers to simplify the reimbursement process.

This research was funded in part by the Steuber Research Fellowship in Plastic Surgery at the University of Maryland Medical Center.

O.31

TRANSPLANTING THE WAY TO CLEARANCE: LESSONS LEARNED FROM DEVELOPMENT OF A HIDRADENITIS SUPPURATIVA (HS) XENOGRAFT MOUSE MODEL. Qaren Quartey*, Robert J. Miller[1], Uchechukwu J. Okoh[1], Lloyd S. Miller[1], Ginette A. Okoye[2], and Angel S. Byrd[2], [1]Department of Dermatology, Johns Hopkins University School of Medicine, Baltimore, MD, and [2]Department of Dermatology, Howard University College of Medicine, Washington, D.C.

Despite its 0.053-4% prevalence in patient populations, especially African American (AA) females, major gaps in our understanding and treatment of Hidradenitis suppurativa persist. Using previously developed methods from human foreskin xenotransplantation, we sought to develop a human HS xenograft mouse model. Human foreskin tissue and discarded lesional skin from HS African American female patients were retrieved, and subsequently grafted onto immunocompromised mice. Skin xenotransplants were transferred to NOD Scid gamma (NSG-SGM3) mice, which can readily accept human skin tissue grafts (and other human tissue and cells) due to a lack of mouse T cells, B cells and NK cells. The mice also express human IL-3, GM-CSF and Steel Factor to enhance human myelopoiesis. Image J (NIH) was used to quantify pigmentation. Both groups were quantified on Day 30 ± 5 after xenotransplantation. Although hyperpigmentation is typically seen in transplanted skin, from a sample set of 5 HS xenograft mouse models, there was an average percentage change of 57.7% in brightness value, which indicates significant depigmentation; in comparison, a sample set of 8 foreskin xenograft mouse models had an average percentage change of -8.9% in brightness value, indicating a slight increase in pigment ($p<0.05$). Additionally, there was spontaneous clearance of disease nodules in the HS lesional transplanted skin. Human xenograft transplanted mice serve as a limited model for studies of HS pathophysiology. It is currently unknown if the depigmentation seen in lesional HS transplanted NSG-SGM3 mice plays a role in the observed disease regression. However, the loss of supporting cells, signaling molecules, and various other components offer important clues regarding mechanisms of the disease. Such a compelling reversal of disease manifestations highlights the need for further understanding of pertinent molecular targets in the immune scaffold, rendering an impetus for discovery of novel approaches to HS treatment.

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O.32

EVALUATION OF THE THERAPEUTIC POTENTIAL OF MULTIVALENT HER3 AFFIBODIES IN OVARIAN CANCER TREATMENT. Daphine Kwesiga*, Steven Jay, and John Schardt, Division of Engineering, Department of Bio-Engineering, University of Maryland, College Park School of Engineering, College Park, MD.

HER3, a member of the ErbB receptor tyrosine kinase (RTK) family, has emerged as a therapeutic target in ovarian, breast and other cancers because of its ability to potently activate the PI3/Akt pathway and its key role in mediating drug resistance. Prior studies in the Jay Lab have shown that multivalent HER3 affibodies have a broad ability to improve inhibition of Neuregulin-induced HER3 and Akt phosphorylation. In this study, I further validated HER3 affibody therapeutic effects observed in previous studies using the OvCAR8 cell line by expanding the ovarian cancer cell line models used to include the SKOV3 and CAOV3 cell lines. I replicated the methodology as described in Schardt et al 2017, which includes cell proliferation assays and HER3

downregulation assays. For these cell lines, l also assessed the potential of combination therapies involving common ovarian cancer chemotherapeutic, carboplatin and multivalent HER3 ligands. I applied the methodology used in preliminary studies acquiring the effective dosages for carboplatin on each cell line from the literature and perform cell toxicity assays to determine affibody-induced sensitization of cells to carboplatin. Results from these experiments showed that bivalent affibodies induced rapid and prolonged HER3 downregulation in CAOV3 cell line. Additionally, these affibodies decreased pHER3 protein and pAkt expression in a dose dependent manner in this cell line. On the other hand, in the SKOV3 cell line, these affibodies significantly decreased HER3 protein expression only at early timepoints and the dose dependent decrease in pHER3 and pAkt expression by bivalent affibodies was lost. Combined therapeutic treatment of CAOV3 cells showed rapid and prolonged cell sensitization to carboplatin particularly at the low drug doses but this was absent in the SKOV3 cell line. The reduced HER3 affibody functionality in the SKOV3 cell line can be explained by its limited HER3 cell surface receptors. Hence, these investigations reveal that engineered multivalency enhances affibody-mediated HER3 downregulation in multiple HER3-positive ovarian cancer cell lines and highlight the promise of HER3 affibody combination therapies as a strategy to provide a new and improved treatment option for patients with ovarian cancer.

This research was supported in part by the University of Maryland Scholars Program, an initiative of the University of Maryland: MPowering the State.

O.33

SURVIVAL OUTCOMES OF INITIAL LOCAL THERAPY ON CLINICALLY LOCALIZED GLEASON 9-10 PROSTATE CANCER: A SEER DATABASE ANALYSIS. Amy Nemirovsy*, Hubert Huang, Michael Nasland, and Mohummad Minjah Siddiqui, Division of Urology, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Men with Gleason score 9-10 prostate cancer have significantly worse outcomes compared to those with Gleason score 8 disease. Choice of upfront treatments remain controversial for this patient cohort. Using the Surveillance, Epidemiology, and End Results (SEER) database, we evaluated the impact of initial treatment with external beam radiation therapy (EBRT), external beam radiation therapy with brachytherapy (EBRT+BT), or surgery on prostate cancer-specific mortality (PCSM) and overall mortality in Gleason 9-10 disease. The SEER database was queried for men diagnosed with biopsy Gleason score 9-10 prostate cancer from 2004-2014. Only localized disease with clinical N0 and M0 status was included. Gathered data included demographic, pathologic, therapy received, and survival outcomes. Using JMP v11.0, Kaplan-Meier survival curves and univariate and multivariate analyses were generated for initial therapy with EBRT, EBRT+BT, or surgery. A total of 8,796 men were included with 4,988 (56.7%) who underwent upfront treatment with EBRT alone, 677 (7.7%) with EBRT+BT, and 3,131 (35.6%) with surgery. 7-year PCSM rates were 26.9%, 14.1%, and 13.7% for EBRT, EBRT+BT, and surgery respectively ($p < 0.001$) (Figure 1). 7-year overall mortality rates were 41.6%, 26.3%, and 19.4% for EBRT, EBRT+BT, and surgery respectively ($p < 0.001$) (Figure 2). When controlling for age, Gleason score, clinical T stage, and PSA level on multivariate analysis, EBRT had greater PCSM than either surgery or EBRT+BT (HR 0.36, 95% CI 0.25 – 0.51, $p < 0.001$ and HR 0.56, 95% CI 0.33 – 0.90, $p = 0.015$ respectively). Comparison of PCSM and overall mortality between surgery and EBRT+BT revealed HR 0.38 (95% CI 0.20 – 0.77, $p = 0.01$) and HR 0.49 (95% CI 0.33 – 0.76, $p = 0.002$) respectively. Among men with localized Gleason 9-10 disease, surgery and EBRT+BT showed significant improvement in survival outcomes compared to EBRT alone. When compared with EBRT+BT, surgery showed improvement in PCSM and overall mortality. Future prospective studies are warranted.

O.34

CLINICAL AND MOLECULAR CHARACTERISTICS OF LONG TERM SURVIVORS OF CNS TUMORS: A REPORT FROM THE NEURO-ONCOLOGY BRANCH NATURAL HISTORY STUDY. James Frisbie*, Elizabeth Vera, Mark Gilbert, Terri Armstrong, National Institute of Health - Neuro Oncology Branch (NCI), Bethesda, MD.

Almost 17,000 Americans die from Central Nervous System (CNS) tumors every year – this equates to almost 2 American deaths every hour. It is paramount to gain a better molecular understanding of these tumors so we can better determine prognostic indicators. Analyzation of long term survivors (LTS) may yield insight into potential clinical and molecular characteristics of specific tumors. The goal of this study was to characterize the clinical and molecular characteristics of CNS Tumor LTS derived from the Natural History Study conducted by the Neuro-Oncology Branch (NOB). Currently, the WHO has 75 distinct CNS tumor diagnoses. As we gain a further molecular understanding of these tumors, we will likely increase our diagnostic categories to allow for better specific and personalized treatment plans. 71 LTS, classified as having greater than 5 year survival, with valid genetic panels were selected and grouped based on diagnosis. Further stratification was then conducted based on the timing of the panel and whether LTS's had tumor recurrence. After looking at the initial genetic alterations among the entire LTS cohort (n=71), there were no unexpected high frequency mutations. Upon sub-classification based on diagnosis, glioblastoma patients showed prognostic indications similar to those found in the literature. When sub-classifying glioblastoma LTS's based on IDH status, the IDH-wildtype LTS's had a statistical decrease in TERT mutations and an increase in TP53 mutations compared to all IDH-wildtype glioblastoma patients. Since IDH-wildtype tumors make up almost 90% of all glioblastoma patients, this may be an important prognostic indicator for these LTS. Finally, it was also noted that non-recurrent LTS had no ATRX mutations, whereas recurrent LTS were much more likely to have an ATRX alteration (62.5%). Future directions include comparing our LTS to a poor survival cohort and observing MGMT methylation, a known positive predictive indicator for treatment. Ultimately, careful characterization of these LTS's may yield a better understanding of tumor genesis, which may lead to new molecular targets and treatments for CNS tumor patients.

This research was funded through the Summer Research Cancer Training Award.

O.35

THE FUTURE OF DRUG DESIGN: PREDICTING ZTA-DNA MOLECULAR INTERACTIONS IN EBV USING METADYNAMICS SIMULATIONS. Netsanet Woldegerima*, Debabrata Pramanik, and Pratyush Tiwary, Institute of Physical Science and Technology, University of Maryland, College Park, College Park, MD.

Epstein-Barr Virus (EBV) is the etiologic factor in Burkitt's lymphoma, Hodgkin's lymphoma and other cancers. The latent to lytic conversion of EBV is triggered by binding of the transcription factor Zta to its DNA binding domain. Mutations to Zta (N182S) and/or its DNA binding domain (G3 DNA) have been shown to reduce binding affinity both experimentally as well through our metadynamics simulations. Here, we investigate the pattern of hydrogen bonds in pairs of wild type/mutant protein and DNA to come up with a structural rationale that can explain the change in the binding affinity for four different cases with either protein and/or DNA mutations. The objective is to probe the relative strengths of interactions in these systems, and see how well our simulations do at predicting the relative interaction strengths as quantified by the experimental z-scores. In future, we wish to extend the same techniques to elucidate drug-target interactions for the purposes of drug optimization and drug design.

This research was supported in part by the National Cancer Institute and the University of Maryland Scholars Program, an initiative of the University of Maryland: MPowering the State.

Poster Presentation Abstracts

Presenters are indicated with "*" next to their names.

P.01

A QUALITY IMPROVEMENT PROJECT ASSESSING COMPLIANCE TO NEWLY IMPLEMENTED RBC TRANSFUSION GUIDELINES IN THE NICU. Cara Lee*, Alexandre Medina de Jesus[1], Kelly Tracey[1], and Sripriya Sundararajan[2], [2]Division of Neonatology, [1]Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Red blood cell (RBC) transfusion is a common lifesaving therapy in the neonatal intensive care unit (NICU) for premature infants with underlying hemorrhage or anemia from iatrogenic blood loss. However, in neonates, especially very low birthweight (VLBW; <1500g) infants, RBC transfusions increase the risks of adverse outcomes such as retinopathy of prematurity (ROP), necrotizing enterocolitis (NEC), chronic lung disease (CLD), sepsis, and death. We hypothesized that broader, and variable approaches to limit the number and volume of RBC transfusions for VLBW infants can significantly impact the risk for developing these adverse outcomes. Use of neonatal-specific RBC transfusion guidelines is one such approach that permit clinicians to standardize RBC transfusion indications and reduce RBC exposure to VLBW infants. On January 1, 2017, the NICU at University of Maryland Medical Center (UMMC) implemented RBC transfusion guidelines for VLBW neonates based on hematocrit, respiratory support, and fraction of inspired oxygen requirements. This study investigated compliance to RBC transfusion guidelines pre- and post-establishment of guidelines and its relationship to number and volume of transfusions and incidence of adverse outcomes associated with RBC exposure. Following IRB approval, retrospective medical record review on 158 VLBW infants from 2016 and 2017 was performed. We reviewed demographics, number and volume of RBC transfusions, and outcomes including ROP, NEC, CLD, sepsis and death on the transfused cohort. Preliminary data shows an approximate 20% compliance increase to RBC guidelines in 2017 ($p < 0.001$) compared to 2016. There was a decrease in mean number of transfusions, from 10.81 in 2016 to 8.0 in 2017 for VLBW infants born at <28 weeks gestational age ($p = 0.055$). Data also suggests that gestational age and birth weight negatively correlate with number of RBC transfusions. As we continue with analysis, we hope our study can establish that compliance to standardized RBC guidelines in anemic VLBW infants can reduce overall RBC exposure and associated adverse outcomes.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.02

IMPACT OF OBTAINING ADMISSION LABORATORY TESTS FROM CORD BLOOD IN PRETERM INFANTS ≤ 28 WEEKS GESTATION. Simin Hossain*, Nina Shah[1], Alexandre Medina[2], and Alison Falck[1], [1]Division of Neonatology, [2]Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Extremely Low Gestational Age Newborns (ELGANs ≤ 28 weeks) are vulnerable to systemic hypotension and iatrogenic anemia requiring packed red blood cell (PRBC) transfusion. Both disorders are risk factors for periventricular-intraventricular hemorrhage (PIVH), a condition associated with adverse neurodevelopmental outcome. Limiting phlebotomy losses from admission laboratory testing may lessen the risk of hypovolemia and anemia, as ELGANs are typically <1000 grams at birth and have a small circulating blood volume (BV) of 100 ml/kg. Using umbilical cord (UC) blood in lieu of peripheral blood for admission testing can yield similar results while limiting blood loss. Thus, we hypothesize that using UC blood for admission testing will reduce the

incidence of hypotension and need for PRBCs in the 1st 72h of life. To provide 80% power to detect a 5 mmHg difference in mean arterial blood pressure (MAP) between groups, 32 ELGANs will be randomized to have admission testing from either the UC (n=16) or peripheral blood (n=16). MAP, hematocrit (hct), PRBC volume, and incidence of PIVH will be compared between groups. Currently there are 3 neonates enrolled. Subject 1 and 2 were both 25 weeks and randomized to peripheral blood, while subject 3 (23 weeks) is in the UC group. Initial BVs of patient 1 and 2 were 81 and 94 ml, with admission hct of 42% and 36%. Phlebotomy losses at 72h were 35% and 30% of BV; both subjects required 2 transfusions. Average MAPs were 33.5±4.1 and 32.1±8.6 mmHg. Only subject 2 required pressor support. Subject 1 developed Grade 2 PIVH and subject 2 was diagnosed with Grade 4 PIVH. Subject 3 (UC group) had an initial BV of 64 mL, hct of 32%, and lost 40% of BV to phlebotomy. Subject 3 received 2 transfusions. Average MAP was 30.6±3.9 mmHg with 24h of pressor support. Subject 3 was diagnosed with Grade 2 PIVH. Preliminary findings indicate significant blood loss in the 1st 72h of life, which may contribute to the need for PRBCs, treatment of hypotension, and potentially to the pathogenesis of PIVH. Currently, enrollment is ongoing with a small sample size (n=3). Further patient recruitment and data analysis is necessary for hypothesis testing.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.03

LVOTD MODEL FOR CARDIAC OUTPUT DETERMINATION IN CRITICALLY ILL PATIENTS. Ehson Aligholizadeh*, Rajan Patel[1], Syeda Fatima[1], Samuel Galvagno, Jr. [2], Daniel Haase[3], and Sarah Murthi[4], [1]Department of Trauma, [2]Department of Anesthesiology, [3]Department of Critical Care, and [4]Division of Trauma and Critical Care, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Hemodynamic monitoring of critically ill patients during the perioperative period is crucial in both identifying underlying pathophysiological processes and determining appropriate treatment options. A vital component of this assessment is cardiac output (CO). Currently, the clinical gold standard method for this determination is thermodilution via a pulmonary artery (PA) catheter. Although this technique is currently the standard, it has a few drawbacks, the most significant of which is its invasive nature. The PA catheter requires insertion into a central vein and progression toward the pulmonary artery. In addition to the invasiveness, there is also limited outcomes data demonstrating any mortality benefits from its use. As a result of these issues, alternative methods are emerging, one of which is echocardiography. This involves the use of Doppler ultrasound to sample the left ventricular outflow tract (LVOT) flow to generate a LVOT velocity time interval (VTI). The VTI can then be combined with echocardiographic measurement of LVOT diameter (LVOTd) to estimate stroke volume (SV), which can then be multiplied by heart rate (HR) to yield CO. This approach is non-invasive and allows for comprehensive cardiovascular assessment of patients. Although less invasive, the echocardiographic method also has its drawbacks, the biggest of which are the lack of accurate measurement in a significant portion of patients and the time-intensive nature. In this research, we aim to use demographic and echocardiographic data to devise a computer model capable of estimating LVOTd. This model will utilize the patient's height, weight, age, and sex to estimate LVOTd. Ideally, the estimation will not only be more accurate and inclusive than echocardiographic measurements, but it will also be very similar to the actual value obtained from PA catheter thermodilution. If the above goals are met, then the implementation of this model into clinical practice will improve the efficiency and effectiveness of hemodynamic and homeostatic assessments of critically ill patients, with the overall goal of providing the best possible medical care.
This research was supported by MPOWER.

