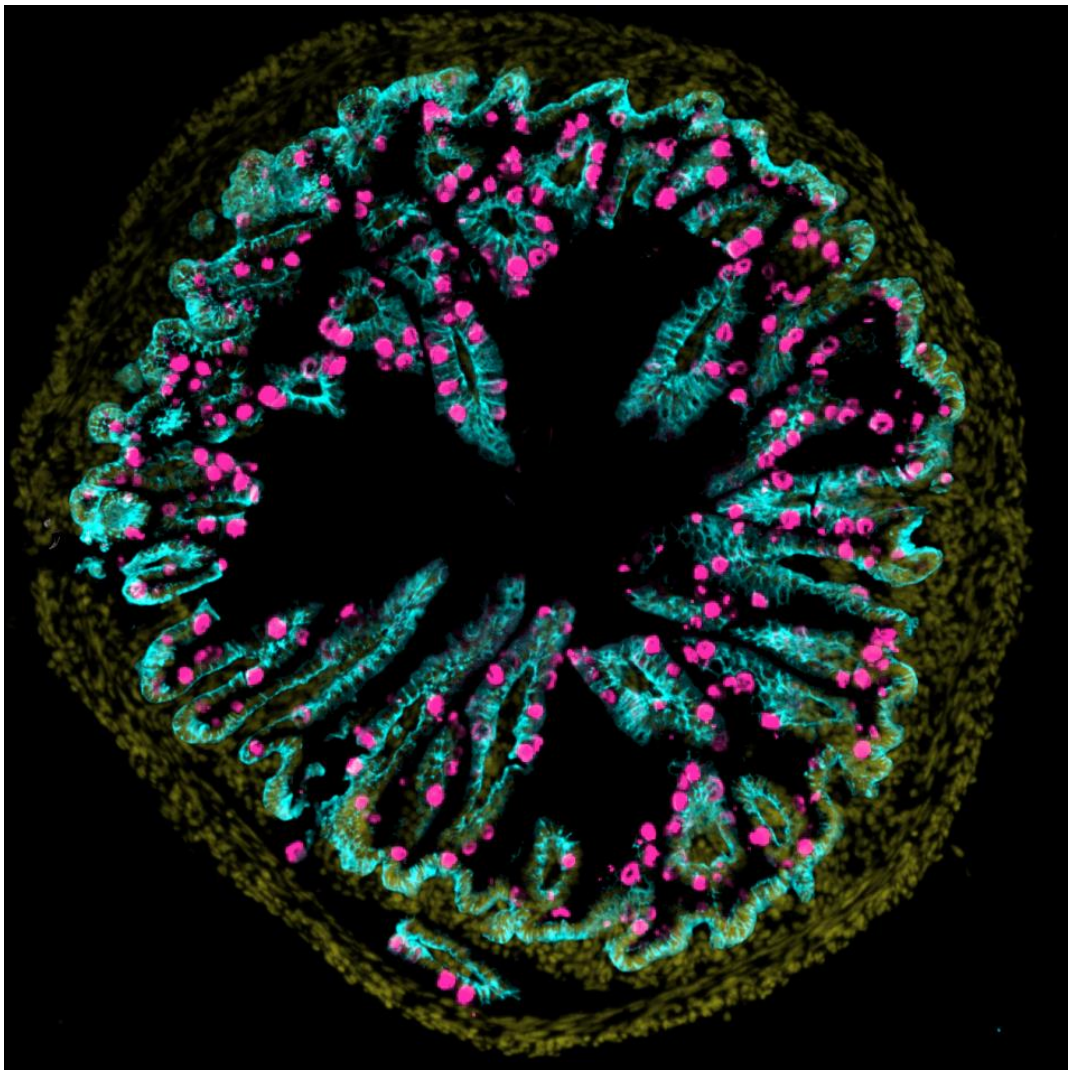
Dale J. Benos
Medical Student Research Day
(MSRD)
November 13, 2017
University of Alabama at Birmingham

"Electric Ileum"
2017 Cover Art Winner
Jeff Singer (GS5, MSTP)



MSRD 2017 JUDGES

Dr. Farrukh Afaq, Assistant Professor, Dermatology
Dr. Shama Ahmad, Associate Professor, Anesthesiology
Dr. Katie Alexander, Postdoctoral Fellow, Medicine
Dr. Amy Amara, Associate Professor, Neurology
Dr. Rebecca Arend, Assistant Professor, Ob/Gyn
Dr. Pankaj Arora, Assistant Professor, Medicine
Dr. Anju Bansal, Assistant Professor, Medicine
Dr. Mark Bevensee, Associate Professor, CDIB
Dr. Badari Birur, Assistant Professor, Psychiatry
Dr. Kirby Bland, Professor, Surgical Oncology
Dr. Sandeep Bodduluri, Instructor, Pulmonary
Dr. Mark Bolding, Associate Professor, Radiology
Dr. Santiago Borasino, Associate Professor, Pediatrics
Dr. Ayesha Bryant, Associate Professor, Anesthesiology and Perioperative Medicine
Dr. David Chaplin, Professor, Microbiology
Dr. Debasish Chattopadhyay, Professor, Medicine
Dr. Tatjana Coric, Assistant Professor, Pharmacology and Toxicology
Dr. Jessy Deshane, Associate Professor, Medicine
Dr. Carmen De Miguel, Instructor, Medicine-Nephrology
Dr. Maria El Hachem, Postdoctoral Research Fellow, Hypertension and Cardiovascular Disease
Dr. Carlos Estrada, Professor, Medicine
Dr. Sonia Fargue, Instructor, Urology
Dr, Christian Faul, Associate Professor, Medicine-Nephrology
Dr. Ricardo Franco, Assistant Professor, Medicine
Dr. Laura Fraser, Associate Professor, CDIB
Dr. William Geisler, Professor, Medicine
Dr. Pallavi Ghosh, Assistant Professor, Pediatric Emergency Medicine
Dr. Paul Goepfert, Professor, Medicine
Dr. Shuko Harada, Associate Professor, Pathology
Dr. Kim Hendershot, Associate Professor, Surgery
Dr. Bridget Hopewell, Assistant Professor, Otolaryngology
Dr. Anna Hurst, Assistant Professor, Genetics
Dr. Edward Inscho, Professor, Medicine
Dr. Kelly Kenzik, Assistant Professor, Hematology & Oncology
Dr. Harrison Kim, Associate Professor, Radiology
Dr. Gang Liu, Professor, Medicine
Dr. Runhua Liu, Assistant Professor, Genetics
Dr. Robin Lorenz, Professor, Pathology
Dr. Roslyn Mannon, Professor, Medicine
Dr. Jeanne Marrazzo, Professor, Medicine
Dr. Colin Martin, Assistant Professor, Surgery
Dr. Margaux Mustian, Resident, Surgery
Dr. Robert Oster, Professor, Medicine - Preventive Medicine
Dr. Jennifer Pollock, Professor, Medicine
Dr. Christopher Pruitt, Assistant Professor, Pediatrics
Dr. Soroush Rais-Bahrami, Assistant Professor, Urology and Radiology
Dr. Leslie Rhodes, Assistant Professor, Pediatrics
Dr. Brandon Rocque, Assistant Professor, Neurosurgery
Dr. Shannon Ross, Associate Professor, Pediatric ID
Dr. Ramaraju Rudraraju, Assistant Professor, Surgery

MSRD 2017 JUDGES Continued:

Dr. Steffanie Sabbaj, Assistant Professor, Medicine ID
Dr. Will Sasser, Assistant Professor, Pediatric Critical Care
Dr. Walter Schrading, Associate Professor, Emergency Medicine
Mr. Randy Seay, Program Manager, PSDO
Dr. Noha Sharafeldin, Instructor, Medicine
Dr. Ashwani Singal, Associate Professor, Medicine – GI Hepatology
Dr. Bhupendra Singh, Instructor, Genetics
Dr. George Solomon, Assistant Professor, Medicine
Dr. Laura Stafman, Resident / PhD Student, Surgery
Dr. Tomasz Szul, Instructor, Medicine
Dr. Valarmathi Thiruvanamalai, Assistant Professor, Biomedical Engineering
Dr. Andres Viles, Simulation Coordinator Senior, OIPS
Dr. Jared White, Assistant Professor, Surgery
Dr. Roger White, Professor, Medicine
Dr. Adele Williams, Post Doctoral Fellow, Resident,Surgery
Dr. Amanda Willig, Assistant Professor, Medicine
Dr. Chang Wu, Assistant Professor, Pediatrics
Dr. Xin Xu, Assistant Professor, Medicine

Dale J. Benos Medical Student Research Day
Monday, November 13, 2017
University of Alabama at Birmingham, Hill Student Center, 3rd Floor
1400 University Boulevard

Complete Agenda:

8:00-9:00am:	**Breakfast / Check-In**
9:00-10:15am:	**Poster Session I Presentations (Ballroom)**
10:30-11:45am:	**Poster Session II Presentations (Ballroom)**
11:45-12:15am	**Lunch**
12:15-1:45pm:	**Oral Presentations***
2:00-3:00pm:	**Award Ceremony (Alumni Theater)**

***Short Term: Ballroom**
***Intermediate & Long Term: Alumni Theater**

Oral Presentations

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Short Term Research

Emily Kennedy, MS2* **Time: 12:15-12:30pm**
Title: "Effects of Auranofin on Txnip and Pro-inflammatory Pathways in Alveolar Macrophages"
Mentor: Trent Tipple - Pediatrics, Neonatology

Richard Seeber II, MS2 **Time: 12:30-12:45pm**
Title: "Identification and Elimination of Porcine Glycan Xenoantigens: An Intermediate Report"
Mentor: Joseph Tector - Surgery

Zachariah Pinter, MS3 **Time: 12:45-1:00pm**
Title: "Posterior Capsular Release: Neurovascular Structures at Risk"
Mentor: Sameer Naranje - Division of Orthopedics

Priyanka Patel, MS2 **Time: 1:00-1:15pm**
Title: "Race Does Not Affect Length of Stay in Colorectal ERAS Patients with Post-Operative Complications"
Mentor: Gregory Kennedy - Gastrointestinal Surgery

Johnston Moore, MS2 **Time: 1:15-1:30pm**
Title: "Impact of Glucose Control and Regimen on Limb Salvage in Patients Undergoing Vascular Intervention"
Mentor: Benjamin Pearce - Division of Vascular Surgery and Endovascular Therapy

Jonny Neilson, MS2 **Time: 1:30-1:45pm**
Title: "Serotonin Mediated Neuro-Intestinal Regulation of Immune Development“
Mentor: Colin Martin - Pediatric Surgery

***Denotes First Place**

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Monday, November 13, 2017
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Intermediate Term Research

Heather Minton, MS3 **Time: 12:15-12:30pm**
Title: "Thoracic Outlet Syndrome Surgical Decompression in Adolescents"
Mentor: Brent Ponce - Orthopaedics

Kathryn Hudak, MS4* **Time: 12:30-12:45pm**
Title: "Post-Discharge Opioid Utilization after Colorectal Surgery is Modified by ERAS Pathways"
Mentor: Daniel Chu - Gastrointestinal Surgery

Stephen Gragg, GS3, MSTP **Time: 12:45-1:00pm**
Title: "Circulating MicroRNAs and Multiple Myeloma: A systematic review"
Mentor: Elizabeth Brown - Pathology

Long Term Research

Ryne Ramaker, GS3, MSTP **Time: 1:00-1:15pm**
Title: "Transcription factor binding at high occupancy target regions is driven by a small number of DNA sequence-specific interactions"
Mentor: Richard Myers - Genetics

Morgan Locy, GS4, MSTP* **Time: 1:15-1:30pm**
Title: "Protein Oxidative Tyrosine Cross-linking Disrupts Cystic Fibrosis Mucus Viscoelastic Dynamics"
Mentor: Victor Thannickal - Medicine - Pulmonary, Allergy, Critical Care

Vincent Laufer, GS5, MSTP **Time: 1:30-1:45pm**
Title: "Enabling Precision Medicine in Rheumatoid Arthritis through Prioritization of Genetic Variants in the AFF3 Locus"
Mentor: Lou Bridges - Rheumatology

***Denotes First Place**

Effects of Auranofin on Txnip and Pro-inflammatory Pathways in Alveolar Macrophages

***Emily H. Kennedy,** Stephanie Wall, Qian Li, Rui Li, Katelyn Dunigan, Rachael Wood and *Trent E. Tipple*

Introduction:

Bronchopulmonary Dysplasia (BPD) is a chronic lung disease in preterm infants. Both oxygen toxicity and inflammation contribute to the pathophysiology of BPD. Work done previously in our lab has shown that inhibiting thioredoxin reductase-1 (TrxR1) increases antioxidant mechanisms and protects against inflammation in murine lung injury models. The TrxR1 inhibitor auranofin (AFN) diminishes interleukin (IL)-1β expression and activity, but the mechanism by which this occurs is unknown. Thioredoxin-interacting protein (Txnip) regulates both inflammatory and antioxidant pathways and may contribute to the mechanism of action by which AFN decreases IL-1β.