P.04

ANESTHETIC MANAGEMENT OF PATIENTS FOLLOWING TRAUMATIC INJURY WITH RESUSCITATIVE ENDOVASCULAR BALLOON OCCLUSION OF THE AORTA (REBOA). Christopher Parrino*, Ashton Engdahl[1], Philip Wasicek[2], Samuel Galvagno Jr.[3], Megan Brenner[4], and Maureen McCunn[3], [3]Division of Trauma Anesthesiology, Department of Anesthesiology, and [4]Division of Trauma and Surgical Critical Care, [2]Department of Surgery, and [1]University of Maryland School of Medicine, Baltimore, MD.

Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) is a temporizing maneuver to provide minimally invasive proximal aortic control to mitigate non-thoracic, non-compressible torso hemorrhage (NCTH). There is a paucity of literature describing the implications of REBOA for the anesthesiologist. We conducted a retrospective cohort study to characterize aspects of anesthetic management and physiology in patients with REBOA following trauma. We hypothesized that patients who underwent REBOA therapy would (1) require massive transfusion of blood products and high amounts of vasoactive medications, (2) require a lower anesthetic dose than the minimum alveolar concentration (MAC) for a healthy patient of the same age, and (3) experience metabolic changes during aortic occlusion (AO) and after balloon deflation. The cohort consisted of 25 patients who received REBOA at the R Adams Cowley Shock Trauma Center and who met inclusion criteria. Patients received aortic occlusion at two levels: supra-celiac (Zone I) and infra-renal (Zone III). Patients were severely ill, had a high in-hospital mortality rate (64%), and suffered significant physiologic derangements in the immediate resuscitation period. All patients received blood products and crystalloids, 64% received at least one vasopressor, and 40% received tranexamic acid. The median estimated blood loss was three liters for the index operation, and the median amount of blood products (packed red blood cells [PRBCs], fresh frozen plasma [FFP], and platelets) transfused was 24 units. The average end-tidal concentration of inhaled anesthetic gas (isoflurane) was 0.27%, compared to an average age-expected value of 1.19%. This study offers an important starting point for clinical practice guidelines, clinician education, and research into anesthetic management of patients undergoing REBOA therapy. Patients with REBOA experience significant physiologic changes that complicate pharmacologic management by the anesthesiologist. Awareness of the physiologic and anesthetic needs of these patients allows titration and safe administration of medications.

This study was funded in part by a grant from the U.S. Department of Defense titled "Clinical Study of Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for Severe Pelvic Fracture & Intra-Abdominal Hemorrhagic Shock using Continuous Vital Signs," grant number W81XWH-15-1-0025.

P.05

PREDICTORS OF EARLY POSTOPERATIVE PAIN FOLLOWING ORTHOPAEDIC SURGERY. Jamie Kator*, Ali Aneizi[1], Patrick Sajak[2], Min Zhan[2], and R. Frank Henn III[1], [1]Department of Orthopaedics and [2]Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, MD.

With the rising incidence of orthopaedic surgery, it is increasingly necessary to assess patient reported outcomes as a measure of surgical success. Pain interference (PI) measures the impact of pain on a person's physical, intellectual, and social endeavors, providing a more holistic measurement. The objective of this study is to identify factors associated with greater PI two weeks following orthopaedic surgery. We hypothesized that greater postoperative PI will be associated with worse preoperative pain, function, and general health status. A cohort of patients enrolled in the Maryland Orthopaedic Registry prior to undergoing orthopaedic surgery between August 2015 and March 2018 were analyzed. Registry data included demographics, medical information, and

responses to pre and postoperative questionnaires, including the Patient Reported Outcome Management Information System (PROMIS) Pain Interference (PI) computer adaptive test. Categorical data was compared with ANOVA analysis and continuous data was compared with Spearman's rank correlation coefficient (rs). Baseline and postoperative data was obtained from 435 patients undergoing orthopaedic surgery at a single urban academic hospital. Preceding surgery mean PI was 60.1 ± 7.04, and following surgery mean PI was 61.7 ± 7.63. There was a moderate positive correlation between 2 week PI and preoperative PI ($rs = 0.33$; $p < 0.001$). A negative correlation was observed between 2 week PI and preoperative PROMIS Physical Function ($rs = -0.26$; $p < 0.001$), as well as with legacy PRO function assessments. Postoperative PI was also correlated with baseline PROMIS Depression, Fatigue, Anxiety, and Social Satisfaction. Postoperative PI showed significant associations with multiple psychosocial and physical function domains, illustrating the intertwined nature of pain, function, and disability. Given the multiple correlations demonstrated by PI with other validated outcome measures and PROMIS domains, we conclude that early postoperative pain interference can be partially predicted by assessment of patient reported outcomes, especially physical function.

This work was supported by a grant from The James Lawrence Kernan Hospital Endowment Fund, Incorporated.

P.06

PREDICTORS OF EARLY PATIENT SATISFACTION FOLLOWING ORTHOPAEDIC SURGERY. Bailey Howard*, Ali Aneizi[1], Vidushan Nadarajah[1], Patrick Sajak[2], Min Zhan[3], and R. Frank Henn III[1], [1]Division of Sports Medicine, [2]Department of Orthopaedics and [3]Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, MD.

The healthcare industry is shifting its focus from traditional clinical outcome measures to patient satisfaction metrics for determination of reimbursement rates, self-assessment, and accreditation. This change has caused orthopaedic surgeons to become increasingly interested in factors influencing patient satisfaction, which would allow them to modify these factors in an effort to preemptively increase postoperative satisfaction. The objective of this study was to identify any preoperative variables associated with patient satisfaction two weeks following upper and lower extremity orthopaedic surgery. To provide a baseline measurement, patients completed a variety of questionnaires preoperatively to assess demographics, function, activity, pain, mental state, and expectations. Two weeks after their operation, patients completed the same questionnaires in addition to an Improvement Survey and Surgical Satisfaction Questionnaire. Student's T test and ANOVA were used to compare satisfaction among groups. Spearman's correlation coefficients were used to assess relationships between satisfaction and continuous variables. Multivariable regression was performed to identify independent predictors of postoperative satisfaction. We found that greater surgical satisfaction two weeks following orthopaedic surgery was associated with higher education, alcohol use, better baseline scores on all six PROMIS domains, better joint function, greater activity levels at baseline and two weeks, and less body pain at baseline and two weeks ($p<0.05$). Additionally, we found that two-week scores on PROMIS Social Satisfaction, NPS Body, Expectations Domain of MODEMS, and Improvement Survey, as well as the change in scores of the PROMIS Physical Function and NPS Joint from baseline, are independent predictors of surgical satisfaction ($p<0.05$). This identification of preoperative variables associated with patient satisfaction will allow orthopaedic surgeons to tailor their treatment options, preoperative counseling, and postoperative planning in hopes of improving patient satisfaction and overall clinical care.

This work was supported by a grant from The James Lawrence Kernan Hospital Endowment Fund, Incorporated.

P.07

THE RELATIVE IMPORTANCE OF SOCIOECONOMIC AND CLINICAL CONCERNS OF ORTHOPAEDIC TRAUMA PATIENTS FOLLOWING INJURY. Stephan Olaya*, Katherine Ordonio, Alexandra Mulliken, Gerard Slobogean, and Nathan O'Hara, Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

A recent meta-analysis estimated that fracture patients miss an average of 122 days from work following injury. These injuries also expose patients to an increased risk of infection, chronic pain, and bone healing complications. The objective of this study was to quantify the relative importance of the medical, work, and disability benefit aspects of recovery in the 6 weeks following injury using a discrete choice experiment (DCE). Patients with a surgically-treated fracture at the R Adams Cowley Shock Trauma Center were recruited at the 6-week follow-up appointment. Participants completed a DCE survey that consisted of 12 choice sets, each presenting two hypothetical scenarios with varying recovery outcomes. The relative importance of each recovery attribute was determined using likelihood ratio tests and reported as a percentage of combined importance. Hierarchical Bayesian modelling was performed to calculate individual-level relative importance and heterogeneity in responses was explored by baseline characteristics using ANOVA (alpha = 0.2). Of the 104 respondents, 61% were male and the mean age was 42 years (SD: 16). Study participants placed the greatest relative importance on medical-related recovery (68%), followed by worked-related recovery (26%), and the least relative importance on disability benefits (6%). Significant heterogeneity in preferences was observed by sex, race, and pre-injury income. Specifically, the relative importance of work-related outcomes was 5% higher in males than females, the relative importance of medical outcomes was 6% higher in white respondents compared to non-white respondents, and the relative importance of disability benefits was 39% higher in low-income respondents compared to high-income respondents. In conclusion, within 6-weeks of injury, orthopaedic trauma patients placed substantially greater relative importance on medical recovery compared to work-related recovery and receiving disability benefits. Significant heterogeneity in responses was observed among sub-groups. Particularly, a significant increase in the relative importance of disability benefits among low-income respondents.

P.08

PROMIS PHYSICAL FUNCTION TWO WEEKS FOLLOWING ORTHOPAEDIC SURGERY. Gregory Perraut*, Ali Aneizi[1], Patrick Sajak[1], Vidushan Nadarajah[1], Min Zahn[1], and R. Frank Henn III[2], [2]Division of Sports Medicine, [1]Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

With the rising incidence of orthopedic surgeries in the United States, there has been an increasing focus on patient-reported outcomes as a metric of operative success. Given the association between patient expectations and satisfaction following orthopedic surgery, physicians must be able to set their patients' expectations appropriately. Thus, this study aimed to characterize physical function level two weeks postoperative from both upper and lower extremity orthopedic surgery and to determine pre-operative factors that are significantly associated with change in physical function two weeks following surgery. We hypothesized that physical function at two weeks following surgery would be significantly decreased from pre-operative levels and that patients undergoing upper extremity surgery will report higher levels of function than those undergoing lower extremity surgery. We additionally hypothesized that certain preoperative demographic variables and patient-reported measures, like age, smoking status, and pain would be associated with postoperative physical function. Patients 17 years and older undergoing elective orthopaedic surgery at one institution were enrolled prospectively and completed various questionnaires prior to surgery and again two weeks postoperatively. The questionnaires included: six of the PROMIS computer

adaptive questionnaires: Physical Function, Pain Interference, Fatigue, Social Satisfaction, Anxiety, and Depression; a joint-specific function questionnaire based on the surgery they were undergoing, such as the International Knee Documentation Committee (IKDC), American Shoulder and Elbow Surgeons (ASES) Score, and the Brief Michigan Hand Outcomes Questionnaire (BMHQ); a joint numeric pain scale; and a body numeric pain scale. Physical activity levels were measured using three PRO questionnaires: the Tegner Activity Scale (Tegner), the International Physical Activity Questionnaire (IPAQ), and Marx Activity Rating Scales (Marx) for upper and lower extremity. Responses were analyzed using Spearman correlation coefficient, ANOVA, and multivariate linear stepwise regression modeling with PROMIS Physical Function (PF) as the dependent variable. A total of 435 patients were included in our final analysis. The mean age was 41.1 with a standard deviation of 15.7. There were 232 males (53%) and 203 females (47%). The mean baseline PROMIS PF score was 42.1 and the mean two-week PROMIS PF score was 35.5 ($p<.0001$), a 6.6 point decline from baseline and 14.5 points lower than the national average. Additionally, those undergoing upper extremity surgery had an average PROMIS PF score at two-weeks postoperative of 39.1 (4.8 point decline from baseline), while those undergoing lower extremity surgery had an average score of 32.2 (8.1 point decline) ($p<.0001$). Ethnicity, preoperative narcotic use, operative joint, injury prior to surgery, and baseline IPAQ category all had significant impact on 2 week postoperative PROMIS PF score ($p <0.05$). Numerous baseline and 2-week measures were correlated with postoperative PROMIS PF score, with 2-week PROMIS Social Satisfaction demonstrating the strongest correlation ($r_s=0.604$, $p<.0001$). Multivariate regression demonstrated several independent predictors of 2-week PROMIS PF score. We found that patients had a significant decline in physical function immediately following orthopaedic surgery, with those undergoing lower extremity surgery having a significantly greater decline. Physicians can use this information to properly educate their patients on what to expect in the short-term following surgery, leading to increased patient satisfaction and better post-surgical outcomes.

This work was supported by a grant from The James Lawrence Kernan Hospital Endowment Fund, Incorporated.

P.09

PREOPERATIVE EXPECTATIONS AND EARLY POSTOPERATIVE MET EXPECTATIONS OF EXTREMITY ORTHOPAEDIC SURGERY. Leah Henry*, Ali Aneizi, Vidushan Nadarajah, Michael Smuda, Jonathan Packer, and R. Frank Henn III, Division of Sports Medicine, Department of Orthopaedics, University of Maryland School of Medicine, Baltimore, MD.