Objectives:

The primary objective of our work is to determine the effects of AFN on Txnip expression in lipopolysaccharide (LPS)-stimulated alveolar macrophages.

Methods:

Murine alveolar macrophages (MH-S) were stimulated with LPS in the presence or absence of 0.5 μM AFN and lysates were collected. IL-1β expression was measured by qRT-PCR and ELISA. Txnip protein levels were determined by western blot.

Results:

LPS treatment increased IL-1β transcript levels by 180 fold after 2 h when compared to non-LPS stimulated cells ($p=0.0001$). In AFN-treated cells, IL-1β transcripts were 97 fold greater than in control-treated cells ($p=0.0025$). Thus, AFN significantly attenuated LPS-induced increases in IL-1β transcript levels ($p=0.0054$). At 6 h, LPS treatment increased IL-1β protein levels by 29 fold when compared to control ($p=0.0001$). Co-treatment with AFN + LPS increased IL-1β protein levels by 16.97 fold ($p=0.0043$). As observed with transcript data, LPS-induced IL-1β protein expression was almost twice that of AFN + LPS co-treated samples ($p=0.04$). Txnip attenuates responses to inflammatory stimuli so that inflammatory pathways can be activated. Txnip protein expression in LPS-treated MH-S cells was ~80% lower than in non-LPS stimulated cells. The combination of AFN + LPS also decreased Txnip levels by ~80% indicating no effect of AFN on LPS-induced alterations in Txnip expression.

Conclusions:

Macrophages significantly contribute to LPS-induced pro-inflammatory responses by increasing IL-1β. Our data suggest that AFN modulates LPS-induced inflammation by attenuating IL-1β expression. AFN had no effect on LPS-induced decreases in Txnip expression suggesting that the mechanism by which AFN alters IL-1β expression is Txnip-independent. Additional studies are being performed to determine the mechanism(s) by which AFN alters LPS-induced IL-1β expression in alveolar macrophages.

Identification and Elimination of Porcine Glycan Xenoantigens: An Intermediate Report

Richard E. Seeber II[1], *A. Joseph Tector, MD, PhD[2]*

[1]University of Alabama School of Medicine, Birmingham, AL

[2] Department of Surgery, University of Alabama at Birmingham, Birmingham, AL, USA

INTRODUCTION: Currently, more than 115,000 patients are waiting on a life-saving organ transplant in the US; however, fewer than 30,000 such surgeries are performed every year. Pig-to-human xenotransplantation of genetically-modified porcine organs may answer this national organ shortage, but porcine xenoantigens remain a barrier to clinical xenotransplantation.

OBJECTIVE: We attempted to identify and eliminate clinically-relevant porcine glycan xenoantigens.

METHODS: Sera from eight organ donors, four dialysis patients, and five plasmapheresis samples were screened for the presence of xenoantibodies by agglutination of erythrocytes taken from GGTA1/CMAH/B4GALNT2 knockout pigs generated using CRISPR/Cas9-mediated genome editing. B lymphocytes were then isolated either from selected spleens of organ donors or blood samples of dialysis and plasmapheresis patients whose sera agglutinated triple knockout erythrocytes. These were incubated with fluorescently labelled triple knockout erythrocytes and single cell sorted using fluorescence-activated cell sorting. Sorted B cells were then sent to a collaborator for production of monoclonal antibodies. In parallel, a list of 38 glycan xenoantigen-encoding gene targets was generated using databases of unitary human pseudogenes and pig glycosyltransferases. The production of monoclonal xenoantibodies and CRISPR/Cas9-mediated candidate gene knockout lines are underway.

RESULTS: Sera from five organ donors (62.5%,) three plasmapheresis patients (60%,) and two dialysis patients (50%) agglutinated triple knockout erythrocytes. Of 43,000 sorted B cells, 608 (1.41%) were sorted and sent for monoclonal xenoantibody production.

CONCLUSIONS: Our preliminary data suggest a negative flow cytometry crossmatch can be achieved for some patients in need of a life-saving organ transplant; however, some patients produce antibodies against glycan xenoantigens which may present a barrier to providing a xenotransplant. By identifying xenoantigens, we may be able to produce xenografts with lower xenoantigenicity, which could end the national organ shortage.

Posterior Capsular Release: Neurovascular Structures at Risk

Authors: **Zachariah W. Pinter, B.S.**, Sung Lee, B.S., Shelby Bergstresser, B.S., Rucker Staggers, B.S., *Sameer Naranje, M.D*., Ashish Shah, M.D.

Affiliations: Department of Surgery, Division of Orthopedics, University of Alabama-Birmingham

Background: Posterior capsular contracture is a potential consequence of osteoarthritis, post-traumatic arthritis, and surgical procedures of the knee. This can result in limited range of motion, gait problems, and pain. Many patients who undergo total knee arthroplasty will be found to have some degree of flexion contracture intraoperatively which necessitates posterior capsular release.

Objectives: The present cadaveric study investigates the safety of posterior capsular release during total knee arthroplasty.

Methods: This study involved 10 fresh-frozen cadaver specimens, each of which underwent three successive releases of the posterior capsule medially, laterally, and in the midline. One senior joint surgeon performed this procedure with a 0.5 inch curved osteotome, hugging the bone posteriorly on the distal aspect of the femur until the osteotome moved freely behind the bone without resistance. We then measured the distance from the distal aspect of the femur to the tip of the osteotome. Finally, we dissected the popliteal fossa and followed the course of the neurovascular bundle to assess for any macroscopic injury.

Results: In our study, the mean depth of penetration was 13.57cm, which exceeds the standard depth of 5 to 10 cm required for posterior capsular release. Even at this depth, 0 of the 30 penetrating events resulted in injury to the popliteal artery, tibial nerve, or popliteal vein.

Conclusion: These results demonstrate that posterior capsular release with an osteotome using a blunt technique is a safe procedure if performed using standard technique hugging the distal femur posteriorly.

Race Does Not Affect Length of Stay in Colorectal ERAS Patients with Post-Operative Complications

Priyanka K. Patel[1], BS; Daniel I. Chu[1], MD; Lauren Goss[1], MSPH; Jameson G. Wiener[1], BS; Tyler S. Wahl[1], MD, MSPH; Kyle D. Cofer[1], BS; Joshua S. Richman[1], MD, PhD; Melanie S. Morris[1], MD; Jamie A. Cannon[1], MD; *Gregory D. Kennedy[1], MD, PhD*; [1]University Of Alabama at Birmingham, Gastrointestinal Surgery, Birmingham, Alabama, USA

Introduction:
Racial disparities have been documented in surgical outcomes. Recent studies show black patients have longer length-of-stays (LOS) and higher rates of post-operative complications (POCs) than similar white patients. However, it is unclear if disparities persist between black and white patients with similar POCs. The primary aim of this study was to assess differences between minority status (white vs. non-white) in the LOS of patients with POCs with and without the Enhanced Recovery After Surgery (ERAS) pathway. We hypothesized that minority patients will have longer LOS if they suffer POCs.

Objectives: The primary objective of this study was to determine if LOS differs in minority patients with POCs with and without the ERAS pathway.

Methods:
Using a prospectively maintained database of patients undergoing colorectal surgery before and after the implementation of ERAS at a single institution, we identified patients who suffered a POC using NSQIP variables. The primary outcome was LOS. Bivariate comparisons were made between races and ERAS status using chi square tests, one-way analysis of variances, and the Kruskal-Wallis test.

Results:
The study included 1121 patients total. In the pre-ERAS cohort, there was a significant difference in LOS between minorities and whites. Among those without POCs, minorities had a longer LOS, but there was no difference in POC patients. Among the ERAS patients, LOS did not differ by minority status overall, for patients without complications, or for patients with POCs.

Conclusion:
In the pre-ERAS era, racial disparities existed with longer LOS and higher rates of POCs among minority patients. These disparities in LOS, however, appeared to be driven by patients without POCs. Under ERAS, there were no observed racial disparities in LOS, with or without POCs. The effect of ERAS on reducing disparities in LOS may therefore occur through its standardization of recovery pathways for patients without complications.

Impact of Glucose Control and Regimen on Limb Salvage in Patients Undergoing Vascular Intervention

Johnston L. Moore[1], Zdenek Novak, Mark Patterson, Marc Passman, Emily Spangler, Adam W. Beck, *Benjamin J. Pearce*[1]
[1]University Of Alabama at Birmingham, Division of Vascular Surgery And Endovascular Therapy, Birmingham, Alabama

Introduction:
Studies have demonstrated correlation between levels of glycosylated hemoglobin (HbA1c) in diabetic patients and the incidence of both peripheral artery disease (PAD) and lower extremity amputation (AMP). However, the impact of glucose control on outcomes in patients undergoing open or endovascular PAD treatment has not been examined.
Objectives:
The purpose of this study is to assess the effect of HbA1c and medication regimen on amputation-free survival (AFS) in patients undergoing treatment for limb salvage.
Methods:
Limb salvage patients with a baseline HbA1c within one month of treatment were identified from a prospectively maintained vascular registry queried from 2010-17. The hospital EMR was cross-referenced to identify patients with HbA1c measured within 3 months of the index procedure. Patient records were examined and instances of AMP, type of treatment (ENDO v OPEN), demographics, co-morbidities, and diabetic glycemic control modalities were analyzed. Diagnosis of diabetes was determined by a combination of HbA1c, physician diagnosis, and usage of diabetic medications.
Results:
Our query found 306 eligible limbs for analysis. AFS was associated with diabetes (82.6%, p=0.002), non-white race (56.5%, p=0.006), insulin-only diabetic control (52.2%, p<0.001), post-operative creatinine >1.3mg/dL (38.0%, p<0.001), and dialysis (26.1%, p<0.001). [Table 1] HbA1c was not significantly associated with AFS. Survival analysis (Kaplan-Meier plots) revealed a diagnosis of diabetes was significantly associated with worse AFS in the entire cohort (Log rank=0.011) [Graph 1] as well as in the critical limb ischemia subgroup (Log rank=0.049) (Rutherford >3) (not pictured). Logistic regression demonstrated an association with age (p=0.040, AOR=1.027), post-operative creatinine level (p=0.003, AOR=1.247), non-white race (p=0.048, AOR=0.567), and insulin-only diabetic control (p=0.002, AOR=2.535) with worse AFS across all limbs surveyed.
Conclusion:
Diabetes with insulin only regimen has significantly worse AFS than non-diabetic patients or those on an insulin sensitizing regimen. This may represent a surrogate for disease severity, but the type of medications may present a modifiable risk factor to improve limb salvage.

Acknowledgements:

The project described was supported by the Diabetes Research Center (P30 DK-079626) and the UAB Obesity Training Program (T32 DK-062710) and from the National Institute of Diabetes and Digestive and Kidney Diseases.

Serotonin Mediated Neuro-Intestinal Regulation of Immune Development

Jon H. Neilson, Kyle M. Brawner, Sara Beth Dees, Alex Chen, James Bibb PhD, *Colin A. Martin MD*

Department of Surgery, University of Alabama at Birmingham, Birmingham, Alabama

Introduction: Dysregulation of serotonin can affect intestinal susceptibility to inflammation. Serotonin is synthesized from tryptophan by tryptophan hydroxylase (TH). Tryptophan is metabolized into a variety of different molecules, some of which are ligands to the Aryl-hydrocarbon Receptor (AhR). AhR is important in intestinal immune function. We hypothesized that depleting serotonin by inhibiting TH would build up AhR ligands, limit inflammation, and increase the gut's protective barrier.

Methods: 8-week-old C57/B6 mice were treated for 5 days with a 150 mg/kg dose of the TH inhibitor 4-Chloro-L-phenylalanine (PCPA). Drug efficacy was measured through serum serotonin levels. Immune function was measured by quantifying fecal IgA by ELISA. To assess barrier function, mesenteric lymph node (MLN) samples were homogenized, plated in aerobic conditions, and colonies were counted after 3 days. AhR ligand availability was measured using a cell-based luciferase reporter assay.

Results: Serum serotonin was depleted in the treated mice from an average of 7800 ng/mL (n=3) to 4300 ng/mL (n=3, P=0.004). IgA in the stool showed no difference with treatment (n=6, P=0.89). PCPA treated MLN cultures averaged 4.5 colonies per plate (n=11) while controls averaged 1057 colonies per plate (n=6, P=0.013). The AhR luciferase assay also showed a significant increase in AhR activity in the stool showing an average light intensity of 2815 (n=3) for control and 5454 (n=3) for treated mice (P=0.013).

Conclusion: Serotonin depletion augments intestinal barrier function resulting in less bacterial translocation by MLN culture, but has no effect on IgA secretion. This could be due to increased AhR activity causing a variety of effects of the intestinal barrier. One mechanism to explain this finding could be differences in immune cell development allowing for decreased bacterial translocation in serotonin depleted mice. Targeted serotonin regulation may be a way to regulate bacterial translocation in patients at risk for infectious intestinal diseases.

Thoracic Outlet Syndrome Surgical Decompression in Adolescents

Heather L. Minton, B.S., Bradley L. Young, M.D., Erin F. Ranson, M.D.,

Richard Meyer, M.D., *Brent A. Ponce, M.D.*,

Department of Orthopaedic Surgery, University of Alabama at Birmingham, Birmingham, Alabama

Introduction: Neurogenic Thoracic Outlet Syndrome (NTOS) is an uncommon diagnosis in adolescents. This study will characterize surgical outcomes following NTOS decompression and identify relationships between perioperative factors and surgical outcomes.

Methods: A retrospective review was conducted of adolescent patients surgically treated for NTOS at a single institution from 2000 to 2015. Perioperative factors and functional outcomes were assessed using quick Disabilities of Arm, Shoulder, and Hand (quick-DASH) survey, Cervical-Brachial Symptom Questionnaire (CBSQ), visual analog scale (VAS) for pain, and Single Assessment Numeric Evaluation (SANE). Data were managed using REDCap electronic data capture tools. Analysis of variance was conducted using Statistical Analysis Software and Microsoft Excel.

Results: Study population consisted of 63 adolescents aged 8-21, with a median age of 15 years. The dominant arm was affected in 65% of patients. Mechanisms of injury included overuse (28; 47.5%) or trauma (13; 22.1%). Surgical intervention was selected in patients whom conservative management was unsuccessful. Surgical procedures were tailored to each patient and commonly involved neurolysis of brachial plexus (98.4%), anterior or (93.8%) middle scalenectomy (87.5%), and excision of anomalous tissue (40.6%). Average in-patient stay was 1.04 +/- 0.19 days. Repeat surgeries (2, 3.1%) were rare. Cervical ribs or other osseous anomalies were seen in 14.1% of patients, while soft tissue anomalies were seen in 73.4%. Long term follow-up averaging 64.2 months identified improvement in VAS of 6.14 points from preoperative average score of 8.0 and postoperative average score of 2.14. The average SANE score before surgery was 26.9 and after was 85.24. Average postoperative quickDASH and CBSQ scores were 12.23, ranging from 0 to 52.27 on a 100-point scale and 27.62 with a range from 0 to 92 on a 120-point scale, respectively.

Conclusion: Following failure of non-operative treatment, surgical decompression reliably relieves symptoms and allows reliable return to recreational activities in adolescent patients.

Post-Discharge Opioid Utilization after Colorectal Surgery is Modified by ERAS Pathways

***Kathryn E. Hudak[1]** , Lauren E. Goss, MPH[2] , Rachel K. Burton[3] , Priyanka K. Patel[1] , Elise A. Dasinger, PharmD[2] , Gregory D. Kennedy, MD, PhD[2] , Jamie A. Cannon, MD[2] , Melanie S. Morris, MD[2] , Joshua S. Richman, MD, PhD[2] , *Daniel I. Chu, MD[2]*

[1]School Of Medicine, University Of Alabama at Birmingham, Birmingham, Alabama, USA;
[2]Department Of Gastrointestinal Surgery, University Of Alabama at Birmingham, Birmingham, Alabama, USA;
[3]School Of Public Health, University Of Alabama at Birmingham, Birmingham, Alabama, USA

Introduction: Enhanced Recovery After Surgery (ERAS) pathways have been shown to decrease in-hospital opioid utilization, but their effect on post-discharge opioid utilization is unclear.

Objective: We hypothesized that patients undergoing ERAS for colorectal surgery would have decreased opioid utilization on discharge and at one-year post-discharge.

Methods: A single-institution ERAS database was used to identify all patients undergoing colorectal surgery in 2015. ERAS patients were matched by sex, race, age, indication, and procedure with pre-ERAS patients from 2013-14 to create a comparison group. Excluded were patients who died within one year of surgery, long-term dependent opioid users, and opioid users above the 99th percentile of oral morphine equivalents (OME).

Results: Of the 197 pre-ERAS and 198 ERAS patients included in this study, 89.6% were prescribed an opioid on discharge. More ERAS patients were discharged with no opioids compared to pre-ERAS patients (13.1% vs. 7.6%, p=0.07). Among those discharged with opioids, ERAS patients received an average of 403 OME and 60.6 pills vs. 343 OME and 46.9 pills for pre-ERAS ($p<0.03$ for all). However, the OME/P at discharge was significantly lower for ERAS (6.9 vs. 7.6, $p<0.01$). ERAS patients used more low-OME medications, such as tramadol (35.9% vs. 0%, $p<0.001$) and were prescribed fewer high-OME medications containing hydrocodone or oxycodone (37.9% vs. 72%, $p<0.01$). At one-year post-discharge, ERAS patients received fewer additional high-OME prescriptions (34.3% vs. 43.7%, $p<0.01$).

Conclusion: On discharge, more patients undergoing ERAS required no opioids and at one year required less opioid prescriptions. While ERAS patients discharged with opioids did receive more OMEs overall, these OMEs were distributed over more pills and ERAS patients actually received more low-potency (low OME) pills, accounting for a lower OME/P ratio. These findings suggest a potential role for ERAS in reducing post-discharge opioids utilization and an additional need to standardize post-discharge prescriptions patterns.

Circulating MicroRNAs and Multiple Myeloma: A systematic review

Stephen D. Gragg[1,2] and Elizabeth E. Brown[3,4]

[1]Medical Scientist Training Program; [2]Cell, Molecular and Developmental Biology Theme, Graduate Biomedical Sciences; [3]Department of Pathology; [4]UAB Comprehensive Cancer Center, University of Alabama at Birmingham, Birmingham, Alabama

INTRODUCTION. Several studies have purported that numerous circulating miRNA species are differentially expressed in the serum and plasma of multiple myeloma patients. However, an objective assessment of the agreement and overlap between studies has not been conducted.

OBJECTIVES. We sought to determine if there were miRNAs in the serum or plasma of multiple myeloma patients that had been consistently shown to be differentially expressed.

METHODS. We performed a systematic review of literature. We searched PubMed and Scopus for all articles related to myeloma and microRNAs. We first screened titles and abstracts (n=555), then full-text articles (n=37), retaining those publications which made direct comparisons of serum and plasma microRNAs of myeloma patients and healthy donors (n=18). We then extracted the methods and results of each study using a standardized form. Effect sizes and measures of variability were rarely reported, thereby precluding our ability to perform a meta-analysis. Therefore, we performed a qualitative summary of these analyses.

RESULTS. We observed a total of 79 circulating microRNAs, which have been evaluated in the serum or plasma of myeloma patients compared to healthy donors. Of these, 14 miRNAs were assessed in more than one study. In total, only 5 miRNAs, miR-221, -720, -16, -29a, and -92a, showed concordance across more than one study (i.e. being found consistently increased or decreased). Three miRNAs, miR-20a, -21, and -660, had discordant findings, being shown both significantly increased or decreased depending on the study.

CONCLUSIONS. Although enthusiasm for miRNA biomarker research remains strong, we demonstrate a lack of validation in the literature and inconsistencies with these findings. We advocate for replication of miRNAs using sound methods including controlling for participant covariates and hemolysis as well as the use of appropriate normalizers for RT-qPCR normalization.

Transcription factor binding at high occupancy target regions is driven by a small number of DNA sequence-specific interactions

Ryne C. Ramaker[1,2], Christopher Partridge[1], Surya B. Chhetri[3], Daniel Savic[2], Kimberly M. Newberry[2], Andrew A. Hardigan[1,2], *Richard M. Myers*[2], *Sara J. Cooper*[2]

1. Department of Genetics, University of Alabama at Birmingham, Birmingham, AL

2. Department of Genetics, HudsonAlpha Institute for Biotechnology, Huntsville, AL

3. Department of Biology, University of Alabama at Huntsville, Huntsville, AL

INTRODUCTION: Transcription factors (TFs) regulate gene expression by binding to regulatory regions, such as enhancers, which control cellular differentiation and identity. Previous cataloging of the genome-wide TF occupancy via chromatin-immunoprecipitation sequencing (ChIP-Seq) identified loci bound by an unusually large number of TFs, termed high occupancy target (HOT) regions. Subsequent debate has ensued over whether HOT regions are artifacts of the ChIP-seq assay or true biological phenomenon and, if true, how binding of dozens of TFs might be coordinated.

OBJECTIVES: We aimed to quantify the prevalence of HOT sites, assess allele bias in TF occupancy at HOT regions, and examine the specificity of TF binding in HOT regions.

METHODS: Encyclopedia of DNA Elements (ENCODE) data from two sources was analyzed for this study: post-mortem human liver tissue and a liver cancer cell line, HepG2. ChIP-seq was performed on 20 TFs in the liver tissue and 208 TFs in HepG2. RNA-sequencing and phased whole genome sequencing was performed on the primary tissue.

RESULTS: HOT sites, defined as loci containing >70 overlapping TF binding sites in HepG2 (n=5,676), represent, on average, 37.5% of a TF's binding sites. Allele bias was correlated among TFs in liver tissue and associated with allele bias in neighboring gene expression (Spearman $P<0.05x10^{-16}$). Using *K*mer-based machine learning to identify TF motifs, we find each HOT site possesses between 1-5 motifs specific to a minority of "driver" TFs. HOT sites behave as expected in an ectopic reporter assay, with mutations in "driver" TF motifs significantly altering the region's ability to drive expression upstream of a minimal promoter (t-test $P<0.05$).

CONCLUSIONS: An increasingly complete catalog of genome-wide TF occupancy has revealed HOT regions are exceptionally prevalent epigenetic phenomena. Unlikely to be a technical artifact, TF co-binding at HOT regions appears to be driven by a few highly specific TF motifs.

Protein Oxidative Tyrosine Cross-linking Disrupts Cystic Fibrosis Mucus Viscoelastic Dynamics

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Background: Cystic fibrosis (CF) is a multi-organ disease with lung morbidities being a primary cause of high mortality. Lung airway disease caused by increased viscosity and decreased clearance of neutrophil-laden mucus is an important component of CF pathobiology. Oxidative stress has been implicated in CF pathogenesis with inflammatory cells thought to be the key drivers. Oxidative tyrosine modifications, including *o,o*'-dityrosine, have been shown to be increased in sputum of CF patients, and could cause protein cross-linking associated with delayed mucociliary transport. *O,o*'-dityrosine is a stable, covalent, irreversible modification that is catalyzed by hydrogen peroxide (H_2O_2)-mediated oxidation of a heme peroxidase (hPx), such as myeloperoxidase (MPO) produced by neutrophils and macrophages. However, mechanisms of how protein-associated *o,o*'-dityrosine contributes to disease pathogenesis is unknown.