Preoperative expectations and met expectations are likely associated with the outcome of treatment. However, there is a lack of data regarding the preoperative expectations and early postoperative met expectations of patients undergoing extremity orthopaedic surgery. We hypothesized that patients with higher preoperative expectation scores and postoperative met expectation scores would have better early postoperative outcomes and satisfaction 2 weeks after extremity orthopaedic surgery. 435 patients age >17 who underwent extremity orthopaedic surgery at one institution were prospectively enrolled in this study. Each patient completed a preoperative questionnaire that included an assessment of demographics, pain, function, treatment expectations, and PROMIS computer adaptive testing. Expectations were evaluated using the Expectations Domain of MODEMS questionnaire. Patients completed a follow-up questionnaire 2 weeks after surgery that also assessed MODEMS met expectations and satisfaction. The mean preoperative expectation score was 87.0 ± 16.6, and the mean postoperative met expectation score was 55.0 ± 27.6 (0-100 scale; 100 = highest level of expectations). Greater met expectations were significantly associated with greater postoperative physical function, social satisfaction, activity level, and

subjective improvement, as well as lower pain interference, joint pain, pain in the rest of the body, fatigue, anxiety, and depression ($p<0.01$). Greater mean preoperative expectations were significantly associated with less of a decline in activity after surgery compared to baseline and less postoperative pain in the rest of the body ($p<0.05$). Multivariable analysis results found that less postoperative joint pain and greater postoperative social satisfaction, improvement, and physical function were all significant independent predictors of greater met expectations ($p<0.01$). Greater preoperative expectations are associated with better activity and less pain 2 weeks after surgery. Met expectations of extremity orthopaedic surgery were associated with postoperative physical function, social satisfaction, activity, pain, anxiety, depression, and subjective improvement.

This work was supported by a grant from The James Lawrence Kernan Hospital Endowment Fund, Incorporated.

P.10

DURATION OF FOLEY BALLOON PLACEMENT AS A PREDICTOR OF SUCCESSFUL INDUCTION IN SINGLETON PREGNANCIES. Martha Coghlan*, Julie Hurvitz[1], Ruofan Yao[2], Kristin Atkins[3], and Sarah Crimmins[4], [2]Division of Maternal Fetal Medicine, Department of Obstetrics, Gynecology and Reproductive Sciences, Loma Linda University Health, Loma Linda, CA, [3]Division of Maternal Fetal Medicine, Department of Obstetrics, Gynecology and Reproductive Sciences, Howard University College of Medicine, Washington, D.C., and [4]Division of Maternal Fetal Medicine, [1]Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, Baltimore, MD.

We sought to determine if duration of Foley balloon placement, in nulliparous women predicts successful induction, defined as complete cervical dilation. A retrospective study was conducted of all singleton nulliparous women receiving Foley balloon for induction of labor during 2013-2016 at a single tertiary urban medical center. Stillbirths were excluded. Primary exposure of interest was the duration (in hours) of Foley bulb placement. Our primary outcome was time to achievement of complete cervical dilation (TTC). Duration of Foley balloon placement was stratified into 3 groups depending on the time that the Foley balloon remained in place: Group 1 (G1): 0-4 hours; Group 2 (G2): 4-6 hours, and Group 3 (G3): 7 or more hours. Difference in time to achievement of complete dilation was estimated using accelerated failure time (AFT) regression using G1 as the reference. This type of analysis allowed estimation of the effect of a foley bulb to accelerate or decelerate the TTC. This regression model allowed for adjustments in starting dilation, effacement, and indication for induction. A Kaplan-Meier plot was also generated for graphic representation. A total of 124 patients met inclusion criteria. 45 patients were in G1, 40 in G2, and 39 in G3. The median duration of labor after FB removal was 34.4 hours in G1, 37.5 hours in G2, and 38.9 hours in G3. There is no statistical difference in TTC when comparing G1 and G2. For individuals in G3, time required to achieve complete cervical dilation demonstrates a trend toward longer duration of labor (Time Ratio (TR) 1.4, 95% CI: [1.00-1.95]) when compared to G1. However, when comparing G3 to the combination of G1 and G2, TTC is significantly longer (TR 1.46, 95% CI: [1.08-1.99]). Foley balloon placement for 7 hours or more is associated with a 37% (~11.5 hours) longer duration of labor. Patients should be counseled regarding the risk of longer labor and all potential complications associated with prolonged labor course, such as chorioamnionitis and postpartum hemorrhage.

P.11

THE BENEFITS OF IMPROVED DISEASE RECOGNITION ON PATIENT SAFETY AND DISEASE OUTCOMES IN CHRONIC KIDNEY DISEASE. Eli Farhy* and Jeffrey Fink, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Chronic kidney disease (CKD) is under-recognized by healthcare providers making it a high-risk condition for adverse safety events and poor disease outcomes such as end-stage renal disease (ESRD) and death. We propose that the use of a medical bracelet will increase the recognition of CKD and, as a result, reduce the occurrence of safety events and improve long term disease outcomes. We analyzed the Safe Kidney Care data – a prospective cohort study of 350 Stage II – V, pre-dialysis CKD patients. The mean age of the participants was 66.1 years, and 251 patients (71.7%) were men. The intervention arm (n=108) received a medical bracelet or necklace that identified the individual as having CKD while participants in the control arm (n=242) received usual care. Participants underwent baseline and annual clinic visits for review of medical history, medications, and safety events as well as a blood draw to measure renal function (serum Cr for estimation of GFR). Participants were followed for up to 6 years during which safety events such as hyperkalemia, hypokalemia, hyperglycemia, hypoglycemia, low hemoglobin, orthostatic blood pressure and bradycardia were recorded. Participants were withdrawn from the study if an end-point of ESRD or death were reached. While the incidence of all safety events was slightly lower in the intervention arm (6.9%) compared to controls (7.1%), this difference was not statistically significant ($p>0.3$). The bracelet did show significant protective benefit, however, against disease progression to ESRD. After adjustment for sex, race, age, diabetes, and baseline stage of CKD by Cox regression analysis, the intervention arm had significantly ($p=0.04$) improved survival compared to controls. We believe that a larger study size could potentially also demonstrate improved absolute survival (ESRD or death) with bracelet use.

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P.13

ASSESSING THE CAPABILITY OF KIDNEY DONOR DEMOGRAPHICS AND BASELINE BIOPSY SCORES IN PREDICTING FUTURE GRAFT FUNCTION.

Grahya Guntur*, Jonathan Bromberg[1], Kevin Chen[1], and Tapati Stalam[2], [1]Division of Transplant, Department of Surgery and [2]Department of Internal Medicine, University of Maryland School of Medicine, Baltimore, MD.

As kidney transplants become more prevalent, the need for a proper system to analyze and predict post-kidney transplant function is important. Currently, there are many tests that are used to monitor kidney transplants through information gathered from donor demographics and baseline biopsy histology; however, the predictive capacity of these tests has not yet been studied for future graft function. This paper assesses the predictive value of four tests: MAPI, Leuven, Remuzzi, and Banff. The score for each test comes from a combination of donor demographics and baseline biopsy histopathology. Donor demographics include age, gender, deceased donor status, history of smoking, history of hypertension, and history of diabetes. Initial baseline biopsy histological analyses include glomerular sclerosis, interstitial fibrosis, tubular atrophy, arteriolar hyalinosis, interstitial inflammation, glomerular thrombi, arterial intimal fibrosis, and acute tubular injury. This paper will compare the MAPI, Leuven, Remuzzi, and Bannf scores of kidney transplant recipients in order to determine the prognostic capability of these tests in predicting long-term graft survival. Comparisons will be done by examining the following attributes: the relationship between the donor demographics and graft survival, the relationship between each test score and graft survival, the relationship between each test score and other test scores, and the difference between scores within each test. Hazard ratios, patient survival curves, and ROC curves will determine the effectiveness of these tests in predicting future graft function.

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P.14

TRANSCRIPTOMIC STUDY OF THE DETERMINANTS INVOLVED IN *BIFIDOBACTERIUM PSEUDOLONGUM* ANTI-INFLAMMATORY ACTIVITY. Julie Gutekunst*, Emmanuel Mongodin, and Lauren Hittle, Institute for Genome Sciences, Department of Microbiology and Immunology, University of Maryland School of Medicine, Baltimore, MD.

The gut microbiota has been shown to critically impact both innate and adaptive immunity, and could therefore be a potential therapeutic target to improve long-term graft survival in transplant patients. We have previously identified the bacterium *Bifidobacterium pseudolongum* as a major anti-inflammatory bacterial in the gut microbiota. Preliminary results indicate that *B. pseudolongum* can significantly decrease organ inflammation and scarring and improve transplant outcome in a clinically-relevant murine model of cardiac allograft. However, its specific anti-inflammatory mechanisms have not yet been elucidated. In this study we aimed to investigate the interactions of two *B. pseudolongum* strains (one reference strain from the American Type Culture Collection [ATCC], and one strain isolated from a murine organ transplantation model) with human colonic epithelial cells (HT29 cell line) using a dual RNA-sequencing approach. Each *B. pseudolongum* strain was co-cultivated with HT29 cells for 24 hours after which mRNA was extracted and sequenced using Illumina HiSeq 4000 for characterization of the transcriptomic profiles of HT29 cells and *B. pseudolongum* bacteria. Sequencing reads were first aligned to the human genome in order to identify differentially-expressed genes in the HT29 epithelial cells exposed to each *B. pseudolongum* strain. The remaining reads were then aligned to the *B. pseudolongum* genome in order to compare transcriptomic profiles amongst the two strains. Our initial results indicate that the two *B. pseudolongum* strains have different effects on gene expression in the gut epithelium. Investigation into the strains' transcriptomic profiles should clarify the differences in their interactions with host tissue, which may provide insight into each *B. pseudolongum* strain's distinct anti-inflammatory determinants.

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P.15

STRUCTURE-FUNCTION ANALYSIS OF THE PROSAAS CHAPERONE IN NEURODEGENERATION-RELATED ASSAYS. Hannah Kass*, Tim Jarvela, and Iris Lindberg, Department of Anatomy and Neurobiology, University of Maryland School of Medicine, Baltimore, MD.

The hallmark of most neurodegenerative disease is the formation of fibrils and toxic oligomers that lead to neuronal dysfunction and death. ProSAAS is a secretory chaperone that prevents fibrillation and toxic oligomer formation of $A\beta_{42}$ and α-synuclein in Alzheimer's and Parkinson's disease models. Previous studies found that the active component of the proSAAS protein includes residues 159-180; thus, we attempted to engineer an inactive proSAAS protein lacking these residues to use as a control. However, in previous α-synuclein fibrillation experiments, wells treated with both active proSAAS 1-180 and inactive proSAAS 1-159 produced more α-synuclein fibrils than reactions containing either proSAAS protein alone. This suggests that truncated proSAAS 1-159 might block the action of endogenous proSAAS, either through competition for binding sites on nascent fibrils or by preventing the initial formation of an active proSAAS chaperone-synuclein complex. In order to determine whether this proSAAS 1-159 blockade extends to other fibrillating proteins, the interaction of Aβ with proSAAS 1-180 in the presence of proSAAS 1-159 was

examined in both Aβ and α-synuclein fibrillation models as well as in hippocampal neuron Aβ cytotoxicity models. ProSAAS 1-180 prevented fibrillation in both the Aβ ($p<0.01$) and □ -synuclein ($p<0.01$) models. ProSAAS 1-159 significantly enhanced fibril formation in the α-synuclein model ($p<0.001$) but not in the Aβ model ($p>0.05$). Preliminary cytotoxicity assays showed substantial hippocampal cell death in the presence of 15 μM Aβ oligomers, but no significant cell rescue with any proSAAS treatment. Further studies are needed to elucidate the mechanism underlying the apparent differential interactions of proSAAS-related proteins with Aβ- and with synuclein-containing oligomers and fibrils.

P.16

EVALUATION OF EFFICACY AND MARKERS FOR POSITIVE OUTCOMES IN A TRAUMA-FOCUSED MULTI-FAMILY GROUP. Harris Feldman*, Eryn Trauben[1], Deborah Medoff[2], and Laurel Kiser[3], [3]Division of Psychiatric Services Research, [2]Department of Psychiatry, [1]University of Maryland School of Medicine, Baltimore, MD.

Children living in socioeconomically disadvantaged urban areas are at high risk for experiencing traumatic events resulting in the development of post-traumatic stress symptoms (PTSS). These children are at an increased risk of experiencing multiple traumas and limited mental health resources may hinder their ability to cope with the trauma. Untreated PTSS may negatively impact academic performance, emotional regulation, and psychological development. There is evidence that having a supportive family network comprised of family routines and rituals is a major protective factor against developing PTSS after trauma exposure. Cognitive behavior therapy (CBT) has been shown in previous studies to have good efficacy for certain individual's post-trauma exposure, but it does not work to increase the protective function of the family. Strengthening Family Coping Resources (SFCR) is a multifamily group intervention therapy that administers trauma-specific, family-focused, and skills-based treatment. Methods of SFCR focus on establishing family routines and rituals, building a trauma narrative, and strengthening communication skills. Multiple instruments were used to measure variables of child post-trauma symptoms, child internalizing and externalizing behaviors, parent PTSD symptomatology, level of caregiver distress, and family coping skills. Data was collected over a period of 7 years from multiple academic institutions that have implemented the SFCR treatment protocol. Using a paired T-test analysis, the raw means of pre and post treatment results from each instrument were evaluated for statistical significance. Results from this study demonstrated that after SFCR, children showed significant decreases in internalizing and externalizing behaviors, along with caregivers showing significant decreases in distress and PTSS. Furthermore, there were significant increases in family general functioning and mobilization of family support. Using these results, it was further hypothesized that baseline family functioning may serve as moderator for decreases in child internalizing and externalizing behaviors; however, this hypothesis was determined to be inconclusive.

P.17

VIOLENT INJURY AS A PREDICTOR OF FUTURE VIOLENT INJURY AND VIOLENT CRIME COMMISSION. Joshua Finkel* and Zachary Dezman, Department of Emergency Medicine, University of Maryland School of Medicine, Baltimore, MD.

Victims of violence are an at-risk patient population because 65% are re-injured in five years. Current drug use and prior criminal history are also risk factors for repeat injuries. We hypothesized that patients admitted to the R Adams Cowley Shock Trauma Center (STC) for a violent injury are more likely to be charged with a crime after discharge, compared to patients with nonviolent injuries, after controlling for socioeconomic factors. We conducted a cohort study by linking the Maryland Judicial Case Search (MJCS) to a data set collected from 1,118 patients admitted to STC

between 1994 and 1996 who underwent a structured clinical interview for substance use disorders (SUD). MJCS contains charges and case outcomes from crimes committed statewide since 1991. The databases were linked using exact matches of personal identifiers. We then conducted a bivariate analysis and a stepwise Cox proportional hazards analysis (variables retained if $p<0.05$, excluded if $p>0.1$). In the 23-year follow-up period, 58% of patients with violent injuries had been charged with ≥1 crime after discharge, compared to 27% of patients admitted with nonviolent injuries ($p<0.0001$). Half of the subjects with violent injuries (179/346, 51.7%) were charged with a crime within five years of discharge. Violent injury (Hazard Ratio [HR] = 1.71, 95% CI:1.4 to 2.1), SUD (HR = 31.34, 95% CI: 15.4 to 63.7), male sex (HR = 5.25, 95% CI: 3.0 to 9.2), and age from 18-35 (HR = 4.44, 95% CI: 2.7 to 7.3) were all risk factors for being charged with any crime after discharge. Employment (HR = 0.75, 95% CI: 0.6 to 0.9) and increasing educational level were protective. When examining the subgroup who were charged with violent crimes, the following were significant risk factors: violent injury (HR = 2.49, 95% CI: 1.9 to 3.3), any SUD (HR = 41.69, 95% CI: 12.9 to 134.5), male sex (HR = 7.7, 95% CI: 2.9 to 18.6), age from 18-35 (HR = 3.93, 95% CI: 1.7 to 8.9), and an estimated annual income less than $20,000 in 1995 dollars (2.66, 95% CI: 1.4 to 5.0). Admission to a trauma center is an opportunity to prevent future violence and crime commission, particularly in those who are victims of violence and have an SUD.