Methods: Patient-derived primary human bronchial epithelial (HBE) cells were grown in an air-liquid interface. H_2O_2 measurements were performed utilizing the hPx-dependent homovanillic acid assay. Micron-Optical Coherence Tomography was used to evaluate mucociliary transport (MCT). Data were analyzed by Student t test (mean ± SEM, $p<0.05$).

Results: We observed that CF donor-derived HBE cells produce increased extracellular H_2O_2 when compared to non-CF control cells (n=3-4 donors; 2.56 ± 0.87 vs. 0.64 ± 0.15 pmol/min; $p \leq 0.05$). MPO treatment decreased MCT 2.55 fold in CF HBE cells when compared to vehicle treated cells (n=4 donors; $p \leq 0.05$), and co-treatment with L-tyrosine, which would be expected to competitively inhibit protein *o,o*'-dityrosine cross-linking, abrogated the effect of MPO on MCT. MPO had no effect on MCT in non-CF donor-derived HBE cells.

Conclusions: These studies suggest that *o,o*'-dityrosine cross-linking delays MCT in CF, and may contribute to elevated viscoelastic properties in CF mucus. Delineating the source of H2O2 production, the proteins modified by *o,o*'-dityrosine cross-linking, and how this modification changes mucus dynamics within the lung could lead to the development of novel therapies for CF patients.

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Title: Enabling Precision Medicine in Rheumatoid Arthritis through Prioritization of Genetic Variants in the *AFF3* Locus

Introduction: Genetic variants in *AFF3* are associated with RA, including in our GWAS and ImmunoChip analyses of African-Americans (610 RA; 1543 controls). Likewise, an *AFF3* SNP (rs10865035) has been associated with response of RA to TNF inhibitors (TNFi). *AFF3* encodes LAF4, a tissue-restricted nuclear transcriptional activator expressed in monocytes and lymphocytes. Variants most strongly associated with RA are in the 5′ UTR; several are expression quantitative trait loci (eQTLs) for *AFF3*.

Objectives: We examined trans-ethnic associations of *AFF3* with RA, prioritized candidate pathogenic variants, and compared this list to variants reported to influence the likelihood of response to TNFi in RA.

Methods: We aggregated our African American RA genetic data with publicly available GWAS data from >100,000 European and Asian RA patients and controls, and conducted a trans-ethnic meta-analysis using METASOFT meta-analysis software then used the PAINTOR3 algorithm on all 3 ancestries to prioritize SNPs according to likelihood of being pathogenic. We compared this list to variants implicated in TNFi response.

Results: We found strong evidence (m>0.9) of trans-ethnic effect on RA for 91 *AFF3* variants, mostly in its 5′ UTR. We confirmed the association of the *AFF3* locus and the previously reported index variant (rs9653442) (m_{EUR}=1.000; m_{ASIAN}=0.999; m_{AFR}=0.975; $p_{TE}=1.14*10^{-15}$). We identified a set of 12 variants that together are >90% likely to include the pathogenic variant, but rs10865035 (which was previously associated with TNFi response in RA) was outside our 90% ancestry informed credible set.

Conclusion: We defined a set of 12 leading candidate pathogenic *AFF3* variants, which may act to increase *AFF3* expression in T cells or monocytes and influence RA susceptibility. Our study indicates rs10865035 probably does not contribute to in RA susceptibility, but further studies are needed to establish whether rs10865035 underlies differences in TNFi response. Our findings will guide functional studies of susceptibility to RA.

Poster Presentations

Denotes First Place*
Denotes Second Place**
Denotes Third Place***

Dale J. Benos Medical Student Research Day
Monday, November 13, 2017
University of Alabama at Birmingham, Hill Student Center, 3rd Floor
1400 University Boulevard
Poster Presentations: Ballroom

Poster Group: Cancer

1 **Briana Miller, MS2**
Handedness and Risk of Brain Tumor
Mentor: Dr. Louis Nabors - Neuro-Oncology

2 **John Ahn, MS2**
Topical Application of Plasmid-based Rinse for Oral Cancer Screening
Mentor: Dr. Jason Warram - Department of Otolaryngology

3 **Susmita Murthy, MS2**
Phenotypic characterization of somatic ZC3H11A mutations in cancer
Mentor: Dr. Akinyemi Ojesina - Epidemiology

4 **Garrett Brinkley, GS2, MSTP***
Oncometabolite L-2 Hydroxyglutarate Creates a Metabolic Liability in RCC by Suppressing the Serine and Glycine Starvation Response
Mentor: Dr. Sunil Sudarshan - Urology

5 **Timothy Norwood, MS2**
Smoldering Myocarditis Following Immune Checkpoint Blockade
Mentor: Dr. Robert Conry - Hematology/Oncology

6 **John Dasher, MS3 (did not present)**
Characteristics of cancer patients participating in presurgical lifestyle intervention trials
Mentor: Dr. Wendy Demark-Wahnefried - Department of Nutrition Sciences

7 **Callie Perkins, MS2**
An Assessment of Immunogenicity in Adolescent Women receiving Gardasil, Gardasil 9, or Cervarix : A Research Proposal
Mentor: Dr. Warner Huh - Dept of OBGYN

8 **Philip Dockery, MS2**
Historical axial bone fractures and risk of multiple myeloma
Mentor: Dr. Elizabeth Brown - Pathology

9 **Gabriel Spieler, MS2**
Using PID1 phospho-mutants to explore its activity as a tumor growth-suppressor in medulloblastoma cell lines
Mentor: Dr. Anat Erdreich-Epstein – Pediatrics

10 **Nicholas Eustace, GS4, MSTP**
Myristoylated alanine-rich C-kinase substrate peptide mimetic crosses the blood brain barrier and has cell-type specificity in glioblastoma
Mentor: Dr. John Hartman – Genetics

11 **Amena Alkeswani, MS2**
Plumbagin inhibits melanoma cell proliferation and tumorigenicity by inducing ER Stress and DDR signaling pathways
Mentor: Dr. Farrukh Afaq - Dermatology

12 **Zachary Gentry, MS2*****
Absence of Disparity in Surgical Treatment of Obese Melanoma Patients at UAB
Mentor: Dr. Thomas Wang - Division of Surgical Oncology

13 **Dewey Brooke, GS1, MSTP (did not present)**
MAPK1E322K Somatic Mutation Promotes Cell Proliferation via Positive Feedback Regulation of EGFR/RAF Signaling
Mentor: Dr.Akinyemi Ojesina - Epidemiology

14 **Stephen Ghavam, MS2 (did not present)**
Synthetic lethal analysis of 2-Hydroxyglutarate in S. cerevisia
Mentor: Dr. John Hartman - Genetics

15 **Tyler Colvin, MS2**
Reduced Margin Stereotactic Body Radiation Therapy for Early Stage Non-Small Cell Lung Cancers
Mentor: Dr. Andrew McDonald - Radiation Oncology

16 **Emily Hayward, MS2****
An emerging role for the bone marrow stroma in acute myeloid leukemia (AML)
Mentor: Dr. Rob Welner - Division of Hematology & Oncology

17 **Luke Johnson, MS3 (did not present)**
In Vivo Fluoresence Imaging of the Pelvic Ureter During Minimally Invasive Surgery for Endometrial and Cervical Cancer
Mentor: Dr. Warner Huh - Gynecologic Oncology

18 **Brendon Herring, MS2**
A Novel Near-Infrared (NIR) Dye Can Accurately Measure Human Neuroendocrine Cancer Proliferation
Mentor: Dr. Herbert Chen - Surgery

19 **Allison Montgomery, MS3 (did not present)**
Analysis of Gene Expression Patterns and Metabolomics Correlated to Obesity, Diabetes, and Outcomes in Patients with Ovarian Cancer
Mentor: Dr. Rebecca Arend - Division of Gynecologic Oncology

20 **Joann Hsu, MS3**
National Characteristics of Emergency Department Visits by Patients with Cancer in the United States
Mentor: Dr. Henry Wang - Emergency Department

21 **Andrew Hardigan, GS4, MSTP**
High-throughput identification of drug resistance mechanisms in pancreatic cancer using pooled CRISPR screening
Mentor: Dr. Richard Myers - Genetics

22 **Savannah Johnson, MS2**
Regulation of ultraviolet radiation induced cutaneous DNA damage by TIR-domain containing adapter-inducing interferon □ (TRIF)
Mentor: Dr.Nabiha Yusuf - Dermatology

24 **Roxanne Lockhart, MS2**
Role of the extracellular domain of ICAM-2 in conferring a non-metastatic phenotype in neuroblastoma
Mentor: Dr. Karina Yoon - Dept of Pharmacology and Toxicology

Poster Group: Cardiovascular and Trauma

23 **Asher Krell, GS1, MSTP*****
An Inducible Cyclin D2 Overexpression Cardiomyocyte Patch for Epicardial Repair Following Myocardial Infarction
Mentor: Dr. Jianyi Zhang - Biomedical Engineering

25 **Kevin M Wall, MS2**
Prevalence of infection secondary to perioperative methylprednisolone infusion in patients under 60 days old undergoing cardiac bypass surgery
Mentor: Dr. Santiago Borasino - Pediatrics, Division of Cardiac Critical Care

26 **Brandon M. Fox, GS5, MSTP**
Resistance Arteries of Humanized Sickle Cell Disease Mice Display Similar Sensitivity to α1-adrenergic and Endothelin-1 Vasoconstriction
Mentor: Dr. Jennifer Pollock - Nephrology

27 **Poojitha Balakrishnan, MS1 (did not present)**
Methods to Estimate Underlying Blood Pressure: The Atherosclerosis Risk in Communities (ARIC) Study
Mentor: Dr. Kunihiro Matsushita - Public Health

28 **Christopher Johnson, MS2**
Influence of Dietary Branched Chain Amino Acids on Cardiac Protein Synthesis: Role of the Cardiomyocyte Circadian Cloc
Mentor: Dr. Martin Young - Medicine

29 **Taylor Jordan, MS2****
The Utility of three iPhone Pulse Oximetry Apps: A Comparison with Standard Pulse Oximetry Measurement in the Emergency Department with Implications for Use in an Austere Environment
Mentor: Dr. Walter Schrading - Emergency Medicine

30 **Jacob Mayfield, MS2**
Atrial fibrillation in resistant hypertension patients and its correlation with primary aldosteronism
Mentor: Dr.Tanja Dudenbostel - Cardiovascular Disease

31 **Mark Pepin, GS3, MSTP***
Etiology-Dependent Epigenetic Reprogramming Occurs in Human Heart Failure
Mentor: Dr. Adam Wende - Pathology

32 **Amy Schmitt, MS2**
Sex-based differences in cardiac function in resolution receptor deficient mice
Mentor: Dr. Ganesh Halade - Division of Cardiovascular Disease, Department of Medicine

33 **Forrest Gamble, MS2**
Comparison of E/A Ratio Measurements in the Evaluation of Diastolic Function using Cardiac Magnetic Resonance
Mentor: Dr. Steven Lloyd - Division of Cardiovascular Disease

34 **Sergey Antipenko, GS5, MSTP**
Neutrophil Expansion in the Failing Heart
Mentor: Dr. Sumanth Prabhu - Cardiovascular Disease

36 **Erin McMinn, MS3**
Partners for Hypertension – A Qualitative Study of Self-Care Needs Among African Americans with Hypertension and a Designated Health Partner
Mentor: Dr. Raegan Durant - Department of Preventive Medicine

Poster Group: Education

35 **Matthew Monaco, MS2**
Assessing the Knowledge of Adults with Congenital Heart Disease with an Emphasis on Pregnancy and Reproduction
Mentor: Dr. Nathaniel Robin - Genetics

37 **Alex Woods, MS2**
Mentor: Dr. Laura Dreer - Opthamology

38 **Pranaya Chilukuri, MS2**
Simulation of Well Baby Emergencies
Mentor: Dr. Nancy Tofil - Pediatrics Critical Care

39 **Wilson Alley, MS4***
Medical Students and Transgender Patients: a Needs Assessment Survey for UASOM Curriculum
Mentor: Dr. Shawn Galin - Medicine

40 **Martha Chodaba, MS2**
Women in Medicine and Science' Innovative Curricular Elective
Mentor: Dr. Lauren Walter - Emergency Department

41 **Joshua Blackwell, MS3**
'Sensitization' of Medical Students Towards Nurse-Physician Collaboration: A Formative Assessment
Mentor: Dr. Carlos Estrada - Department of Medicine

42 **Mary (Meg) Ingram, MS3****
The Characteristics that Set Apart an Honors Student in the Internal Medicine Clerkship
Mentor: Dr. Carlos Estrada - Department of Medicine

43 **Joshua Day, MS4**
Simulation in the UAB Surgery Boot Camp
Mentor: Dr. Kimberly Hendershot - Department of Surgery

44 **Joseph L. Pearman, MS3**
Medical Students in the Surgery Clerkship–Characteristics of Honors Designation
Mentor: Dr. Carlos Estrada - Department of Medicine

Poster Group: Endocrine and Metabolic Disease

45 **Alex Dombrowsky, MS2***
Why is Hyperparathyroidism Under-diagnosed and Under-treated in Older Adults?
Mentor: Dr. Courtney Balentine - Surgery

46 **Perry Griffin, MS2**
Racial Disparity in Associations of Insulin Sensitivity and Human Myofiber Type
Mentor: Dr. Ceren Yarar-Fisher - Physical Medicine and Rehabilitation

47 **Shima A. Dowla, MS3, MSTP**
Dyslipidemia in Pediatric Non-Alcoholic Fatty Liver Disease
Mentor: Dr. Ambika Ashraf - Pediatric Endocrinology

48 **Gabrielle Lindley, MS2**
Perceptions of Body Image and Preferences for Nutrition Services Among African-American Women Living with HIV
Mentor: Dr. Amanda Willig - Infectious Diseases

49 **Griffin K. Russell, MS2**
Racial Differences in Natriuretic Peptide Response to Glucose Challenge
Mentor: Dr. Pankaj Arora - Division of Cardiovascular Disease

50 **Trey Richardson, MS2**
Clinical Characteristics and Outcomes of Pediatric Patients with Severe Hypertriglyceridemia
Mentor: Dr. Ambika Ashraf - Pediatric Endocrinology

51 **J. Paige Souder, GS2, MSTP**
Quantification of endocrine disruptor uptake in zebrafish embryos and larvae
Mentor: Dr. Daniel Gorelick - Department of Pharmacology and Toxicology

52 **Graham Skelton, MS2****
Effects of (PVPON/TA) encapsulation of islets on immunoprotection and vascularization
Mentor: Dr. Hubert Tse - Microbiology

53 **Harrison Thompson, MS2**
Small Molecule TXNIP Inhibitors Improve β-cell Function
Mentor: Dr. Anath Shalev - Med - Endocrinology, Diabetes & Metabolism

54 **Mary Barr, MS2**
Determinants of Pediatric Type 2 Diabetes Recovery
Mentor: Dr. Ambika Ashraf - Division of Pediatric Endocrinology

Poster Group: Gastrointestinal/Renal

55 **Jake Nguyen, MS1**
Esophageal function and obesity
Mentor: Dr. Jayleen Grams - GI Surgery

141 **Jeremie M. Lever, GS3, MSTP**
Parabiosis Reveals Renal Resident Leukocytes in Quiescence and Acute Kidney Injury (AKI)
Mentor: Dr. Anupam Agarwal – Nephrology

156 **John Murphy, MS2**
Assessing Necroptosis in Brain Dead Kidney Donors: Implications for Predicting Recipient Outcomes
Mentor: Dr. Roslyn Mannon - Division of Nephrology, Department of Medicine

158 **Rodrigo Muñoz, MS2**
Minimally-Invasive Ureteral Reimplantation for Primary Vesicoureteral Reflux in Children: A Systematic Review
Mentor: Dr. Pankaj Dangle - Urology

160 **John Pounders, MS2***
The effect of dietary sodium-to-potassium and African American race on arterial stiffness
Mentor: Dr. Eric Judd - Division of Nephrology, Department of Medicine

Poster Group: Genetics and Bioinformatics

56 **Andrew Fowler, MS2**
Pharmacogenomic Profiling of Pediatric Patients
Mentor: Dr. Pallavi Ghosh - Pediatric Emergency Medicine

58 **Kellie Mitchell, MS2***
PCSK9 Loss-of-function Variants and Risk of Infection and Sepsis in the Reasons for Geographic And Racial Differences in Stroke (REGARDS) Cohort
Mentor: Dr. Henry Wang - Emergency Medicine

60 **Matthew Neu, GS2, MSTP (did not present)**
Preliminary analysis of whole genome sequences of autism spectrum disorder
Mentor: Dr. Greg Cooper - HudsonAlpha/Genetics

Poster Group: Immunology and Hematology

57 **Leah Schoel, MS2***
Genetically engineered pigs as a source for clinical red blood cell transfusion
Mentor: Dr. David Cooper - Surgery - Transplantation

59 **Sushma Boppana, GS2, MSTP**
HIV-Specific CD8 T Cell Cross-Reactivity Following Ad5-Based Vaccination is Shaped by Vaccine Regimen and Prior Ad5 Exposure
Mentor: Dr. Paul Goepfert - Division of Infectious Diseases

61 **Patrick Molina, GS1, MSTP**
Effect of High Salt on ET-1 and Histone Deacetylases in Macrophages
Mentor: Dr. Jennifer Pollock - Medicine/Nephrology

62 **Emma Dean, GS1, MSTP**
Induction of the Potent Anti-Inflammatory Cytokine Interleukin 10 by Intestinal Regulatory T Cells
Mentor: Dr. Casey Weaver - Pathology

63 **Hallman TL, MS2**
Analysis of Low TCD velocities in pediatric sickle cell patients
Mentor: Dr. Lee Hilliard - Pediatrics, Division of Hematology/Oncology

64 **Jacob Files, MS2, MSTP*****
Assessing CD8 Polyfunctionality in HVTN502 Recipients Receiving Pre-Adapted and Non-Adapted Vaccines
Mentor: Dr. Paul Goepfert - Medicine

65 **Joseph Ladowski, GS4, MSTp**
Identifying Personalized Anti-MHC Class II Antibody Targets for Xenotransplant Recipients
Mentor: Dr. Joseph Tector - Transplant Surgery

66 **Blake Frey, MS2, MSTP**
Transcription factor Foxp1 negatively regulates B cell class switch
Mentor: Dr. Louis Justement - Microbiology

68 **Ryan McMonigle, GS1, MSTP****
Regulation of Transcription Factor Foxp1 in T Follicular Helper cell Differentiation During Influenza Infection
Mentor: Dr. Hui Hu - Department of Microbiology

70 **Hayden Pacl,**
Heme oxygenase-1 Protects Bone-Marrow-Derived Neutrophils Stimulated with Phorbol Myristate Acetate and Reduces Reactive Oxygen Species
Mentor: Dr. Peter Pappas - Infectious Diseases

72 **Brandon Pope, GS2, MSTP**
Enhanced IFN-γ STAT1 Signaling in CD4 T Cell Populations and Attenuated IL-2 STAT5 Signaling Contribute to the Pathogenesis of Rheumatoid Arthritis (RA)
Mentor: Dr. Chander Raman - Department of Clinical Immunology and Rheumatology

74 **Andrew Schroeder, MS2, MSTP**
Breast Cancer MHCII Expression and Radiation on T Cell Response and Repertoire
Mentor: Dr. Troy Randall - Division of Clinical Immunology and Rheumatology

Poster Group: Infectious Diseases

69 **Alexandra Fry, MS2*****
Mentor: Dr. Peter Pappas – Infectious Diseases

71 **Catherine Dodson, MS2**
IDENTIFYING PATIENT-CENTERED SEXUALLY TRANSMITTED INFECTION (STI) TESTING OPTIONS TO REDUCE HIV/STI TRANSMISSION IN MEN WHO HAVE SEX WITH MEN (MSM)
Mentor: Dr. Ellen Eaton - Department of Medicine, Division of Infectious Diseases

73 **Michael Patton, MS1, MSTP**
The Proteome of Chlamydia trachomatis Plasmid Regulated Genes
Mentor: Dr. Robin Lorenz - Pathology

75 **Jamiko Rose, MS2**
Investigating the Cumulative Burden of Chlamydia in Women Presenting to an Emergency Department
Mentor: Dr. William Geisler - Infectious Disease

76 **Anooshah Ata, MS2**
Circulating levels of pro-inflammatory cytokines are associated with increased pain sensitivity and greater clinical pain severity in people living with HIV (PLWH) and chronic pain
Mentor: Dr. Burel Goodin - Department of Anesthesiology and Perioperative Medicine and Division of Pain Medicine and Department of Psychology

77 **Jeffrey Singer, GS5, MSTP**
Late Onset Sepsis in Neonates with Dysbiosis from Altered Succession
Mentor: Dr. Casey Weaver - Pathology

78 **Sally Harrison, MS2***
Evaluation of the Cumulative Burden of Chlamydia trachomatis Infection in Females at an Adolescent Medicine Clinic
Mentor: Dr. William Geisler - Division of Infectious Diseases

79 **Chase Cox, MS2**
Universal Screening for Hepatitis C in an Inpatient Psychiatric Patient Population: Preliminary Results
Mentor: Dr. James Galbraith - Emergency Medicine

80 **Winston Joe, MS2****
Reverse Syphilis Screening Algorithm Fails to Demonstrate Cost Effectiveness in Persons Living with HIV
Mentor: Dr. Ellen Eaton - Division of Infectious Diseases

82 **Anisha Khanijow, MS2**
Antiviral Antibodies in CMV Transmission via Breast Milk
Mentor: Dr. Suresh Boppana - Pediatric Infectious Disease

84 **Kacie Oglesby, MS2**
Development and Validation of dried blood spot assay to determine maternal cytomegalovirus seroprevalence in differing racial/ethnic groups
Mentor: Dr. Shannon Ross - Department of Pediatrics, Division of Infectious Disease

86 **Kristin Olson, GS3, MSTP**
Statistical Modeling of Immunogenetic Determinants of Chlamydia Reinfection in African American Women
Mentor: Dr. William Geisler - Infectious Diseases

88 **Milza Opper, MS3**
Identification of Herpes Simplex Virus (HSV) Shedding In The Female Genital Tract Of Pregnant Women By The Xpert HSV 1/2 Assay and Routine PCR
Mentor: Dr. David Kimberlin - Pediatrics

90 **Barrie Schmitt, MS2**
Cytotoxicity of human monocyte-derived macrophages and THP-1 cells infected with Mycobacterium tuberculosis
Mentor: Dr. Adrie Steyn – Microbiology

Poster Group: Neuroscience and the Brain

81 **Ramon Reddick, MS4**
Prevalence and Assessment of Pseudobulbar Affect in the Multiple Sclerosis Patient Population
Mentor: Dr. John Rinker - Department of Neurology

83 **John Gambril, MS2**
Retinal Pigment Epithelium (RPE) Phenotypes in Donor Eyes with Age-Related Macular Degeneration (AMD)
Mentor: Dr. Christine Curcio - Department of Ophthalmology

85 **Brandon Bodie, MS4**
Impact of exercise and sleep hygiene on depressive symptoms in Parkinson's disease patients
Mentor: Dr. Amy Amara - Department of Neurology

87 **Nicholas Boyle, MS2**
Lysosomal Dysfunction in Progranulin-Deficient Primary Neurons
Mentor: Dr. Erik Roberson - Neurology

89 **Graham Cochrane, GS1, MSTP**
Visual-Vestibular Integration Tasks As Possible Biomarkers for Concussion Injury
Mentor: Dr. Jennifer Christy - Physical Therapy

91 **Ashleigh Irwin, MS2, MSTP*****
Short latency cortical potentials elicited by DBS for movement disorders: an electrocorticography study
Mentor: Dr. Harrison Walker - Neurology

92 **Mary Craig, MS4**
Effects of brain illness on visuospatial search patterns in patients undergoing acute inpatient rehabilitation
Mentor: Dr. Victor Mark - Department of Physical Medicine and Rehabilitation, Department of Neurology

93 **Kelsey Patterson, GS4, MSTP**
Regionally Enhanced CO2 Sensitivity Suggests a Role for Astrocytes in Respiratory Function During Early Postnatal Development
Mentor: Dr. Michelle Olsen - CDIB