P.18

USING METABOLIC PATHWAYS TO IMPROVE DIAGNOSIS AND RISK-STRATIFICATION OF PROSTATE CANCER. Harrison Bell*, Aymen Alqazzaz[1], Dexue Fu[2], Arman Karimi[3], Mary McKenna[3], and M. Minhaj Siddiqui[4], [2]Division of Oncology and [4]Division of Urologic Oncology, Department of Surgery and [3]Department of Pediatrics, [1]University of Maryland School of Medicine, Baltimore, MD.

Prostate cancer cell metabolism has been well characterized, including disinhibition of aconitase and resulting decreased levels of citrate. [1-^{13}C]pyruvate can trace important metabolic steps in carcinogenesis, however is limited by the loss of the labeled carbon to CO_2. We have proposed that using [2-^{13}C]pyruvate as a biomarker metabolic substrate would better characterize these metabolic changes due to its labeling of downstream metabolites. We intend to elucidate the differences in metabolic profiles among aggressive and non-aggressive prostate cancer cell lines. Tumorigenic LNCaP and PC3 prostate cancer cells were exposed to medium containing [2-^{13}C]pyruvate for 4 hours. The metabolites of PC3 were then extracted from the incubation medium and subsequently frozen, lyophilized (to remove H_2O), desalted with Chelex 100, and reconstituted with D_2O and Dioxane (as an internal standard) for NMR chemical shift analysis in a BRUKER 950 MHz NMR. The same procedure was used to extract the metabolites from the LNCaP cell pellet, without use of Chelex 100. Chemical shifts were analyzed with focus on peaks for glutamate, lactate and alanine. NMR quantification data is shown in table 1. Of note are the differences in quantity of lactate between LNCaP cell (low lactate producing) extract and PC3 (high lactate producing) medium samples. Alanine was not quantifiable for PC3. Further, as expected, there was no quantifiable amount of citrate present in PC3 or LNCaP samples. [2-^{13}C]pyruvate can be successfully utilized as a marker to analyze prostate cancer cell metabolism among non-aggressive and aggressive cell lines via cell extract and medium. Further research will focus on risk-stratification and diagnosis frameworks in both animal and human models.

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P.19

LEARNING CURVE FOR MAGNETIC RESONANCE IMAGING/ULTRASOUND FUSION BIOPSY IN DETECTING PROSTATE CANCER USING CUSUM ANALYSIS. Linhan Xu*, Nancy Ye[1], Michael Naslund[1], Jade Wong[2], Amelia Wnorwoski[2], and Mohummad M. Siddiqui[1], [1]Division of Urology, Department of Surgery and [2]Department of Diagnostic Radiology and Nuclear Medicine, University of Maryland School of Medicine, Baltimore, MD.

Targeted magnetic resonance (MR) with ultrasound (US) fusion guided biopsy has been shown to improve detection of prostate cancer. The implementation of this approach however requires integration of efforts with radiologists who may not be heavily experience in prostate MRI with surgeons not familiar with fusion biopsy. Objective methods of assessment for learning curves, such as the cumulative sum (CUSUM) analysis, may be helpful to identify the presence and duration of a learning curve for this process. The aim of this study was to determine the learning curve for MR/US fusion guided biopsy in detecting prostate cancer using CUSUM analysis. Two urologists performed MR/US fusion guided prostate biopsies between March 2015 and September 2017. The primary outcome measure was the rate of diagnosis of prostate cancer in relation to Prostate Imaging Reporting and Data System (PI-RADS) scores in the MRI. The CUSUM analysis assesses how close to target accuracy or far from accuracy actual performance is on a sequential case-by-case basis. For this analysis, target performances of > 80% cancer detection rate (CDR) for PI-RADS 5, > 50% CDR for PI-RADS 4, and < 20% CDR for PI-RADS 1-3. Retrospective data were collected and analyzed using CUSUM methods. In total, complete data were available for MR/US fusion guided biopsies performed on 107 patients. 36 of these patients were PI-RADS 1-3, 57 were PI-RADS 4, and 14 were PI-RADS 5. Figure 3 demonstrates the CUSUM learning curve analysis for these 107 cases and demonstrates intermittent poor performance (upward sloping line) and good performance (downward sloping line) until approximately 50 cases. At this infection point, there was a consistently downward sloping line consistent with evidence that no further learning curve was being encountered. CUSUM analysis objectively assess acquisition of competence in MR/US fusion guided prostate biopsies in detecting prostate cancer. At a new center implementing this technology, the learning curve was approximately 50 cases before consistent high performance for prostate cancer detection.

P.20

USE OF 3D PRINTED PROSTATE MODELS IN PREOPERATIVE PLANNING TO ASSIST RADICAL PROSTATECTOMY. Zachary Bolten*, Hubert Huang[1], Amelia Wnorowski[2], Jeffrey Hirsch[2], and M. Minhaj Siddiqui[3], [2]Department of Diagnostic Radiology and Nuclear Medicine and [3]Division of Urology, Department of Surgery, [1]University of Maryland School of Medicine, Baltimore, MD.

Prostate cancer is the most common cancer and the second leading cause of death among men in the US today. One common method for treating localized prostate cancer is robot assisted radical prostatectomy (RARP) – removal of the entire prostate via robotic surgery. While outcomes have significantly improved over the years, RARPs are still known to involve postoperative side effects such as impotency and incontinence that negatively impact the patient's quality of life. Image-based 3D anatomical modeling and its applications have become increasingly popular as an imaging technique used in surgical planning. These 3D printed models, based on 2D cross-sectional images from MRI, provide tangible anatomical information that may improve surgical technique and allow for better anatomical visualization as compared to 2D CT and MRI imaging. Preliminary studies have demonstrated the ability of these patient specific 3D models to provide clear visualization of tumor location and size, but additional data is required to evaluate the true efficacy of the use of 3D printed models for RARP. The purpose of this study is to evaluate the efficacy of using 3D-printed

prostate models to improve surgical outcomes of patients undergoing RARP. We predict that use of 3D printed prostate models in preoperative planning of RARP will reduce incidence of positive cancer resection margins (when cancer cells have been left behind after surgery), reduce incidence of urinary incontinence and erectile disfunction, while exhibiting a high utility in surgical planning. Patient specific 3D prostate models that allow the visualization of tumor, neurovascular bundle, seminal vesicles, and urethra were printed and used in the preoperative planning process for patients undergoing RARP. Patient data was collected via the electronic medical record. The Anatomical Model Utility in Surgical Planning survey assessed the utility of these models by comparing how 3D model or MRI use alter the surgical planning for RARP. This study may potentially provide justification for further research to validate the use of 3D models in surgical planning and may alter the standard of care for the surgical management of prostate cancer.

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P.21

COMBINATION OF MAGNETIC RESONANCE IMAGING AND DECIPHER TEST PROVIDE IMPROVED PREDICTIVE VALUE OF EXTRACAPSULAR EXTENSION IN PROSTATE CANCER. Michael Tzeng*, Michael Naslund[1], Jade Wong-You-Cheong[2], Amelia Wnorowski[2], and M. Minhaj Siddiqui[1], [1]Division of Urology, Department of Surgery and [2]Department of Diagnostic Radiology and Nuclear Medicine, University of Maryland School of Medicine, Baltimore, MD.

Magnetic resonance imaging (MRI) is emerging as a highly-utilized tool for diagnosis and risk-stratification of prostate cancer. One area of interest has been in detection of extracapsular extension (ECE) of prostate tumors. The approach, however, has demonstrated limited accuracy with a 49% sensitivity and 74% specificity for ECE. The Decipher test is a genomic classifier that measures RNA expression of 22 different biomarkers using biopsy or prostatectomy specimens that is being used for prognostic analysis of prostate cancer. The aim of this study was to determine if the combined use of MRI and Decipher test would result in an improvement in risk stratification through an improved predictive value of ECE. Between April 2015 and August 2017, 22 patients underwent robot-assisted radical prostatectomy following prostate MRI at the University of Maryland Medical Center. Specimens obtained were sent for analysis of Decipher scores, which reported 5 year metastasis risk of the cancer. MRI was evaluated for several criteria including imaging-based suggestion of ECE and Prostate Imaging Reporting and Data System (PI-RADS) score. Multivariate and receiver operating characteristic (ROC) curve analysis was used to assess the predictive values of Decipher scores and PIRADS scores for pathologic ECE. In total, 22 patients with complete data were analyzed of whom 14 had ECE (62%). 4 of these patients were PIRADS 3, 14 were PIRADS 4, and 8 were PIRADS 5. The 5 year metastasis risks obtained from Decipher tests ranged from 1% to 45.9%. Three ROC curves were created to compare the ability of PIRADS score to predict ECE, Decipher score to predict ECE, and Decipher and PIRADS scores combined to predict ECE. This demonstrated improved predictive value of ECE when Decipher and PIRADS scores are used together with the area under the curve (AUC) = 0.92 when compared to each score separately (Decipher score vs ECE AUC = 0.71; PIRADS score vs ECE AUC = 0.83, $p < 0.05$). Thus combining the genomic testing and MRI improved prediction of pathologic ECE in the prostatectomy sample. In conclusion, use of prostate MP-MRI PIRADS score and genomic testing scores may work synergistically to help predict pathologic ECE for prostate cancer at time of radical prostatectomy.

P.22

VALIDATION OF AN MRI-BASED PROSTATE CANCER GLEASON SCORE PREDICTIVE NOMOGRAM. Adrianna Lee*, Amelia Wnorowski[1], Nancy Ye[2], Linhan Xu[2], Bradford Wood[3], and M. Minhaj Siddiqui[2], [1]Department of Radiology and [2]Department of Urology, University of Maryland School of Medicine, Baltimore, MD and [3]Department of Molecular Imaging, National Cancer Institute, National Institutes of Health, Bethesda, MD.

Gleason score grading is a cornerstone of risk stratification and management of patients with prostate cancer (PCa). In this work, we validate a previously derived nomogram that uses MRI and clinical patient characteristics to predict biopsy Gleason scores (bGS). The nomogram (Figure 1) was derived from 143 men who underwent multiparametric prostate-MRI (MP-MRI) prior to any prostate biopsy and then validated on an independent cohort of 212 men from a different institution who underwent MP-MRI for PCa workup. Screen positive lesions (SPLs) were defined as lesions positive on T2W and DWI sequences. PSA density (PSAD), number of SPLs, and MRI suspicion were associated with PCa Gleason score on biopsy. The validation cohort was tested on the nomogram and the most likely bGS was noted. The mean PSA in the validation cohort was 13.7ng/ml vs 6.8ng/ml in the original cohort. In the original group, 57% of men had no cancer on biopsy, whereas 13%, 25%, and 6% had Gleason 6, 7, and ≥8 disease as compared to 49%, 22%, 19%, and 11% distribution in the validation group. In the original cohort of men, the most probable nomogram generated Gleason score agreed with actual pathologic bGS findings in 61% of the men. We then further validated the nomogram on an independent cohort of men and found the most likely nomogram predicted bGS agreed with actual pathologic bGS 48% of the time. The nomogram correctly identified any PCa vs no PCa 61% of the time and clinically significant PCa 68% of the time. A pre-intervention nomogram based on PSA and MRI findings can help narrow down the likely pathologic finding on biopsy. Validation of the nomogram demonstrated a decrease in accuracy, but still significant ability to correctly identify the most likely bGS. This feasibility study demonstrates the potential of a pre-interventional prediction of biopsy Gleason score which could have significant impact on future risk stratification and potentially even augmented screening protocols for prostate cancer.

P.23

FN14-RELATED ALTERATIONS IN GLIOBLASTOMA CELL MOVEMENT AND NUCLEAR INTEGRITY IN THE SETTING OF CONFINED MIGRATION. Neila Kline*, Graeme Woodworth[1], and Jeff Winkles[2], [1]Department of Neurosurgery and [2]Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Glioblastoma (GBM) is one of the most lethal human malignancies because of challenges to administer drugs across the blood brain barrier and the diffuse invasion of tumor cells into normal brain tissue. This has stalled median survival at 15 months for decades. Even with conventional treatment, the infiltration of GBM cells into normal brain most always leads to the formation of distant and irresectable tumors. A unique feature of the CNS is narrow, torturous extracellular spaces through which migrating cells travel. As cells traverse these spaces, they commonly experience nuclear envelope rupture (NER), a process that leaks genetic material into the cytoplasm and promotes DNA damage. While most cells will mount a reparative response or undergo cell death, evidence suggests that GBM cells may evade these normal responses to NER, thereby generating new chromosomal changes. In exploring new strategies to inhibit cell invasion, research has shifted to exploit the pathways that facilitate cell movement. Fn14 is a cell surface receptor that is upregulated in the central regions of GBM but even more so in cells residing in the invasive rim. Accordingly, we investigated the effects of Fn14 expression on cellular responses to confined migration using microfluidic channels and high-resolution microscopy. We analyzed one paired

Fn14 +/- human breast cancer and three paired Fn14 +/- human GBM cell lines for migration speed, DNA damage, nuclear blebbing and changes to nuclear area following confined migration. While Fn14 depletion did not reduce migration speed, it was associated with increased DNA damage, consistent with previous data. We also found that as Fn14+ cells exit the channels, they show reduced nuclear area. These experiments suggest an important role for Fn14 in cellular responses during interstitial migration. Future work will extend these findings to protein expression analysis following confined migration to determine if Fn14's downstream pathways are regulated during migration. Understanding the role that Fn14 plays in GBM invasion and cellular responses to NER may reveal new opportunities for therapeutic invention to combat this universally fatal disease.

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P.24

EFFECT OF DECREASED ADHESIVITY RECEPTOR TARGETED NANOPARTICLE DELIVERY IN A MELANOMA BRAIN METASTASIS MODEL. Lucy Wang*, Jeffrey Winkles[1], Graeme Woodworth[2], Nathan Roberts[1], Aniket Wadajkar[1], and Rebeca Galisteo[1], [2]Division of Neurosurgery, [1]Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Melanoma accounts for a large majority of skin cancer deaths and rates are projected to keep rising. Recently, innovations in melanoma treatment have vastly improved prognosis for patients; however, this progress has been limited for the majority of Stage IV melanoma patients who develop brain metastases. Immunotherapy trials often excluded these patients due to historical poor prognosis and uncertainty about the ability of the drugs to cross the blood brain barrier (BBB). The chemotherapeutic agent temozolomide, although known to definitely cross the BBB, has shown very little clinical benefit for patients harboring brain metastases. This is likely because effective delivery of drugs to the brain faces several challenges in addition to the BBB, including poor drug penetration into brain tissue and rapid drug clearance via the glial-lymphatic system. Therefore, new therapeutic strategies are drastically needed. Our lab has developed decreased non-specific adhesivity receptor targeted (DART) nanoparticles which we have shown to overcome some of these challenges. These particles target the TNFR family member Fn14, which is overexpressed in human melanoma. In this study, we implanted mouse B16 melanoma cells into the brains of syngeneic C57BL/6 mice and then treated these mice via intravenous delivery of saline, free paclitaxel (PTX), PTX-loaded DART nanoparticles or PTX-loaded non-targeted nanoparticles. Tumor size was monitored with bioluminescence imaging (BLI). Animals were examined every 3 days for weight and behavioral changes, and were euthanized at IACUC-approved endpoint criteria.

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P.25

LNC-RNA DANCR PROMOTES LUNG CANCER THROUGH INVOLVEMENT IN WNT/B-CATENIN SIGNALING. Nicholas Musacchio*, Pang-Kuo Lo, and Qun Zhou, Department of Biochemistry and Molecular Biology, University of Maryland School of Medicine, Baltimore, MD.

Currently, there is a poor 15% 5-year survival rate for non-small cell lung carcinoma (NSCLC). Therefore, it is critical to investigate the factors that drive NSCLC to define novel therapeutic targets. One such factor is long non-coding Differentiation Antagonizing Non-protein Coding RNA (lnc-RNA DANCR), which may have a critical role in inducing cancer stem cells (CSCs). The induction of CSCs by activating oncogene signaling pathways is a key process for tumor progression

and cancer metastasis. One such signaling pathway is the canonical Wnt/β-catenin pathway, which can contribute to CSC induction and tumorigenesis once activated. In these current studies, we tested the hypothesis that DANCR promotes NSCLC tumorigenesis through induction of lung CSCs. We first tested the impact of DANCR on lung cancer cell viability. Following knockdown of DANCR expression using siRNA in NSCLC cell lines A549, H358, and H1975, we counted cells after 72 hours. Our results show a reduction in cell viability following DANCR knockdown, which provides evidence of DANCR's role in promoting NSCLC cell growth. We also isolated mRNA transcripts and analyzed gene expression using qRT-PCR. Our results show downregulated expression of Wnt signaling targets c-Myc and AXIN2 in DANCR-knockdown cell lines. Additionally, DANCR knockdown induces downregulated expression of PD-L1, a membrane protein with immune-evasive properties that can become overexpressed in CSCs through Wnt signaling activation. To examine the impact of DANCR on PD-L1 protein expression, flow cytometry analysis was performed and further revealed a decrease in PD-L1 in DANCR-knockdown cells. Lastly, we performed a chromatin immunoprecipitation assay (ChIP) to assess the impact of DANCR on histone acetylation in the Wnt target gene c-Myc promoter. It showed a decrease in histone H3K27 acetylation in DANCR-knockdown cells. Overall, these results reveal DANCR's role in promoting lung cancer cell growth and activating the Wnt/β-catenin pathway. They also highlight DANCR's involvement in promoting the overexpression of PD-L1. Together, this suggests DANCR has a role in inducing cancer stem cells and promoting immune evasion.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.26

STAGE III NON-SMALL CELL LUNG CANCER CLINICAL OUTCOMES WITH SURGICAL RESECTION AFTER DEFINITIVE NEOADJUVANT CHEMORADIOTHERAPY. Ilaria Caturegli*[1], Melissa Vyfhuis[1], Whitney Burrows[2], Mohan Suntharalingam[1], Shahed Badiyan[1], and Pranshu Mohindra[1], [1]Department of Radiation Oncology, and [2]Division of Thoracic Surgery, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

The role of neoadjuvant chemoradiotherapy (CRT) followed by surgery continues to evolve in patients with stage III non-small cell lung cancer (NSCLC). To date, limited prospective data exist assessing definitive preoperative radiotherapy doses. We report our clinical experience of high-dose (definitive) radiation-based trimodality therapy. Between 2000 and 2016, 107 patients with stage III NSCLC treated with curative intent at our institution with definitive doses of neoadjuvant CRT were analyzed. The primary endpoint was overall survival (OS) and secondary endpoint was freedom from recurrence (FFR), analyzed using the Kaplan-Meier method with log-rank testing. Cox regression with forward-model selection was used for the multivariate analyses (MVA). The patients had a median age of 58.5 years and were largely Caucasian (76%) with baseline performance status of 0 (69%). Stage grouping was IIIA: 79%, T3/4: 44%, N2: 75%. CRT was delivered concurrently in 98% of patients. Median radiation dose was 61.2Gy; 89% receiving ≥60Gy. Radiation technique was 3D conformal (71%) or intensity-modulated radiotherapy (27%). The 30-day and 90-day surgical mortality rates were 4.7% and 7.5%, respectively. At a median follow-up of 30 mos., estimated OS and FFR (median/5-year) were 61 mos./49% and 29 mos./35%, respectively. On univariate analysis (UVA), age≥60 (HR, 1.776; P=0.023) and having no health insurance (HR, 3.071; P=0.039; as compared to private insurance) predicted for an increased risk of death, while receiving consolidation chemotherapy was associated with improved survival (HR, 0.472; P=0.015). On MVA, age≥60 was the only characteristic with a continued association with OS (HR, 1.779; P=0.039). On UVA, lack of health insurance was the only predictor of disease recurrence (HR, 6.059; P<0.001). In

a carefully selected population, full dose neoadjuvant CRT followed by surgery can achieve high OS and FFR even for stage III NSCLC patients, much higher than recent reports of bimodality therapy (RTOG 0617 median OS of 28.7 mos. and PACIFIC median PFS of 16.8 mos.). Prospective evaluation of high-dose radiation trimodality therapy versus induction chemotherapy alone is warranted.

P.27

IMPROVING HIV OUTCOMES AMONG HIV-INFECTED PATIENTS WITH CANCER FOLLOWED IN AN INTEGRATED, MULTIDISCIPLINARY, INFECTIOUS DISEASE/ CANCER CLINIC. Helen Cheung*, Kristen Stafford[1], and David Riedel[2], [1]Division of Genomic Epidemiology and Clinical Outcomes, Department of Epidemiology and Public Health and [2]Division of Infectious Diseases, Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

Patients dually diagnosed with HIV and cancer have poorer outcomes compared to general cancer patients. HIV management is complicated by multiple specialist involvement, drug-drug interactions, and overlapping drug toxicities. Past studies of HIV-infected patients noted improved virologic suppression and CD4 counts with access to multidisciplinary services. A multidisciplinary clinic (ID specialists, oncologists, pharmacists, social workers, etc.) embedded in the University's Outpatient Cancer Center starting in late 2011 sought to improve virologic suppression and care coordination. HIV outcomes for patients seen in the multidisciplinary clinic (≥2 visits) from 2012-16 (N=51) were compared to a historical cohort seen from 2007-11 (N=548). In the pre- vs. post-cohorts, the median age at cancer diagnosis was 51 vs. 46 years (range 24-76, p=0.01), 78% vs. 72% were male (p=0.38), and 86% vs. 73% were African American (p=0.02). 53% in the post- cohort had stage IV disease vs. 32% in the pre- cohort (p=0.0001). In both cohorts, less than half were on HIV therapy at the time of cancer diagnosis (42% pre- and 43% post-, p=0.91). Baseline median CD4 count at cancer diagnosis in the post- cohort was lower (171, IQR 70-310) than the pre- cohort (274, IQR 120-462; p=0.20), and baseline median HIV viral load was higher (post-16,802 vs. pre-1,985). Viral suppression at cancer diagnosis was similar (42% pre- vs. 40% post-), but at study end, 75% of patients in the post-cohort were virologically suppressed vs. 63% in the pre- cohort (p=0.09). Patients in the post- cohort were 1.41 (95% CI, 0.91, 3.53) times more likely to be virally suppressed at end of follow up compared to patients from the pre- cohort. The post-cohort had fewer days between their first follow up visit (51) versus 81 in the pre-cohort (p=0.0004). Average number of 1-and 2-year follow-up visits were both significantly higher in the post- cohort (5.6 and 7.6 respectively) compared to the pre-cohort (3.7 and 4.9; p <0.0001 and p<0.001 respectively). Integrating HIV care into Cancer Centers may improve HIV treatment outcomes for these dually diagnosed, medically fragile, and complicated patients.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.28

SUPPORTING THE UNMET CARE NEEDS OF OLDER ADULTS WITH ADVANCED CANCER. Christine Server* and Ryan Nipp, Massachusetts General Hospital, Boston, MA.

Cancer disproportionately impacts older adults, yet research defining the supportive care needs of these patients is lacking. We sought to examine associations between geriatric impairments, quality of life (QOL), and physical and psychological symptom burden in older adults with advanced gastrointestinal (GI) cancer. We prospectively surveyed patients aged ≥70 within 8 weeks of diagnosis of incurable GI cancer and assessed their geriatric impairments (Vulnerable Elders Survey-13 [range 0-10, scores ≥3 identify patients with impairments), QOL (EORTC QLQ-C30 [range 0-

100, higher scores indicate better QOL]), physical symptoms (Edmonton Symptom Assessment System [range 0-10, higher scores indicate greater symptom burden]) and psychological symptoms (Geriatric Depression Scale, [range 0-15, higher scores indicate greater depression symptoms]). We used descriptive statistics to determine differences in patient characteristics by the presence or absence of geriatric impairments. We used linear regression adjusted for age, employment, cancer type, and comorbidity to examine associations between geriatric impairments, QOL, and physical and psychological symptom burden. From 10/2015-11/2016, we enrolled 50 of 58 (86%) patients approached (mean age = 78.7; 52% with pancreatic cancer). Nearly half (46%) screened positive for geriatric impairments; these patients were older (mean age: 81.7 vs 76.1, $p < .01$) and had more comorbid conditions (2.4 vs 1.2, $p = .01$). On linear regression, patients with geriatric impairments reported worse QOL across all domains (General QOL: $B = -28.3$, $p < .01$; Physical: $B = -36.8$, $p < .01$; Role: $B = -36.8$, $p < .01$; Emotional: $B = -30.1$, $p < .01$; Cognitive: $B = -17.8$, $p = .03$; Social: $B = -39.7$, $p < .01$), higher depression scores ($B = 5.1$, $p < .01$) and worse fatigue ($B = 4.6$, $p < .01$), drowsiness ($B = 4.0$, $p < .01$), appetite ($B = 3.8$, $p < .01$), and pain ($B = 2.7$, $p = .02$). Older adults with advanced cancer experience considerable unmet supportive care needs, particularly those with geriatric impairments. These results will inform future efforts to address the unique palliative and supportive care needs of the geriatric oncology population.

P.29

STRIATAL MICROCIRCUIT DYNAMICS OF ETHANOL HABITS. Cecelia Kim* and Brian Mathur, Department of Pharmacology, University of Maryland School of Medicine, Baltimore, MD.

Habitual alcohol consumption is defined as drinking that occurs despite adverse consequences. Habitual action strategies are mediated by the dorsolateral striatum (DLS), the activity of which is disinhibited by alcohol exposure. The powerfully inhibitory fast-spiking interneurons (FSI) are in relatively high abundance in the DLS as compared to other striatal subregions, are linked to habit learning, and are responsive to alcohol. As a minority population of neurons in the striatum, FSIs and their role in ethanol habits remain understudied. Here, we hypothesize that FSIs are necessary for late-stage escalations in alcohol consumption that are associated with the DLS. We investigated this by employing molecular, neural circuit and behavioral methods to dissect the causal role of FSIs in alcohol consumption. Specifically, we aim to measure alcohol consumption in mice with selective lesions of DLS FSIs. To track drinking behavior in a precise manner, we use custom-built lickometers to record individual licks while animals voluntarily consume 20% ethanol using a chronic intermittent drinking paradigm, the so-called 'drinking in the dark' (DID) protocol. From the lickometer data, we construct behavioral ethograms of individual mice and calculate the total number of lick bouts, average bout length, and latency to bout. Finally, the weight of ethanol consumed is recorded as are blood ethanol concentrations. Experiments are ongoing.

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P.30

BARRIERS TO BYSTANDER NALOXONE DISTRIBUTION AND ADMINISTRATION IN BALTIMORE. Valerie Jenkins*, Brent Hurt*, Atizaz Hussain[1], Ilya Lazzeri[1], Siamak Moayedi[2], Hong Kim[2], and Stephen Schenkel[2], [2]Department of Emergency Medicine, [1]University of Maryland School of Medicine, Baltimore, MD.

According to the CDC, the rate of overdose deaths involving synthetic opioids, including fentanyl, doubled from 2015 to 2016. As a result, state governments have taken steps to increase public access to naloxone, an effective antidote to opioid-related overdoses caused by heroin and

fentanyl. Non-medically trained bystanders and peers of opioid users are often the first individuals to witness acute overdoses and have the potential to initiate lifesaving treatment with publicly available naloxone before EMS arrival. Therefore, the availability of bystander administered naloxone (BNAL) play a crucial role in the reversal and prevention of fatal overdoses. Despite decreased legal barriers to BNAL, there is a current lack of data assessing how many opioid users have access to BNAL kits as well as knowledge on how to appropriately use them. It was hypothesized that opioid users are not prescribed naloxone frequently enough by health care providers. A cross-sectional study was conducted at an urban hospital in Baltimore from May 20-July 30, 2018. Research assistants screened ED patients from 12-10 pm, 7 days per week. Consenting adult patients with active opioid abuse (use within the last 7 days) were enrolled. A survey was administered to obtain demographics data, substance abuse history, and patients' access, knowledge, and use history of BNAL. Our primary outcome was possession of BNAL; secondary outcomes included knowledge and use of BNAL, and barriers to obtaining and using BNAL. There was a total of 165 consenting patients enrolled in this questionnaire-based study. Of these 165 patients, 126 patients (76.3%) had never been given a prescription for naloxone by a health care provider. However, of these 165 patients, 54.6% had been given a BNAL from another source besides a prescription. Additionally, only 60.4% of patients reported knowing how to administer naloxone. Although there are financial burdens involved with prescribing naloxone, ensuring that members of the opioid abuse community are offered BNAL prescriptions and formally educated on how to use it by health care providers is an important step in preventing potentially fatal overdoses.

This research was supported by the University of Maryland Emergency Department.

P.31

PREVALENCE OF FENTANYL EXPOSURE AMONG ED PATIENTS WITH HISTORY OF OPIOID ABUSE. Ilya Lazzeri*, Atizaz Hussain*, Brenten Hurt[1], Valerie Jenkins[1], Siamak Moayedi[2], Stephen Schenkel[2], and Hong Kim[2], [2]Department of Emergency Medicine, [1]University of Maryland School of Medicine, Baltimore, MD.

In 2016, 64,070 Americans died from drug overdose, of which 42,249 deaths were due to opioids. Synthetic opioid other than methadone such as fentanyl and its analogs were responsible for over 20,000 deaths, a five-fold increase from 2013. Fentanyl has been used to adulterate heroin in the past. However, it is unclear how much of the "heroin" users are exposed to fentanyl. The purpose of our study was to assess the extent of fentanyl exposure amongst ED patients with active history of opioid abuse. The specific aims of the project were to estimate the prevalence of fentanyl exposure, and to assess patient's knowledge of fentanyl. A convenience sample of emergency department (ED) patients at Mercy Medical Center were screened for study eligibility (7 days, 12-10 pm). ED patients with history of active opioid abuse within the past week were enrolled. We excluded those younger than 18 years old, patients in custody of law enforcement, or those unable to consent for the study. Urine samples were tested for the presence of fentanyl using a point of care Rapid ResponseTM Single Drug Test Strips (SDTS) by BTNX Inc. Ontario, Canada. A survey regarding opiate misuse and knowledge of fentanyl was performed. Preliminary data: 451 patients were screened for substance abuse in 2-month span.165 patients consented and were enrolled to our study. 77.0% of the patients were male; 89.7% preferred to use heroin via intranasal route (64.2%). 84.2% (n=139) patients reported awareness of fentanyl while 85.5% (n=141) identified fentanyl as the opioid with highest risk of death in overdose. However, 28.5% (n=47) actively sought fentanyl for misuse. Of the134 patients who provided a urine sample, 104 (77.6%) tested positive for fentanyl. In our ED population, A large proportion of the patients were exposed to fentanyl even though the majority reported preferentially using heroin. A significant proportion of the ED patients

actively sought fentanyl for misuse even though nearly 90% of the patients recognized fentanyl as possessing the highest risk of overdose death.