94 **Nkele Davis, MS3**
Analysis of Factors Contributing to Concussion Risk in the NFL
Mentor: Dr. John Amburgy - Neurosurgery / Department of Engineering

96 **Adarsh Kulkarni, MS2**
Utilizing a ketogenic diet to improve neuro-recovery and metabolism following spinal cord injury (SCI)
Mentor: Dr. Ceren Yarar-Fisher - Department of Physical Medicine and Rehabilitation

98 **Fabio Raman, GS2, MSTP**
Semi-automated, Multi-modal Brain Parcellation Workflow for PET/MR Neuroimaging Analysis
Mentor: Dr. Jon McConathy - Radiology

100 **William Webb, GS4, MSTP**
Methylation of NF-κB RelA by SETD6 initiates histone mehylation in the hippocampus during fear memory consolidation
Mentor: Dr. Farah Lubin – Neurobiology

102 **J. Edward Bryant, MS2, MSTP***
Ketamine induced NMDA-receptor blockade effects on regional cerebral blood in healthy volunteers
Mentor: Dr. Nina Kraguljac - Psych - Behavioral Neurobiology

104 **Hunter Dean, MS2****
Peripheral Monocyte Entry is Required for Alpha-Synuclein Induced Inflammation and Neurodegeneration in a Model of Parkinson Disease
Mentor: Dr. Ashley Harms - Department of Neurology

Poster Group: Other

95 **Lena Zhang, MS2**
Pregnancy, Labor, and Delivery Outcomes of Women with and without Spinal Cord Injury
Mentor: Dr. Amie McLain - Physical Medicine and Rehabilitation

97 **Hannah Hashimi, MS2**
Optic nerve pit maculopathy: giant maculoschisis and treatment
Mentor: Dr. Robert Morris - Department of Ophthalmology, Associate Professor Clinical; Helen Keller Eye Research Foundation

99 **Jaime Peña Garcia, MS2**
Synergistic Effects between Cystic Fibrosis Transmembrane Conductance Regular (CFTR) Potentiators
Mentor: Dr. Bradford Woodworth – Otolaryngology

101 **Shivani Ananthasekar, MS1**
Mentor: Dr. Dhananjay Tambe - University of South Alabama College of Medicine Center for Lung Biology and Mechanical Engineering

103 **Caroline Arata, MS2**
Distribution and correlation of C-reactive protein and erythrocyte sedimentation rate in the pediatric emergency department
Mentor: Dr.Christopher Pruitt

105 **Muhan Hu, GS3, MSTP****
The DAF-7/ TGF Cascade Affects Prostaglandin Metabolism, Sperm Guidance, And Sperm Gene Expression In The Adult Hermaphrodite Gonad
Mentor: Dr. Michael Miller - CDIB

106 **Sadhvi Batra, MS3 (did not present)**
Empirical argument against using placebo controls
Mentor: Dr. Jeremy Howick - Department of Primary Care Sciences

107 **Shreya Kashyap, MS2, MSTP***
Mentor: Dr. Jonathan McConathy - Nuclear Medicine

108 **Sellers Boudreau, MS2**
Exercise During Pregnancy
Mentor: Dr. Amelia Sutton - Obstetrics

109 **Tyler McCaw, GS3, MSTP**
Induced MHCII Expression on Breast Cancer Cells Impairs Tumor Growth by Broadening the Responding T Cell Repertoire and Delaying Tumor-Specific T Cell Exhaustion
Mentor: Dr. Troy Randall - Division of Clinical Immunology and Rheumatology

110 **Michael Coker, MS3**
The Failure of MRI/US Fusion Biopsy to Accurately Localize Prostate Cancer in Conjunction with Systematic Core Biopsy
Mentor: Dr. Soroush Rais-Bahrami - Department of Urology

111 **Michelle Wang, MS3**
Outcomes of Indicated Preterm Births differ by Indication
Mentor: Dr. Lorie Harper - Maternal Fetal Medicine

112 **Helen Cunningham, MS2**
Herpes Simplex Virus Testing in Young Infants: Are we doing it right?
Mentor: Dr. Christopher Pruitt - Department of Pediatric Emergency Medicine

113 **Judi Hakim, MS2**
Association between Macular Pigment Optical Density (MPOD) and Delayed Rod-Mediated Dark Adaptation in the Early Stages of Age-Related Macular Degeneration (AMD)
Mentor: Dr. Cynthia Owsley - Ophthalmology

114 **Jamal Egbaria, MS2**
Exercise in Pregnancy: The Effects of Exercise on Post-Partum Weight Loss
Mentor: Dr. Sara Gould - Orthopedics

116 **Marius Heersink, MS2**
Surgical Outcomes Comparison of Canaloplasty during CEIOL and Trabecular Stenting: Combined Phacoemulsification, Trabecular Bypass Stenting, and Canaloplasty Versus Combined Phacoemulsification and Trabecular Stenting Alone
Mentor: Dr. Jesse Dovich - Department of Opthalmology

118 **Maani Kamal, MS1**
The Assessment of Microscopic Material Properties in Guinea Pig Sclera
Mentor: Dr. Quan Hoang - Department of Ophthalmology

120 **Timothy Kennell Jr., GS3, MSTP**
Methods for Analyzing Big Alert Data from the Electronic Health Record
Mentor: Dr. Jim Cimino - Informatics Institute

122 **Natasha Mehra, MS2****
Daily Immune Monitoring to Identify Peripheral Biomarkers in Chronic Fatigue Syndrome
Mentor: Dr. Jarred Younger – Psychology

124 **Hannah Turner, MS4 (did not present)**
Interactive Tabletop Simulation for Testing Workflow Processes
Mentor: Dr. Marjorie Lee White - Office of Interprofessional Simulation

Poster Group: Public Health Outcomes and Quality Improvement

115 **Daniel McNeill, MS3**
Evaluating nutritional and health science understanding through use of an integrated mobile kitchen curriculum in children of East Lake, Alabama
Mentor: Dr. Krista Casazza - Department of Nutrition Science

117 **Andrew Moon, MS4 (did not present)**
Marijuana Use and In-Hospital Mortality following Orthopedic Surgery
Mentor: Dr. Brent Ponce - Orthopaedics

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191 **Katie Vines, MS2**
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Mentor: Dr. Brandon Rocque - Neurosurgery

Poster: 1

Handedness and Risk of Brain Tumor

Authors: **Briana D. Miller (MS2)**, BS[1], Noah C. Peeri, MPH[2], Kathleen M. Egan, MPH, ScD[2], *L. Burt Nabors*, MD[1]
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Introduction: Gliomas are the most common type of malignant primary brain tumor, yet few risk factors have been linked to their development. Left handedness has been linked to several pathologic neurological conditions, but few studies have evaluated a connection between handedness and risk of glioma.

Objectives: The primary objective of this study was to identify whether an association exists between left-handedness and glioma development.

Methods: This was a case-control epidemiological study of patients recently diagnosed with a first primary glioma. Patients were recruited at academic medical centers in the southeastern US and completed the study a median of one month following the diagnosis. Controls were friend and acquaintances of the patient or were identified from white page listings with frequency matching to cases on age, gender, and postal zip code. Enrollment occurred between December 2004 and July 2014. Subjects were asked “are you right or left-handed” with responses recorded as “right”, “left”, or “use both hands equally.” Odds ratios and 95% confidence intervals were estimated for handedness and risk of glioma using logistic regression. Additional odds ratios were calculated for cohorts separated by tumor classification and gender, as well as laterality of tumor and season of birth.

Results: In a multivariate regression, a protective association with glioma overall was observed for left handedness (OR = 0.65, 95% CI: 0.51, 0.83) for all glioma subtypes. Significant inverse associations with glioma for left-handedness were found both in males (OR=0.73, 95% CI: 0.54, 0.99) and females (OR=0.50, 95% CI: 0.35, 0.72), adjusting for age, race, education, and residence. No significant relationship was observed between handedness and laterality of the brain tumor.

Conclusion: A reduced risk of glioma in persons reporting left handedness was observed in this study that was consistent for all subtypes of glioma as well as in both males and females. Further research on handedness and other developmental risk factors may shed light on pathogenic mechanisms in glioma.

Poster: 2

Topical Application of Plasmid-based Rinse for Oral Cancer Screening

Authors: **John C. Ahn**[1], Yolanda E. Hartman[2], Angela D. Haskins MD[2], *Jason M. Warram PhD*[2]

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Abstract

INTRODUCTION:

Current strategies for oral squamous cell carcinoma (OSCC) screening rely on physical examination alone using visual inspection and manual palpation. A highly sensitive, cost-effective, and non-invasive method for OSCC screening is needed for timely detection and accurate diagnosis. We propose the use of a topically applied oral rinse solution containing the cancer-specific pId1-SEAP-Id1-mCherry DNA plasmid coated with the transfection agent linear polyethylenimine (PEI) for enzyme based saliva screening (SEAP) and fluorescence imaging (mCherry).

OBJECTIVES:

The overall charge of the linear PEI/DNA plasmid complexes, which is defined by the N/P ratio, is crucial for efficient transfection. The purpose of the study was to determine the optimal N/P ratio in a panel of OSCC cell lines that produced the greatest reporter expression relative to Id1 levels.

METHODS:

A panel of OSCC cell lines (Fadu, Cal27, SCC1, OSC19) with varying degrees of Id1 expression was used for in vitro studies. Following manufacturer protocol, N/P ratios of 2, 3, 4, 5, and 10 were added to respective cells and incubated for 24 and 48 hr and SEAP expression was measured. Fluorescence mCherry expression was also measured. Images were analyzed and blindly graded for fluorescence quantity, intensity, and cytotoxicity.

RESULTS:

An N/P ratio of 10 produced the highest levels of SEAP expression in Fadu, SCC1, and OSC19, while levels varied in Cal27. SEAP expression correlated with Id1 expression (R^2=0.99) at N/P of 10 at 24 hr post-transfection. Optimal N/P ratio for mCherry expression varied within the cancer cell line panel.

CONCLUSION:

This study supports that higher ratio of PEI leads to higher transfection efficiency and greater reporter expression. However, further in vitro and in vivo studies must be performed in order to demonstrate the feasibility of a plasmid-based OSCC screening approach.

Poster: 3

Phenotypic characterization of somatic ZC3H11A mutations in cancer.

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Introduction: Genomic analyses from the Ojesina lab have previously identified genes that harbor somatic mutations occurring more frequently in cancerous tissues than would be expected by chance. These mutations could possibly be targets for cancer treatment, but first their functions and associated phenotypes need to be better understood. One such recently identified gene is *ZC3H11A*, located on chromosome 1q32.1, whose protein product is thought to play roles in RNA splicing and DNA damage response.

Objectives: The objective of this study was to determine the effect of two hotspot somatic mutations, L801P and S805*, found near the C terminal end of`*ZC3H11A*, on several phenotypes associated with cancer: cellular proliferation, motility, and invasiveness.

Methods: A viral vector (LV203) was used for stable transfections to overexpress constructs with wildtype and mutant *ZC3H11A* into a human embryonic kidney cell line (HA1E). Four functional assays were performed to characterize gene and mutations functions in cellular proliferation, motility, and invasiveness respectively: MTT assay, wound assay, migration assay, and soft agar colony formation assay.

Results: Proliferation rates of cells overexpressing the wildtype gene were slightly elevated compared to the empty vector. In cells expressing the L801P mutant, proliferation was further increased (p=0.034) whereas the truncated mutation S805* did not show a significant difference in proliferation. Overexpression of the wild type gene reduced cell motility compared with the empty vector, while the S805* mutant restored a faster motility rate to a level nearly the same as the empty vector. No significant differences were observed regarding invasiveness for all constructs studied.

Conclusion: The results of these phenotypic assays suggest that *ZC3H11A* mutants may possess potential tumor promoting properties, with differential effects of 2 hotspot mutations, L801P and S805* on cellular proliferation and motility, respectively.

*Contributed equally

Poster: 4

Oncometabolite L-2 Hydroxyglutarate Creates a Metabolic Liability in RCC by Suppressing the Serine and Glycine Starvation Response

Brinkley G, Shelar S, Nam H, Shim E, Kirkman R, Absher D, Sudarshan S

INTRODUCTION: Renal cell carcinoma (RCC) is among the ten most common neoplasias in the United States and is well known to undergo extensive metabolic reprogramming. Previous work by our lab has identified high levels of the oncometabolite L-2 Hydroxyglutarate (L2HG) in RCC. It is currently unknown if we can utilize metabolic liabilities created by oncometabolites for personalized RCC therapy.