This research was supported by the University of Maryland Emergency Department and supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.32

BRIVARACETAM: A NOVEL NON-OPIOID TREATMENT FOR PAIN ASSOCIATED WITH PERIPHERAL NERVE INJURY. Solomiya Tsymbalyuk*, Madeleine Smith[1], Orest Tsymbalyuk[1], and Marc J. Simard[2], [2]Department of Neurosurgery, [1]University of Maryland School of Medicine, Baltimore, MD.

The ongoing opioid epidemic is driven in part by legitimate use of opioids prescribed for neuropathic pain resulting from peripheral nerve injury (PNI). After PNI, cytokines, chemokines, and other factors (IL-6, CCL2 and CXCL1) are upregulated centrally, where they contribute mechanistically to the pathogenesis of neuropathic pain. Previous work has shown that dorsal horn astrocytes exhibit non-canonical NF-kB signaling, which is upregulated by the TWEAK/Fn14 axis after PNI. This may be responsible for transcriptional expression of Sur1-Trpm4 cation channels. Preliminary data also suggests that Sur1-Trpm4 plays a role in regulating the expression of IL-6, CCL2, and CXCL1. Thus, the current hypothesized molecular cascade is as follows: in dorsal horn astrocytes post-PNI, TWEAK-induced non-canonical NF-kB signaling is an upstream regulator of Sur1-Trpm4 expression, and that Sur1-Trpm4, in turn, regulates the expression of downstream effectors that promote chronic neuroinflammation and neuropathic pain. We hypothesized that treating animals with a sciatic nerve cuff model of neuropathic pain with brivaracetam would diminish neuropathic pain by inhibiting FN14 expression, causing decreased downstream transcription of IL-6, CCL2 and CXCL1 in astrocytes. Brivaracetam treatment began two weeks postsurgery. Von Frey testing revealed significantly less mechanical allodynia in brivaracetam-treated animals compared to vehicle treated controls. Molecular data is being collected in order to confirm that brivaracetam treatment decreases astrocytic transcription of IL-6, CCL2 and CXCL1.

This research was supported in part by the Program for Research Initiated by Students and Mentors (PRISM), University of Maryland School of Medicine Office of Student Research.

P.33

PROVIDER ATTITUDES TOWARD NALOXONE DISTRIBUTION IN THE CLINICAL SETTING. Nora Loughry*, Deborah Stein[1], and Erin Hall[2], [1]Division of Trauma, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD, and [2]Division of Critical Care, Department of Surgery, MedStar Washington Hospital Center, Washington, DC.

There are many limiting factors to effective implementation of naloxone training for at risk patients in the emergency department. One of the most important is emergency department staff willingness to train patients in naloxone overdose response. Gaining understanding about barriers emergency department staff have towards naloxone training may allow for more effective interventions for the staff to better implement patient training programs in naloxone overdose response. Our hypothesis was that there would be specific, identifiable barriers that may be shared across emergency department staff to participating in naloxone training programs. Nursing staff in the emergency receiving unit of a busy, urban Level 1 Trauma center were anonymously surveyed to assess their willingness to train patients in naloxone overdose response. In addition, each respondent answered questions on confidence, logistical obstacles (time restraint, institutional support), and interpersonal attitudes toward training patients in naloxone overdose response. Scores were generated for willingness, confidence, logistical obstacles, and interpersonal attitudes. Chi square

analysis was utilized to test for association between willingness and the other factors. Of the 18 people who were sent surveys, 15 responded (response rate=82%). Forty-six percent of respondents were willing to train patients (N=7). By chi square analysis, greater confidence and more positive attitude toward patients who use drugs were significantly associated with greater willingness to train ($p = 0.01$ and 0.02). People who scored higher on concerns about logistical obstacles (which involved perceived time constraint, lack of institutional support) did not have a significant association with degree of willingness ($p = 0.14$). Confidence and interpersonal attitude are significantly related to willingness to train patients in naloxone overdose response. This has important implications for future interventions with healthcare staff, as an intervention such as liberating time constraints to provide training in naloxone overdose response may be less effective in addressing staff willingness than further education for staff about naloxone and addressing staff's personal attitudes toward people who use drugs.

P.34

LIPID FINDINGS FROM THE DIABETES EDUCATION TO LOWER INSULIN, SUGARS, AND HUNGER (DELISH) STUDY. Samantha Schleicher*, Ashley Mason[1], Laura Saslow[2], Patricia Moran[1], Elissa Epel[3], and Frederick Hecht[1], [1]Osher Center for Integrative Medicine and [3]Aging, Metabolism, and Emotions Center, Department of Psychiatry, University of California, San Francisco School of Medicine, San Francisco, CA and [2]Department of Health Behavior and Biological Sciences, University of Michigan School of Nursing, Ann Arbor, MI.

A ketogenic diet can improve glycemic control in type 2 diabetes mellitus (T2DM), however, there have been concerns that the high fat content can result in increased low density lipoprotein (LDL) cholesterol, which has been associated with cardiovascular disease (CVD). We assessed the effects of a ketogenic diet on LDL particle size and number (LDL-P) among individuals with T2DM. Small particle LDL size and number are particularly associated with CVD, thus, these metrics may more accurately predict CVD disease risk than the calculated LDL (LDL-C) obtained on standard lipid tests. We delivered a ketogenic diet intervention (n=58) in a classroom format (weekly for the first 3 months, monthly for 3 months; ~n=10 per class). We obtained a standard lipid panel and lipid particle size and number (LDL size, LDL-P, small LDL-P; NMR; LabCorp). HDL-C (M diff (SD)=4.51 mg/dL (9.43), 95% CI [1.96, 7.06], p=.0008) increased, triglycerides (M diff (SD)=-38.07 mg/dL (61.76) 95% CI [-54.77, -21.38], p<.0001) decreased, and the triglyceride/HDL-C ratio (M diff (SD)= -1.21 (1.81), 95% CI [-1.70, -0.72], p<.0001) decreased. LDL-C (M diff (SD) = 7.03 mg/dL (29.93), 95% CI [-1.22, 15.28], p=.0933) tended to increase, total cholesterol (M diff (SD)=5.78 mg/dL (35.25), 95% CI [-3.75, 15.31], p=.2291) did not. Small LDL-P number (M diff (SD)=-116.64 nmol/L (255.70), 95% CI [-185.76, -47.51], p=.0013) decreased, but LDL-P (M diff (SD)=-6.44 nmol/L (359.33), 95% CI [-103.58, 90.70], p=.8948) did not. LDL size (M diff (SD)=0.24 nm (0.46), 95% CI [0.12, 0.37], p=.0003) increased. We found that of 30 participants whose LDL-C increased, only 7 (23.3%) also demonstrated increases of 5% or greater in small LDL-P. Thus, although LDL-C may suggest that a ketogenic diet could increase CVD risk, LDL particle size and number suggest that most people do not experience lipid changes likely to increase CVD risk. We observed lipid changes that were consistent with decreased CVD risk in most participants. Additional research is needed to understand why a minority of participants do experience increases of 5% or greater in small LDL-P, and how this should be managed.

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P.34A

EFFECT OF INTRAVITREAL ANTI-VEGF AGENTS ON INTRAOCULAR PRESSURE. David Na*, Ramya Swamy, and Sachin Kalarn, Department of Ophthalmology and Visual Sciences, University of Maryland School of Medicine, Baltimore, MD.

With the increasing use of intravitreal injections of anti-VEGF agents, the treatment paradigm for many intraocular and retinal diseases have dramatically changed in the last decade. With growing concerns of a possible association between multiple intravitreal injections and the development of glaucoma in certain individuals, we aimed to determine the response in intraocular pressure over time between varying anti-VEGF agents. Patients that received a single intravitreal anti-VEGF agent were reviewed retrospectively. The data that were collected includes patient demographics, indicated intraocular pathology, intraocular lens status, total number of intravitreal injections, intraocular pressures prior to injections, and time between initial treatment and last treatment. Patients were excluded from the study if they had a prior history of intravitreal injections, prior use of steroids, pre-existing diagnosis of glaucoma, or pre-existing diagnosis of glaucoma suspect. Statistical methods of independent sample, paired sample t-test, and analysis of variance was performed between intraocular pressure and the collected patient characteristics. Within the sample size of 73 patients, the mean time between baseline and the last injection was 7.1±7.9 months. Mean number of injections was 3.8±2.2. There were no statistically significant differences in IOP of the treated eye between the IOP at baseline and the IOP at last injection with any of the variables. There was also no difference in IOP when comparing the treatment eye with the untreated fellow eye. There were no clinically significant changes in IOP over a short period time with receiving an average of 4 intravitreal injections. Overall, no significant differences were observed between intravitreal anti-VEGF agents. However, there may be differences that exist with further long-term data, with more intravitreal injections, and with co-existing diagnosis of glaucoma.

P.35

CORRELATING MRI EVIDENCE OF CEREBRAL ISCHEMIA WITH MORTALITY FOLLOWING DECOMPRESSIVE CRANIECTOMY. Wesley Shoap* and Bizhan Aarabi, [1]Department of Neurosurgery, University of Maryland School of Medicine, Baltimore, MD.

Each year nearly 200 patients with severe head injuries are treated at University of Maryland Shock Trauma Center. Of these patients, about 20 will have a decompressive craniectomy. Decompressive craniectomy is a neurosurgical procedure in which a portion of the skull is removed in order to reduce intracranial pressure and allow for cortical swelling. The mortality rate in patients who receive this procedure is close to 40%. Multiple studies have failed to demonstrate a relationship between decompressive craniectomy, reduction of intracranial pressure, and outcome. Cerebral ischemia could be a major factor contributing to this mortality rate but the relationship has not been well characterized. MRI is the only imaging modality that can indicate brain ischemia, and it is routinely done on patients who have decompressive craniectomy at The Shock Trauma Center. This study will evaluate brain MRIs to determine the incidence of cerebral ischemia following decompressive craniectomy and whether there is an increased mortality rate in the patients who have ischemia versus those who do not. Elucidating a relationship will help to further our understanding of the 40% mortality rate among these patients. It could also lead to a criterion for excluding certain high-risk patients from the procedure and thus improving outcomes. The trauma registry has supplied the names and MRNs of all patients who had a decompressive craniectomy from the years 2012 to 2016. All races are included, ages 18 and older, males and females. The charts of 123 patients who had brain MRIs following their decompressive craniectomy have been identified for review.

P.36

UNDERSTANDING THE SHORT-TERM NEUROLOGICAL IMPACT OF EXPOSURE TO HYPEROXIA FOLLOWING CANINE CARDIAC ARREST. Da Bin Lee*, Timothy Pearson[1], Julie Proctor[1], Robert Rosenthal[2], and Gary Fiskum[1], [1]Department of Anesthesiology and [2]Division of Hyperbaric Medicine, Department of Emergency Medicine, University of Maryland School of Medicine, Baltimore, MD.

Each year in the US over 250,000 survive cardiac arrest (CA) but suffer from moderate to severe neurologic injury. Previous animal studies indicate that the use of 100% O_2 (hyperoxia) during and following resuscitation results in greater hippocampal neuronal death than what occurs using O_2 titrated to maintain normoxia. This study tested two hypotheses: 1. Hyperoxic O_2 worsens neuronal death in cerebellar Purkinje cells (PCs) and associated neuroinflammation. 2. Exposure to moderate levels of O_2 during both acute resuscitation and sub-acute critical care does not increase PC death or neuroinflammation. Adult female beagles were anesthetized and mechanically ventilated. Ventricular fibrillation CA was induced by electrical stimulation to the right pericardium, and the ventilator stopped. Ten min later, dogs were ventilated with 100% O_2 and resuscitated using 3 min of open chest CPR followed by defibrillation. In Experiment 1, dogs were ventilated for one hr under either A) severe hyperoxia: 100% O_2, or B) at O_2 levels titrated to maintain hemoglobin saturation at 94 to 96%. In Experiment 2, all dogs were maintained for the first 30 min under 50% O_2 and then randomized to either A) normoxia: pO_2 of 80-120 mmHg, or B) moderate hyperoxia: pO_2 of 180-220 mmHg for the next 4 hr. Following critical care for 24 hr, dogs were euthanized by perfusion. When CA is followed by resuscitation under 100% O_2 but not an oximetry protocol, the number of injured PC was increased while the number of healthy PC and resting microglia was notably lowered. Experiment 2. Dogs exposed to 50% O_2 for 30 min following resuscitation did not exhibit a significant loss of cerebellar neurons. Activated microglia were elevated in the cerebellum but not affected by moderate hyperoxia during the "in-hospital" critical care period. Exposure to moderate hyperoxia but not normoxia led to an increase in number of injured PCs. These results support the hypothesis that exposure to 100% O_2 during the first hr following CA resuscitation worsens PC death. Neuronal death and inflammation are also exacerbated when moderate hyperoxia is employed during the period from 30 min to 4 hr post-arrest.

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P.37

CORRELATING HOME-BASED UPPER EXTREMITY ACTIVITY MONITORING WITH CLINICAL EVALUATIONS IN PATIENTS WITH CHRONIC STROKE. Kavita Bhatnagar*, Susan Conroy[1], and Christopher Bever[2], [1]Department of Physical Therapy and Rehabilitation Science and [2]Department of Neurology, University of Maryland School of Medicine, Baltimore, MD.

Clinical evaluations of arm function in chronic stroke patients are done in a highly-structured environment and may not be fully reflective of a patient's paretic arm use in everyday life. The objective of this study was to determine if they do in fact correlate, by utilizing wrist-worn accelerometers. Twenty chronic stroke patients with moderate to severe upper extremity deficits completed baseline evaluations with an occupational therapist, followed by 72 hours of accelerometer data collection at home in their normal routine. Clinical evaluations included the Fugl-Meyer Assessment (FM), Action Research Arm Test (ARAT) and Wolf Motor Function Test (WMFT), along with two self-assessments: the Motor Activity Log (MAL) and Stroke Impact Scale (SIS). Accelerometer-derived variables were calculated to quantify intensity and duration of bilateral

and unilateral arm use. Paretic and bilateral vector magnitudes characterized intensity. Total, paretic and simultaneous bilateral hours of use characterized duration. These variables were then correlated to each clinical evaluation using the Spearman correlation. The Mean Magnitude Ratio correlated significantly with the FM Total (CC = 0.68, p = 0.001), WMFT Functional Score (0.62, p = 0.004), and ARAT Paretic Total (CC = 0.52, p = 0.02). The Use Ratio positively correlated with the MAL AOU (CC = 0.54, p = 0.01) and MAL QOM (CC = 0.63, p = 0.003). However, most temporal variables did not correlate with the FM, WMFT or ARAT, and intensity variables did not correlate with the MAL or SIS. These results showed that patients with higher baseline clinical function (FM, WMFT, ARAT) have greater intensity of arm movement at home; similarly, those who perceive they have less disability (MAL) exhibit more relative paretic arm use. However, this study also suggests the possibility of learned non-use, as some patients with greater clinical function scores did not exhibit longer duration of paretic arm use in everyday life. Therefore, individualized home accelerometry profiles could provide valuable insight to better tailor post-stroke therapy.

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P.38

SICKLE CELL TRAIT AND RISK FOR EARLY-ONSET ISCHEMIC STROKE. Rebecca Zhang*, Kathleen Ryan[1], Haley Lopez[2], Zachary Flair[2], and Steven Kittner[2], [1]Division of Endocrinology, Diabetes and Nutrition, Department of Medicine and [2]Department of Neurology, University of Maryland School of Medicine, Baltimore, MD.

African-Americans (AA) are disproportionately affected by ischemic stroke (IS) compared to non-Hispanic Caucasians and illuminating the basis of this disparity could lead to improved targeted therapy options. Approximately 8% of AA have sickle cell trait (SCT), the benign heterozygous carrier state of sickle cell anemia, and there have been recent conflicting reports from cohort studies on the association of SCT with IS. All prior studies of SCT as a risk factor for IS focused on older stroke populations, with few data available in young adults. We hypothesize that SCT is associated with an increased risk of IS in young adults. Through a population-based case-control study in the Baltimore-Washington region, we identified 342 AA cases aged 15-49 years with first IS between 1992-2007 by neurologist referral and discharge surveillance. We identified 333 controls matched for age, race, and gender through random digit dialing. We used genome-wide association study (GWAS) data to impute the single nucleotide polymorphism (SNP) variant encoding SCT with a SNP imputation quality score of 0.80. For analysis, we used Chi-square tests and logistic regression models adjusted for age, hypertension (HTN), diabetes mellitus (DM), current smoking status, and previous myocardial infarction (MI). Participants with SCT (n=55) did not differ from those without SCT (n=620) in prevalence of classic risk factors for IS, including HTN, DM, current smoking status, and previous MI. Stroke cases had increased prevalence in these risk factors compared to controls. We did not find an association between SCT and early-onset IS in either model (unadjusted OR=0.8 [0.5-1.4]; adjusted OR=0.9 [0.5-1.7]). Given our 9% rate of SCT among controls, our study had 80% power to detect an OR of 1.94. We did not find evidence of increased risk of early-onset stroke with SCT. This study further questions the association between SCT and stroke, but larger multi-cohort studies of young AA adults are needed to help clarify whether this association exists.

P.39

CHARACTERIZING PERI-ICTAL MOOD CHANGES IN PATIENTS WITH EPILEPSY. Autusa Pahlavan*, Scott Thompson[1], and Jennifer Hopp[2], [1]Department of Physiology and [2]Division of Epilepsy, Department of Neurology, University of Maryland School of Medicine, Baltimore, MD.

Epilepsy is a chronic neurological disorder that affects 50 million individuals worldwide. Up to 40-60% of patients with epilepsy report feeling depressed, and rates of suicide are ten times higher in patients with epilepsy compared to the general population. Past studies have demonstrated a correlation between depressive symptoms and seizure type and frequency. While these studies have assessed changes in mood in the time interval between seizures, these fluctuations are less well characterized in the peri-ictal period defined as the hours before and after a seizure. In this study, we had the unique ability to quantitatively analyze peri-ictal mood symptoms in the inpatient Epilepsy Monitoring Unit (EMU). Because inducing seizure activity during electroconvulsive therapy is effective in treating depression, we hypothesized that depressed epileptic patients would exhibit improvements in mood following a seizure. We also predicted that mood improvements would be greater in patients with focal seizures compared to generalized seizures. We enrolled patients admitted to the EMU for continuous video electroencephalography monitoring (VEM). Patients completed three validated mood questionnaires (Beck Depression Inventory-II, Beck Anxiety Inventory, and Montgomery Asberg Depression Rating Scale) at enrollment and at four time intervals following a seizure event: 4 hours, 12 hours, 24 hours, and 2 weeks. Of the 123 patients who enrolled in the study and were eligible to participate, 33 patients had epileptic seizures and 27 patients had nonepileptic seizures. Mood scores improved in the 24 hours following an epileptic seizure (BDI: -5.56, $p=0.017$; MADRS: -4.57, $p=0.012$) but returned to baseline after 2 weeks. Furthermore, there was a greater improvement in depression and anxiety scores in patients with focal-onset epilepsy (BDI: -7.37, $p=0.022$; BAI: -4.44, $p=0.013$; MADRS: -5.16, $p=0.018$) versus generalized onset. This study may help to improve screening in patients with both mood disorders and epilepsy by defining when assessment should be performed, and it may help to develop more targeted treatment strategies in this population.

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P.40

ALTERED MITOCHONDRIAL FUNCTION MEDIATE THE EFFECT OF HIGH GLUCOSE ON THE PLURIPOTENCY OF EMBRYONIC STEM CELLS. Ben Cornwell* and Peixin Yang, Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, Baltimore, MD.

Cellular stress in maternal diabetes contributing to birth defects in the developing embryo has been implicated, such as increased mitochondrial dysfunction and reactive oxygen species production. Previous research has shown the impact of high glucose on inhibiting embryonic stem cell (ESC) cardiogenesis and neurogenesis through inhibition of genes essential for proper differentiation. However, little is known about the impact hyperglycemia has on mitochondrial function in these same cells, and if this has lasting effects on their pluripotency. GR-E14 cells, a mouse ESC line adapted in low glucose (5 mM) conditions, were grown under hyperglycemic conditions over several passages and analyzed for mitochondrial dynamics and changes in pluripotency. E14 cells were also exposed to Leflunomide, a mitochondrial fusion activator, to observe changes in pluripotency to mESC. Both mitochondrial fusion and fission genes were upregulated in naïve E14 cells grown in high glucose media, however there was no morphological perturbation. Leflunomide was able to induce mitochondrial fusion and altered pluripotency genes in naïve E14 cells.

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P.41

MATERNAL DEPRESSION AS POTENTIAL MODERATOR BETWEEN FOOD INSECURITY AND CHILD HEALTH. Bo Peng*, Bridget Armstrong, Yan Wang, and Maureen Black, Division of Growth and Nutrition, Department of Pediatrics, and University of Maryland School of Medicine, Baltimore, MD.

Food insecurity is a major public health challenge in the US. Children who grow up in food-insecure homes are at risk of health and developmental challenges. Maternal depression is also related to adverse child health. Children exposed to both food insecurity and maternal depression may be particularly vulnerable to poor health. We hypothesized that the association between household food insecurity and adverse health in children would be stronger if mothers reported risk of depression. We assessed 1) the relation between food insecurity and child health independently and 2) the potential moderating effect of maternal depression risk on this relationship. Analysis was performed on a selected subsample (n=5711) from Children's HealthWatch, a cross-sectional sampling of caregivers and their children under four years of age in five US cities. All data were maternal self-report. Child health was characterized by developmental concerns, fair/poor vs good/excellent health status, and prior hospitalizations. Multivariate logistic regression models showed that children from food insecure households had higher odds of developmental concerns (AOR=1.324; P=0.005) and fair/poor health (AOR=1.505; p=0.000). In the same model, children whose mother reported depression risk had higher odds of fair/poor health (AOR=1.431; p=0.001) and prior hospitalizations (AOR=1.318; p=0.001). Moderation analysis showed that the 2-way interaction between household food insecurity and maternal depression risk was not statistically significant for developmental concern (B=-0.049; p=0.811), fair/poor child health (B=0.327; p=0.147), and hospitalization (B=-0.095; 0.573), which indicates that maternal depression risk did not significantly strengthen or weaken the association between food insecurity and adverse child health. Nonetheless, food insecurity and maternal depression risk were both independently associated with adverse child health. Clinicians and policy makers should consider screening for food insecurity and maternal depression risk, connecting families to additional resources, and developing interventions to address these conditions to improve the wellbeing of vulnerable children.

P.42

PATIENT PREFERENCE AND CONTRACEPTION CONSISTENCY IN SELF-IDENTIFIED LATINA WOMEN IN BALTIMORE: PRELIMINARY REPORT. Meredith Grover* and Diana Carvajal, Department of Family and Community Medicine, University of Maryland School of Medicine, Baltimore, MD.

Values and beliefs are linked to preferences in certain medical decisions where multiple equivalent options exist. For women deciding on a contraceptive method, physicians may or may not take into account the values and preferences of a patient, and the patient's desire for that understanding from the physician could affect her consistency of use of the method she uses. In self-identified Latina women in Baltimore, survey data suggests that they feel it is important for their physician to know her values and preferences as it relates to reproductive choices. An analysis of data about consistency of use of contraception and the patient's desires to have her physician know her values and preferences shows an association between a stronger understanding between the patient and physician and consistency of use. Therefore, using the shared decision making model in contraception counseling will help the patient establish her values and preferences and be better understood by the physician, while also allowing the physician the opportunity to provide the pertinent medical information needed for the ultimate decision to be made by the patient. This can

lead to more consistent use of contraception and, therefore, increased reproductive justice for Latina women.

P.43

MEAN ADMISSION TEMPERATURES IN INFANTS <32 WEEKS GA SUSTAINED AFTER MOVE TO NEW NEONATAL INTENSIVE CARE UNIT. Kelly Pham*, Natalie Davis, and Sara Mola, Division of Neonatology, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

In September 2015, the Neonatal Intensive Care Unit (NICU) at the University of Maryland Medical Center (UMMC) moved from the 6th floor of the South Hospital to the 4th floor of the North Hospital. This resulted in the unit being located further away from labor and delivery. Similar to the trauma literature, there too is a "golden hour" of care for infants that begin shortly after delivery. During this time period, attention must be paid to temperature control as neonates, especially those born <32 weeks gestational age (GA), lack many responses to heat loss, which they experience immediately after birth (McCall, 2010). According to the Neonatal Resuscitation Program and the World Health Organization (WHO), hypothermia is defined as axillary or core temperatures <36.5°C in the newborn. Responses to heat loss that neonates lack are shivering thermogenesis or altering the position of the body. Hypothermia has been associated with increased risk of mortality, and significant morbidities such as necrotizing enterocolitis (NEC), intraventricular hemorrhage (IVH), and late onset sepsis. A quality improvement bundle implemented in 2012 utilizing a polyethylene wrap, a chemical thermal mattress, a role specific checklist and a dedicated thermoregulation nurse at deliveries for infants <32 weeks GA resulted in a statistically and clinically significant improvement in admission temperatures at UMMC (Mola, 2015). In this study, we performed a retrospective chart review of <32 weeks GA infants born at UMMC from January 1, 2014 to December 31, 2016, to compare a cohort of infants admitted to our NICU both before and after the move to the new location. We hypothesized that inborn infants <32 weeks GA would have a longer time to admission due to the increased distance from L&D, but would continue to exhibit normothermic (36.5° – 37.5°C) mean admission temperatures as a result of our current thermoregulation practices.

P.44

THE IMPACT OF FOOD AND HOUSING INSECURITY ON CHILDHOOD OBESITY IN BALTIMORE CITY. Natalia Perez*, Maureen Black, and Yan Wang, Division of Nutrition and Childhood Development, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Childhood obesity in the United States is estimated to affect 17% of all school aged children and this number has remained stagnant in recent years.12 It is well established that childhood obesity can lead to poor health outcomes for children including increased risk for cardiovascular disease, diabetes, asthma, sleep apnea, and joint problems, as well as increased risk for depression, anxiety, low self-esteem and being targets of social stigma and bullying.12 Therefore, assessing potential social and risk factors that children face, such as food and housing insecurity, and determining their associations to childhood obesity could lead to novel approaches to help prevent childhood obesity. Food insecurity has been associated with negative health outcomes for children, including higher risk for hospitalizations and general poor health, being at greater risk for developing iron deficiency anemia and developmental delays.4,5,6 Housing insecurity has been associated with increased risk of food insecurity and poor child health, including decreased ability to deal with stress and increased risk of injuries and infections.8,9 However, there has been no clear relationship established between food insecurity, housing insecurity and childhood obesity. Baltimore City has seen an increase in the

risk for housing insecurity in recent years due to increases in rent with no increase in income and 13% of households in Baltimore face food insecurity.16,20 Additionally, the childhood obesity prevalence is 25%, which is higher than the national average.18 For these reasons, this study will look at Children's Health Watch data collected from December 2007 to December 2017 in teaching hospitals in Baltimore City to determine differences in childhood obesity rates across the 10 years and how food and housing insecurity might be associated with risk of childhood obesity. With these results, we hope to help elucidate potential social factors affecting childhood obesity and help inform future interventions for childhood obesity prevention in Baltimore City and urban settings.

P.45

FOOD ACCESS AND FOOD SECURITY AMONG MEDICAID-INSURED YOUTH TREATED WITH ANTIPSYCHOTIC MEDICATION. Nicole Rangos*, Kristin Bussell[1], Heidi Wehring[2], Meredith Roberts[2], Emily Steiner[1], and Gloria Reeves[1], [1]Division of Child Psychiatry, [2]Department of Psychiatry, University of Maryland School of Medicine, Baltimore, MD.

Pediatric antipsychotic treatment is associated with metabolic side effects, including increased appetite, weight gain, dyslipidemia, and new-onset diabetes. Practice guidelines universally recommend healthy lifestyle education and guidance for youth treated with these medications. However, healthy lifestyle practices are difficult for low-income families to implement if they do not have adequate access (e.g. "food desert") or financial resources ("food insecurity") to obtain healthy foods. In this study, we assess prevalence of food access and food insecurity among the Medicaid-insured, antipsychotic-treated youth throughout Maryland. Participants are identified through a state Medicaid antipsychotic prior authorization program at the time of medication approval. We included youth ages 8-16 years old who lived with a parent guardian and we exclude youth with mobility issues (e.g. unable to participate in physical education), moderate to severe intellectual disability, and residence in a treatment center or foster home. Food security was evaluated with the USDA Household Food Security Survey Module and food access was measured using the USDA Economic Research Service Food Access Research Atlas. We analyzed baseline data from the first 60 parent-youth dyads enrolled in a NIMH-funded healthy lifestyle intervention study. In this sample, a third of families reside in low-income and low access communities, with 20 families (33.3%) living at ½-mile urban/10-mile rural demarcations. A concerning 46.7% of households reported food insecurity in the past 12 months, compared to the national average of 16.5%. Parents reported food insecurity more frequently among themselves (43.3%) rather than their child (18.3%), which may be due to support of school-based breakfast/lunch programs. Surprisingly, many families utilizing food assistance programs continue to experience food insecurity. Developing an understanding of the food environment in this population can lead to improvement in provider training and patient care by addressing food access issues as part of healthy lifestyle interventions. Research is needed to learn how to support food security among parents of antipsychotic-treated youth.

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P.46

QUALITY OF LIFE IN PATIENTS WITH DELAYED RADIATION INJURY TREATED WITH HYPERBARIC OXYGEN THERAPY. Sam Famenini*, Kinjal Sethuraman, and Melissa Schroeder, Division of Hyperbaric Medicine, Department of Emergency Medicine, University of Maryland School of Medicine, Baltimore, MD.

Patients who have undergone radiation therapy for the treatment of malignancy can develop delayed effects of radiation and may have decreased quality of life (QOL). Hyperbaric oxygen therapy (HBOT) is an accepted treatment for delayed effects of radiation. The aim of this study is to evaluate if HBOT improves QOL in patients who have delayed effects of radiation. Twenty-seven patients with delayed effects of radiation were followed at the Center for Hyperbaric and Dive Medicine at R Adams Cowley Shock Trauma Center as a quality improvement project. Most patients received a minimum of 40 treatments. Twenty-seven patients completed the validated medical outcomes short form survey (SF-36) before the start of treatment, 20/27 completed at mid-treatment, and 17/27 upon completion. The baseline pre-treatment domain scores were compared with mid- and post- treatment. Six domains are scored in the SF-36 instrument are: physical functioning (PF), role limitation due to physical health (RPH), role limitation due to emotional problems (REP), energy/fatigue (EF), Emotional well-being (EWB), social functioning (SF), general health (GH), pain (P). The average pre-treatment domain scores were PF= 62, RPH=34, REP=67, EF=47, EWB=70, SF=57, GH=50 and pain=51. Testing for differences at baseline and mid-treatment did not show a significant difference in any of the domains. Testing for differences at baseline and completion of HBOT also did not show a statistically significant difference. EWB, pain, EF, GH, RPH, and SF did trend upwards by the end of the patient's treatments. We are currently obtaining further SF-36 data and patient enrollment. In our very small sample of patients, SF-36 domain scores were lower than what is reported in the general population. HBOT showed a raw score improvement in many of the SF-36 domains, but was not statistically significant. Larger studies should be developed to study the effect of HBOT on QOL of patients with delayed effects of radiation therapy.