OBJECTIVES: The primary objective of this study is to understand the mechanism and impact of loss of *de novo* serine and glycine biosynthesis in RCC. In turn, we will assess how this liability can be targeted therapeutically.

METHODS: This project analyzed normal renal cell line HK2 and renal cancer cell lines (RXF-393, OS-RC-2, A498, 786O, 769P, Caki1, Sn12Pm6, and A704) using lentiviral transgene or knockdown expression. Proliferation assays were counted over 4 day periods and inhibitor experiments were done at 10mM. Data was analyzed via real-time PCR and western blot. Patient samples were obtained through proper procedures at UAB. Additionally, The Cancer Genome Atlas was also analyzed.

RESULTS: Phosphoglycerate dehydrogenase (PHGDH), the first and rate-limiting step in the serine synthesis pathway, is commonly reduced in both RCC patient samples and several RCC cell lines. Lentiviral transgene L2HGDH knockdown or re-expression was able to either decrease or increase PHGDH expression respectively. Serine and glycine starvation significantly decreased proliferation in RCC cell lines with reduced PHGDH (OS-RC-2, 769P and 786O) but not in RCC cell lines with higher basal PHGDH (RXF393, Sn12pm6). Pharmacologic inhibition of serine and glycine transporters SLC38A1 and SLC38A2 (SNAT1 and SNAT2) with MeIAB decreased proliferation in 769P cells (low PHGDH) but not RXF-393 (high PHGDH), whereas inhibition of SLC1A4 and SLC1A5 (ASCT1 and ASCT2) did not alter growth of either cell line.

CONCLUSION: L2HG controls *de novo* serine and glycine synthesis in RCC cell lines. SNAT pathway inhibition via MeIAB reduces proliferation in low PHGDH RCC cell lines. Targeting serine and glycine transports looks to be a promising direction for novel, personalized RCC treatments.

Poster: 5

Smoldering Myocarditis Following Immune Checkpoint Blockade

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Background

Severe myocarditis associated with electrical conduction abnormalities and occasionally heart failure has been well documented following treatment with immune checkpoint blockade with an estimated incidence of less than 1%. However, the incidence, early detection, and management of less severe immune-related myocarditis are unknown since most immunotherapy trials have not included routine cardiac monitoring. Herein, we provide the first description of subclinical or smoldering myocarditis with minimal signs and symptoms following immune checkpoint blockade with a single dose of ipilimumab and nivolumab.

Case Presentation

Our patient was diagnosed with immune checkpoint blockade-induced myocarditis based upon an acute rise in serum cardiac troponin I beginning two weeks after the initial dose of ipilimumab/nivolumab consistent with the reported median onset of clinical myocarditis at seventeen days, as well as a lack of other causes despite extensive cardiac evaluation. The patient initially presented with intractable nausea with no known gastrointestinal etiology. High dose glucocorticoid therapy led to rapid resolution of nausea and a four-fold decrease in troponin I over four days. Serum troponin I spiked again following a steroid taper to 13 times the upper limit of normal with endomyocardial biopsy revealing collagen fibrosis and lymphocytic inflammation predominantly comprised of CD8+ T cells consistent with chronic smoldering myocarditis. Serum anti-striated muscle antibodies were also detected with no evidence of rhabdomyolysis. Serum cardiac troponin I levels as an indicator of ongoing myocyte damage gradually improved with chronic prednisone at 10 mg daily.

Conclusions

This case demonstrates that subclinical, smoldering myocarditis may occur following immune checkpoint blockade, with evidence of both humoral and cell-mediated immunity responsive to corticosteroid therapy. This experience supports early monitoring for myocarditis with serial electrocardiograms and serum troponin I determinations in patients receiving combination immune checkpoint blockade as early detection and initiation of immunosuppression may forestall fulminant presentation of this disease and limit myocardial damage.

Poster: 6

Title: **Characteristics of cancer patients participating in presurgical lifestyle intervention trials**

Authors:

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Introduction: Obesity, poor diet, and insufficient physical activity are strongly associated with an increased risk of several cancers. Preclinical studies suggest that lifestyle modifications may exert favorable effects on tumor biology. Randomized controlled trials in the presurgical setting serve as an ideal means to translate this research to humans; however, little is known about the characteristics of patients who enroll in these presurgical trials versus those who do not.

Objectives: The primary objective of this study was to compare the characteristics of adult cancer patients who enroll in presurgical trials versus those who do not.

Methods: Screening databases from three presurgical lifestyle intervention trials for breast and prostate cancer conducted at Duke University Medical Center (NCT00049309) and the University of Alabama at Birmingham (NCT02224807 and NCT01886677) were combined for analysis. Demographic and anthropometric differences between enrolled vs. non-enrolled individuals were assessed using Chi-square for categorical variables and t-tests for continuous variables.

Results: There was no difference in participation rate between overweight and obese patients. However, obese females were more likely to enroll than women who were overweight ($p=0.014$), a trend not seen in men. Women also were less likely than men to participate if their treatment center was >25 miles from their home ($p=0.034$). Patients who had completed a college degree were somewhat less likely to enroll than those with less education ($p=0.079$). Of those who did not enroll, 80% cited a lack of time.

Conclusion: Similar to other clinical trials, lack of time is a leading barrier to enrollment in presurgical studies, and travel/distance appears to be a greater barrier for women. Larger presurgical trials will require tailored strategies to enhance recruitment across gender.

Poster: 7

An Assessment of Immunogenicity in Adolescent Women receiving Gardasil, Gardasil 9, or Cervarix : A Research Proposal

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Introduction: There is overwhelming evidence that the cervical cancer vaccine will significantly reduce the incidence of HPV related cervical cancer and its precursors. As such, women, who have been previously vaccinated, may require less cervical cancer screening during their lifetime and may be able to start this screening at a later age. However, it is often difficult for patients to remember whether they were vaccinated as a young girl or adolescent. We would like to assess if it is possible to identify vaccine-specific antibodies with a simple blood draw and assay.

Objective: To establish if a blood assay can be used to determine if a woman has been previously vaccinated against HPV and if so, which vaccine was used.

Methods: We would like to draw blood samples from women vaccinated with all types of the vaccine, and from a variety of time intervals since their last vaccine. We recognize that since the nonavalent is a fairly recent vaccine, the women who will have received this vaccine are largely in the pediatric/adolescent population. Therefore, we will partner with the COA Adolescent Clinic to identify eligible participants. We will piggyback our blood draws from patients already receiving blood draws as part of their normal care routine. We will collect 2 gold top tubes of blood, and send them for a pseudovirion assay at the UAB Comprehensive Cancer Center in Dr. Rebecca Arend's Lab.

Results: None, experiment still in progress.

Potential Implications: The identification of these antibodies could be used as a point of care test in OBGYN offices to determine the schedule of screening required for the patient based on vaccination status. This would provide a practical way to implement research suggesting that vaccinated women should be screened with a different paradigm.

Poster: 8

Historical axial bone fractures and risk of multiple myeloma

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Background. Multiple myeloma (MM) is the second most common hematologic malignancy in the US. It is characterized by prolonged survival and accumulation of clonal plasma cells in the bone marrow microenvironment, presence of monoclonal protein in serum, urine or both, and end organ damage that includes skeletal destruction, defined by osteolytic lesions, pathologic fractures, and severe diffuse osteopenia. Although not all MM patients present with evidence of bone disease at diagnosis, approximately 80 percent will develop pathological fractures or osteolytic lesions over the course of their disease, accounting for significant morbidity and mortality. Evidence of bone pathology several years prior to diagnosis may provide an opportunity for improved clinical monitoring, particularly among patients diagnosed with the at-risk condition, Monoclonal Gammopathy of Undetermined Significance (MGUS).

Methods. Using participants enrolled in the Molecular And Genetic Epidemiology (iMAGE) study of myeloma (561 MM cases; 972 age-, sex-, race-matched controls), we examined the risk of MM associated with historical bone fractures and fracture location. Historical bone fractures were defined as those occurring at least 2 years prior to MM diagnosis or in controls, at the time of enrollment. Risk estimates were calculated using odds ratios and corresponding 95% confidence intervals from logistic regression adjusted for confounders.

Results. Overall, MM risk did not notably differ in cases with self-reported history of any bone fracture compared to controls (OR=0.87, CI 0.69-1.10; P=0.25). However, increased MM risk was observed among cases with any axial or pelvic girdle fracture, including those who also had appendicular fractures (OR=1.78, CI 1.08-2.93; P=0.02) and the magnitude of this effect was higher among MM cases who reported only axial or pelvic girdle fractures with no additional appendicular fractures (OR=2.68, CI 1.31-5.50; P=0.01). The association between axial or pelvic girdle fractures 2 years prior to diagnosis and the risk of MM was greater among those with fractures after age 40 (OR=2.24, CI 1.08-4.67; P=0.03) and among Blacks compared to Whites (Whites: OR=1.97, CI 0.90-4.31; P=0.09 and Blacks: OR=8.10, CI 0.82-80.51; P=0.07), albeit not significantly.

Conclusion. Our findings suggest that axial and pelvic girdle fractures, particularly among persons with MGUS, could be used to identify those patients at highest risk for progressing to MM. Early detection and intervention could promote improvements in morbidity and mortality associated with late-stage MM.

Poster: 9

Using PID1 phospho-mutants to explore its activity as a tumor growth-suppressor in medulloblastoma cell lines

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INTRODUCTION: Phosphotyrosine Interaction Domain Containing 1 (PID1) inhibits brain tumor growth and promotes apoptosis *in vitro* and in mice. Furthermore, increased PID1 mRNA levels correlate with increased survival in medulloblastoma and glioma patients. We found several serines in PID1 to be phosphorylated.

OBJECTIVES: Primary objective was to test if specific serine phosphorylation of PID1 affected its tumor suppressing activity in medulloblastoma cell lines.

METHODS: Serines at two sites in PID1 were mutated to aspartic acid (S→D; mimic constitutive phosphorylation) or to alanine (S→A; prevent serine phosphorylation). We expressed these mutants *vs.* wildtype PID1 or eGFP vector in DAOY and UW228 SHH medulloblastoma cell lines and compared proliferation (BrdU/7AAD), apoptosis (AnnexinV/7AAD) and clonogenicity.

RESULTS: BrdU/7AAD assay (n=1, DAOY) showed that S→A mutation of one of the sites blocked the growth-inhibitory effect of PID1 whereas the phosphomimic S→D PID1 mutant at that site retained the inhibitory effect of PID1. Results from the colony assay (n=3) showed the same overall pattern as the BrdU assay: S→D phosphomimic PID1 mutant had fewer colonies than the eGFP control whereas cells expressing the S→A PID1 (cannot be phosphorylated) showed no significant difference in colonies compared to the control.

CONCLUSION: Phosphorylation of PID1 at the candidate site mediates at least part of its growth inhibitory effect in DAOY cells. Ongoing work is examining these effects in additional medulloblastoma cell lines in order to assess the significance of these differences and their biological implications.