P.47

VIRTUAL REALITY COMPUTER GAMING MAY ENCOURAGE UPPER EXTREMITY USE IN PERSONS WITH RETT SYNDROME. Molly Himmelrich*[1], Grace Omotunde[1], Matthew Foreman[2], Jack Engsberg[2], and Pamela Diener[1], [1]Department of Neuroscience, Georgetown University School of Medicine, Washington, D.C. and [2]Department of Neuroscience, Washington University in St. Louis School of Medicine, St. Louis, MO.

Individuals with Rett Syndrome (RTT) begin to lose acquired skills around 6-18 months. Purposeful arm/hand (UE) skills are replaced by stereotypical handwringing/mouthing, which interfere with participation in daily living. Widely used techniques (elbow extension splints) inhibit handwringing stereotypies to promote function of the opposing UE, yet this restrictive design inherently impedes independent UE use. Virtual reality gaming (VRG), which is intrinsically motivating and sensory-rich, stimulates self-initiated practice of movement patterns using individualized activities. In pilot studies, individuals with RTT demonstrated interest in VRG, indicating that this mode of interaction is motivating and can elicit participation. The purpose of this project is to determine if individuals with RTT will independently reduce stereotypies to perform the purposeful UE movements needed for VRG sessions. Four participants, ages of 5-50, completed the study using an ABA design. Each participant engaged in 12 wks (36 hrs) of VRG intervention where UE movements were converted into keyboard strokes to control the VRG activities (e.g., games, videos, songs). Purposeful UE use and stereotypies were evaluated 4 times: baseline and after each stage of the ABA design. Assessments administered included the PEDICAT, GAS, ROM, and a functional reach test (fRT), which evaluates UE function using a single switch connected to a battery-operated device. Preliminary results from participants show improvement in the number and extent of time the subject self-initiates and maintains hand separation. Current fRT outcome measures demonstrate maintenance of skill post-withdraw of intervention. Overall, individuals with RTT appear to self-initiate purposeful use of their hands, decrease hand mouthing, and improve in

interactive play. Active participation in the VRG sessions suggests this may be an effective intervention for acquiring self-initiated motor behaviors. Parental reports confirm that UE skills transfer to daily function in the home. As data is further analyzed, the information gained from the results may assist in the development of future study designs and therapy programs.

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P.48

SURGICAL MANAGEMENT OF GYNECOMASTIA: A REVIEW OF THE CURRENT INSURANCE COVERAGE CRITERIA". Carly Rosen*, LediBabari M. Ngaage[1], Chinezimuzo Ihenatu[1], Adekunle Edegbede[2], Sheri Slezak[1], and Yvonne Rasko[1], [1]Division of Plastic Surgery and [2]Division of Shock Trauma and Plastic Surgery, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

Gynecomastia is characterized by the abnormal proliferation of glandular breast tissue in males. Depending on the severity and symptom involvement, a patient may choose to undergo surgical excision of the breast tissue. This study reviews US insurance company policies for coverage of gynecomastia surgery and compares these policies to the guidelines put forth by the American Society of Plastic Surgeons (ASPS). The top 61 US insurance companies, including Medicare, were selected based on their market shares in 2017. The policy for each company was identified using a web-based search or by contacting the company directly. A systemic review of the policy for each company was performed to gather information regarding coverage criteria. In reviewing coverage, 23 (38%) of the 61 companies do not have a defined policy for management of gynecomastia and assess each request on a case-by-case basis. Only 38 (62%) of the 61 providers reviewed have a defined policy. These companies often require thorough documentation of breast size, BMI, duration of symptoms, prior treatments, and the extent of symptomatic involvement, but requirements vary by company. Many of these policies are limited in their coverage, such that they will cover the excision of tissue but not liposuction. Only 14 (39%) of these companies offer consideration of coverage for patients under 18 years old. Coverage of gynecomastia surgical management varies across insurance companies and is often based on internally-generated policies by individual US health insurance companies. Insurance company considerations do not often align with patient concerns and physician recommendations on gynecomastia and its treatment options. Coverage criteria should be reevaluated and universally established, to expand access to care and improve treatment efficiency.

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P.49

GRADUATE PERCEPTION OF COSMETIC SURGERY TRAINING IN PLASTIC SURGERY RESIDENCY AND FELLOWSHIP PROGRAMS. Cecelia Kim*, Ledibabari M Ngaage[1], Carly Rosen[2], Colton McNicholls[3], Fan Liang[4], and Yvonne Rasko[1], [1]Division of Plastic surgery and [4]Division of Plastic and Reconstructive Surgery, Department of Surgery, [2]University of Maryland School of Medicine and [3]Division of Plastic surgery, Department of Surgery, Johns Hopkins Hospital, Baltimore, MD.

As the demand for cosmetic surgery is continuing to rise, it is essential to reevaluate the plastic surgery curriculum. The evolution of plastic surgery (PS) programs over the last ten years also reflect changes to increasing the amount of exposure to aesthetic surgery and required aesthetic cases. Our aim was to evaluate the quality of current cosmetic surgery training and identify perceived strengths and weaknesses amongst recent graduates. A 16 question survey was sent to recent graduates who

completed their residency and fellowship at all Accreditation Council for Graduate Medication Education (ACGME)-approved PS training programs in the United States in 2017. Surveys were analyzed to determine the amount and proportion of cosmetic surgery exposure graduates received, varying teaching modalities, and perceived competency with cosmetic procedures. 111 (21%) recently graduated PS residents (n=92) and fellows (n=19) completed the survey. 40% of graduates reported that <10% of their current practice included cosmetic surgery, however, 80% of graduates planned on increasing such procedures in the next 5 years. Median time dedicated to cosmetic surgery training was 4-6 months. Virtual training was rated the highest, whereas assisting with attendings' patients and cases had the lowest rating amongst the teaching modalities. The top three procedures that graduates felt they were not adequately prepared for were endoscopic breast augmentation, endoscopic browlift, and hair transplantation. Conversely, endoscopic breast augmentation and hair transplantation were the procedures which required the fewest number of cases to feel confident, as reported by plastic surgery graduates. Cosmetic training in PS graduates is not fully comprehensive. Residents and fellows felt inadequately prepared for the same procedures. However, these areas are not linked to the number of cases needed to feel competent. To alleviate the gap in knowledge and training, the teaching curriculum for residents and fellows should be adapted to incorporate teaching modalities that are best received by graduates, and expanded to include procedures outside the ACGME recommendations.

P.50

EVALUATING THE THREAT OF CARBAPENEM-RESISTANT *ENTEROBACTER* IN CRITICAL CARE PATIENTS. Matthew Tinkham* and Kristie Johnson, Department of Pathology, University of Maryland School of Medicine, Baltimore, MD.

Carbapenem resistant Gram-negative bacteria represent a large obstacle to appropriate clinical care for infected patients in hospitals. Patients with carbapenem-resistant Gram-negative bacteria have increased mortality rates, with certain Gram-negative bacteria causing a greater than 50% mortality rate for infected ICU patients (Nordmann 2012). *Enterobacter* spp. can acquire carbapenem resistance by carbapenemases on transferable plasmids or chromosomally based porin mutations in conjunction with AmpC beta-lactamase production. *Enterobacter* spp. was the 4th most common cause of Gram-negative infections from 2011-2014 according to the CDC (Weiner 2016) and drug resistant *Enterobacter* spp. are a major challenge due to differing optimal treatments in ICUs. In this study, we aimed to determine the prevalence of and resistance mechanisms of carbapenem-resistant *Enterobacter* spp. infections at University of Maryland Medical Center from 2016-2017. We also aimed to determine the molecular relatedness of carbapenem-resistant *Enterobacter* spp. strains, their role in treatment, and patient outcomes for each strain type. In this study, we used real time and reverse transcriptase quantitative PCR to determine the genetic resistance mechanisms as well as the modified carbapenem inactivation method (mCIM), a phenotypic carbapenemase producing method. Pulsed field gel electrophoresis (PFGE) was used to determine the isolates' genetic relatedness. We examined 116 *Enterobacter* spp. strains from 77 patients. 25.9% (20) of patients were infected with strains that carried the *Klebsiella pneumoniae* carbapenemase (KPC) plasmid. Furthermore, we concluded that most types of carbapenem resistance in the hospital were not a result of carbapenemases.

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P.51

CLINICAL FEATURES AND QUALITY OF LIFE IN PATIENTS WITH COMPLEX DEFECTS OF THE ABDOMINAL WALL. Lauren Pace*, Adekunle Elegbede[1], Yvonne Rasko[2], Fan Liang[3], Michael Grant[3], and Arthur Nam[3], [1]Department of Plastic and Reconstructive Surgery, Johns Hopkins, [2]Division of Plastic and Reconstructive Surgery, University of Maryland Medical Center, and [3]Division of Plastic, Reconstructive, and Maxillofacial Surgery, Department of R. Adams Cowley Shock Trauma Center, University of Maryland School of Medicine, Baltimore, MD.

Abdominal loss of domain (LOD) is loosely defined as 50% of abdominal viscera residing outside of the abdominal cavity, however, there is no true consensus definition in the field. It presents a significant problem for many patients and can adversely impact quality of life, resulting in pain and disability. LOD is the result of a large defect in the abdominal wall (often involving both fascia and skin), resulting in protrusion of abdominal contents. This may occur after an emergent abdominal surgery with open management, abdominal surgery in the morbidly obese, or in patients needing multiple abdominal surgeries. Management tends to be varied and complex; it often involves bridging fascial defects with biologic mesh. The goals of this study are to (1) identify demographic, clinical characteristics, morbidity of patients with LOD; (2) develop clinically relevant metrics such as defect size and hernia grade to evaluate LOD severity; (3) estimate quality of life (QOL) in patients with significant LOD. To achieve these goals, we began by searching relevant CPT codes to identify and extract data from the records of patients with histories consistent with LOD and bridged defects. Subsequently, we are surveying patients meeting our selection criteria to evaluate QOL. We hypothesize that (i) the extent of abdominal wall defect or fascial bridging will correlate with clinical outcomes; (ii) compared to patients with smaller defects and bridged repairs, patients with large defects and significant LOD will have worse QOL; (iii) the extent of a patient's LOD or fascial bridging will correlate with a decreased QOL. Upon completion of my summer research, I have conducted EMR searches to screen over 300 patients by reading operative notes and looking at clinical photos. This led to identification of 9 LOD patients and 8 bridging repair patients on whom I collected clinical data from the EMR. I conducted QOL surveys on 5 LOD patients. As this research project is ongoing, we will continue collecting data and conducting surveys and will analyze collected data for trends and correlations.

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P.52

OUTCOMES OF ABDOMINAL RECONSTRUCTION AT THE TIME OF CRS AND HIPEC. Brigit Baglien*, LediBabari Millie Ngaage[1], Carly Rosen[1], Erin Rada[1], Nader Hanna[2], and Yvonne Rasko[1], [1]Division of Plastic Surgery and [2]Division of Oncology, Department of Surgery, University of Maryland School of Medicine, Baltimore, MD.

A treatment option available to patients with peritoneal metastatic cancer is Cytoreduction Surgery with Hyperthermic Intraperitoneal Chemotherapy (CRS/HIPEC). This procedure has been shown to improve survival, however, patients are often left with abdominal wall and soft tissue defects requiring further surgical correction. We aim to assess the safety and clinical outcomes of abdominal reconstruction performed concurrent with CRS/HIPEC. A retrospective chart review was conducted on patients with peritoneal metastases who received CRS/HIPEC therapy and abdominal wall reconstruction at University of Maryland Medical Center from 2012 to 2018. Records were evaluated for the patient characteristics, oncologic history, operative details, and post-operative course. Five patients met the inclusion criteria. Patient age at time of surgery ranged from

29 to 63 years and mean body mass index was 30 kg/m2 [r: 24 – 46]. The most common type of cancer within the patient cohort was colorectal cancer. To close the abdomen, four patients underwent component release, biologic mesh overlay, and adjacent tissue transfer. The last patient was closed solely with adjacent tissue transfer. Two complications occurred: atrial fibrillation during the patient's index admission (treated with diltiazem); and deep vein thrombosis (self-resolved). Only one patient was readmitted within 90 days due to a Pseudomonas-infected abdominal wound (treated with oral antibiotics). No patients experienced severe surgical complications defined as ileus, bowel perforation, fistula, metastatic recurrence of previous cancer, or re-operation. The last recorded follow up appointment for this group of patients was a median of 5.3 months [r: 2.6 – 21.9]. The patients benefitted therapeutically from combined abdominal reconstruction and CRS/HIPEC with minimal complications and good long-term survival. We advocate for the coupling of these procedures as the benefits outweigh the risks, and allows wound closure at the time of CRS/HIPEC.

P.53

CHILDREN WITH BOTH CEREBRAL MALARIA AND SEVERE MALARIAL ANEMIA HAVE A MALARIA EXPOSURE PROFILE DISTINCT FROM THOSE WITH OTHER SEVERE MALARIA SYNDROMES. Abby Goron* and Mark Travassos, Division of Infectious Diseases and Tropical Pediatrics, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD.

Sub-Saharan Africa carries a disproportionately high malaria burden—in 2015, the region accounted for 90% of cases worldwide. The Plasmodium falciparum apical merozoite antigen 1 (AMA1) appears to be essential during the invasion of host cells, eliciting an anti-parasitic immune response and has been the focus of several vaccine trials. Serological responses to AMA1 variants allows for estimates of malaria exposure and potentially immunity. We aimed to improve our understanding of how children with specific severe malaria syndromes differ in terms of malaria exposure, analyzing cases of cerebral malaria (CM), severe malarial anemia (SMA), or a combination of both (CM+SMA). Using a protein microarray of 268 AMA1 antigen variants, we measured reactivity of sera from Malian children with cerebral malaria, severe malarial anemia, and both syndromes and compared these responses to those of age-, region- and ethnicity-matched controls with mild, uncomplicated malaria episodes. Overall, sera from individual children with CM+SMA recognized an average of 97.5% of variants, while sera from those with only CM recognized 87.8% of variants, and sera from those with only SMA recognized 92.1% of variants. In terms of seroreactivity, sera from children with CM alone reacted significantly less to a subset of 39 AMA1 variants compared to sera from matched children with uncomplicated malaria. Overall, sera from children with only SMA had similar seroreactivity to AMA1 variants as matched sera from children with uncomplicated malaria, differing for only two AMA1 variants. In contrast, children with both CM+SMA exhibited greater seroreactivity to 50 of 268 AMA1 variants than sera from matched controls with uncomplicated malaria. These results indicate that children with both cerebral malarial and severe malarial anemia have a unique malaria exposure profile to variants of AMA1 compared to children with uncomplicated malaria, exhibiting stronger reactivity to particular AMA1 variants. Future work will further explore how these severe malaria syndromes differ in terms of cytokine profiles and which ones may benefit most from particular preventive and therapeutic efforts.

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