Poster: 10

Myristoylated alanine-rich C-kinase substrate peptide mimetic crosses the blood brain barrier and has cell-type specificity in glioblastoma

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INTRODUCTION: Novel therapeutics targeting highly drug and radiation resistant brain tumor-initiating cell (BTICs) are needed to improve glioblastoma's median survival past 14 months. Myristoylated alanine-rich C-Kinase substrate (MARCKS) peptide mimetic has the ability to sequester phosphatidylinositol 4,5-bisphosphate (PIP2), a heavily dysregulated phospholipid signaling molecule involved in radiation resistance, cancer stemness and cell division and invasion.
OBJECTIVES: This study tests the efficacy of a MARCKS peptide to suppress growth in sub-populations of glioblastoma (GBM) patient derived xenografts (PDX) as well as its potential to cross the blood brain barrier (BBB).
METHODS: MARCKS peptide containing a PIP2 binding domain and cell permeable TAT sequence was screened against a panel of molecularly characterized PDX lines for sensitivity using the luminescent cell viability assay CellTiter-Glo. A moderately sensitive PDX line was enriched for the BTIC marker CD133 or differentiated using serum to test for alterations in therapeutic sensitivity. Localization of MARCKS peptide within GBM was determined using a fluorescent peptide and confocal microscopy. Co-localization of MARCKS peptide in CD133+ and CD133- cells was determined using Xcyto10 quantitative fluorescent microscopy. MARCKS ability to cross the BBB was determined 3 hours post tail vein injection into athymic nude mice either with or without tumor using fluorescent microscopy of coronal brain sections.
RESULTS: The proneural line D456 was highly sensitive to MARCKS peptide at 5uM compared to control peptide, with classical lines 1046, X14 and 1016 moderately sensitive ($p<0.001$) and normal human astrocytes were least sensitive. Enrichment of CD133 increased sensitivity to peptide compared to parental lines and CD133 negative cells ($p<0.001$). MARCKS peptide accumulates throughout cytoplasm and nucleus of D456 at 6hrs and is abundant in CD133+ cells. MARCKS peptide is detectable in orthotopic implanted tumors 3 hours post tail vein injection.
CONCLUSION: MARCKS peptide can cross BBB and has selective cytotoxicity in subpopulations of GBM.

Poster: 11

Plumbagin inhibits melanoma cell proliferation and tumorigenicity by inducing ER Stress and DDR signaling pathways

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Introduction: Melanoma is a type of skin cancer that originates from melanocytes, pigment-producing cells in the basal layer of the epidermis. In 2017, an estimated 87,110 new cases and 9,730 deaths are expected in the United States. Although recent targeted therapies and immunotherapies have revolutionized the treatment of melanoma, it remains one of the most aggressive and treatment-resistant human malignancies. Therefore, there is an imperative need for exploring novel therapeutic agents. Plumbagin is a naturally occurring naphthoquinone isolated from the roots of *Plumbago zeylanica.* Its potent anti-proliferative and anti-tumorigenic properties have been observed in animal models and cell culture studies.

Objectives: The focus of this study was to determine whether plumbagin reduces melanoma cell proliferation and tumorigenicity by inducing endoplasmic reticulum (ER) stress and DNA damage response (DDR) signaling pathways.

Methods: We utilized MTT, colony assay, and western blotting to evaluate the effects of plumbagin on melanoma cell proliferation and apoptosis. Athymic nude mice subcutaneously injected with A375 melanoma cells were used to study the effects of plumbagin on tumor growth.

Results: We found that treatment of melanoma cells with plumbagin induced ER stress, evidenced by increased protein expression of GRP78, ATF4, and CHOP, and increased phosphorylation of PERK and eIF2α. Furthermore, plumbagin treatment induced DDR signaling in melanoma cells, evidenced by increased phosphorylation of ATM, ATR, CHK1/2, p53, and γ-H2AX. In athymic nude mice, plumbagin treatment resulted in inhibition of tumor growth, induction of ER stress and DDR signaling, compared to control mice.

Conclusion: These data indicate that plumbagin reduces melanoma cell proliferation and tumor growth, and induces melanoma cell apoptosis by activating the ER stress and DDR signaling. Therefore, the use of plumbagin as a single agent or as an adjuvant to current therapies could be useful for the treatment of melanoma.

Poster: 12

Absence of Disparity in Surgical Treatment of Obese Melanoma Patients at UAB

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Introduction & Objectives:

As the incidence of melanoma and obesity both increase, it is important to ensure that surgical treatment is not dictated by unproven disparities related to surgeon bias. Melanoma patients with a sentinel lymph node (SLN) exhibiting micrometastasis (positive SLN) should undergo appropriate regional lymph node dissection (LND). Because of biases that obese patients have higher incidences of postoperative complications, we hypothesized that patients with high body mass index (BMI) may have a LND less often after a positive SLN than patients with normal BMI.

Methods:

After proper IRB approval was obtained, a retrospective chart review was performed on patients treated for melanoma over an eleven-year period (2006-2016). All patients who underwent SLN biopsy for melanoma were evaluated from the UAB Tumor Registry. Multiple data points were extracted, including positive or negative SLN, burden of disease in the sentinel node, BMI, and whether or not a LND was performed. Bivariate tests and adjusted logistic regression were used to examine LND rates by BMI.

Results:

Among the 1169 patients who underwent SLN biopsies, we identified 290 patients with a positive SLN. 122 (42%) patients underwent a LND. Patients undergoing a LND had a mean BMI comparable to patients who did not undergo a LND (29.4±5.5 and 29.5±5.9, respectively). The difference in mean BMI between groups of 0.12 (95% CI -1.2- 1.4) was not significant (p=0.87). With this sample, we would have had 80% power to detect as significant a difference in means of 1.89, 90% power for 2.11, and 95% power for a difference of 2.4, providing evidence against a large disparity in BMI.

Conclusions:

This analysis suggests that there is no bias in LND rates of obese melanoma patients at UAB, which provides evidence against the existence of a disparity in melanoma care between obese and non-obese patients.

Poster: 13

MAPK1^{E322K} Somatic Mutation Promotes Cell Proliferation via Positive Feedback Regulation of EGFR/RAF Signaling

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Introduction

Cervical cancer remains the second most common type of cancer (17.8 per 100,000 women) and cause of cancer deaths (9.8 per 100,000) among all types of cancer in women. Previously, we reported significantly recurrent somatic E322K mutation in *MAPK1*, in 8% of cervical squamous cell carcinoma (CSCC). The *MAPK1* gene encodes the ERK2 protein which is the final effector of the RAS/RAK/MEK/MAPK cascade, and is a critical pathway for human cancer cell survival, dissemination, and resistance to drug therapy. Many identified mutations involving the MAPK/ERK pathway have been well characterized in human cancers, yet the role of *MAPK1* mutations in tumorigenesis remains unclear.

Objective

To determine the role of MAPK1 in tumorigenesis, we aimed to characterize the functional impact of somatic *MAPK1 E322K* mutations on cancer cell phenotype and signal transduction dysregulation.

Methods

Assessments of proliferation, migration, and invasiveness were performed on HA1E (embryonic kidney), C4-I (CSCC) cell lines expressing stable vectors of either the wild-type MAPK1 (MAPK1^{WT}), E322K mutant (MAPK1^{E322K}), and KRAS^{G12V} (positive control) using MTT assay of mitochondrial enzymatic activity, the scratch assays, Boyden Chamber assays respectively. To measure the effect of the mutation on signal transduction for cells stimulated by EGF, we performed Western blot analyses on abundance and phosphorylation of known members of the MAPK, PI3K, and MTOR pathways over a time course of 2 hours.

Results

We found that cells expressing *MAPK1^{E322K}* exhibited higher rates of proliferation and cellular mobility compared to the cells transduced with wild type *MAPK1*. However, the cells expressing wild type MAPK1 presented poor cell proliferation and cellular mobility compared to the cells transduced with the empty lentiviral vector. Western blot analyses showed two-fold increase in phosphorylation of MAPK1/ERK (T202/Y204) following EGF treatment in the cells harboring the mutation compared to the cells expressing the wild type MAPK1. A similar pattern was observed with phospho-EGFR (T669, Y1045), phospho-cRaf (S338, S259), phospho-AKT (S473, T389), and phospho-STAT5 (Y694).

Conclusion

Our data suggest that somatic *MAPK1 E322K* mutation might reinforce the positive feedback loop on EGFR and cRaf signaling in cancer. This finding contributes to the understanding of the roles of MAPK1 in the RAS/RAF-MEK-MAPK signaling pathway in cancer, and might help identifying possible therapeutic targets for HNSCC and CSCC patients with tumors harboring somatic *MAPK1^{E322K}* mutations.

* Equal contribution

Poster: 14

Synthetic lethal analysis of 2-Hydroxyglutarate in *S. cerevisiae*

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INTRODUCTION: 2-hydroxyglutarate (2-HG) is an oncometabolite that is often elevated in brain cancers and clear cell renal cell carcinoma.

OBJECTIVES: The primary objective of this study is to overexpress L-2-HG in the *Saccharomyces cerevisiae* collection of 6000 gene knockout/knockdown strains in order to identify genetic targets for killing 2-HG overproducing cancer cells.

METHODS: 2-HG expressing strains were constructed by sub-cloning the mouse LDHC, under control of a tetracycline-regulatable promoter, into yeast strains missing enzymes (*dld2 and/or dld3*) that metabolize 2-HG. Metabolites were extracted with 80% methanol and chloroform and analyzed by chiral column chromatography with mass spectrometry, a method that distinguishes the D and L isoforms of 2-HG. Growth curve analysis was used to assess whether induction of 2-HG expression affected cell proliferation. After strain construction, synthetic lethal analysis will be performed by high throughput phenotyping of the *Saccharomyces cerevisiae* 6000 gene deletion library, via induction of 2-HG expression.

RESULTS: LDHC sub-cloning was verified by PCR of genomic DNA for 4 strains (*dld2, dld3, LDHC, LDHC+dld3*), and is ongoing for 2 others (*LDHC+dld2, LDHC+dld2+dld3*). Tetracycline induction of LDHC did not alter growth, thus RT-PCR will be used to confirm expression. Metabolite extractions have been obtained, but not yet analyzed at the time of writing.

CONCLUSION: Though the basic cloning strategy has been accomplished, we are making multiple double mutants to hopefully insure optimal (high) expression of 2HG is achieved. We are still in the stage of confirming expression of 2-HG; thus far it does not cause a growth phenotype, but this is consistent with *dld2* and *dld3* overexpressing mutant strains. Expression must be confirmed by RT-PCR for LDHC and direct measurement of 2-HG. Strain construction is being performed in a background that will enable synthetic lethal analysis by introducing 2HG-expression into the haploid 6000 strain yeast gene knockout collection.

Poster: 15

Reduced Margin Stereotactic Body Radiation Therapy for Early Stage Non-Small Cell Lung Cancers

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Introduction:

While surgical resection is the standard of treatment for early stage non-small cell lung cancers (NSCLC), there is a growing role for the use of radiation in the treatment of these cancers, especially in the inoperable setting.

Purpose:

To report the clinical outcomes of patients treated with reduced-margin, fiducial-guided stereotactic body radiation therapy (SBRT) for early stage non-small cell lung cancer (NSCLC). We also sought to assess the effect of histologic subtype on local control.

Methodology:

We reviewed the charts of all patients treated with SBRT for early stage NSCLC between 2007-2017 at our institution. All patients who had implanted fiducial markers, planning target volume margins of 5mm or less, and were treated with curative intent were included. Local failure was defined as tumor recurrence on radiographic imaging or by biopsy within 1 cm of the previously treated volume, and time to local failure was measured from the beginning of SBRT. Estimates of local control were generated using the Kaplan-Meier method and differences between survival curves were assessed using the log-rank test.

Results:

A total of 194 patients met the inclusion criteria for this analysis with a median follow-up of 12 months. NSCLC histology was adenocarcinoma in 89 (45.9%) cases, squamous cell carcinoma in 78 (40.2%) cases, and other or non-subtyped in 27 (13.9%) of cases. Overall, the 2-year estimate of local control was 88.5%. The 2-year estimate of local control among patients with adenocarcinoma was 100% as compared to 84.5% for patients with squamous cell carcinoma (p=0.044) and 77.5% for patients with other histologies (p=0.003).

Conclusion:

Fiducial guided, reduced margin SBRT did not compromise local control as compared to historical standards. Decreasing treatment margins may lead to decreased radiation-induced toxicities and lower the disease burden of patients. In this series, patients with adenocarcinoma experienced improved local control as compared to squamous cell carcinoma.

Poster: 16

An emerging role for the bone marrow stroma in acute myeloid leukemia (AML)

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Introduction: Acute myeloid leukemia (AML) is an aggressive hematologic malignancy. The overall survival is less than 25 percent, primarily due to high rates of relapse. Recent studies suggest that this phenomenon may involve the bone marrow microenvironment of hematopoietic cells and the supporting tissue (stroma). Our central hypothesis is that AML alters the stroma to promote its survival and recurrence, specifically by generating a quiescent environment that shields them from chemotherapeutics targeting actively dividing cells.

Objectives: To determine what unique features allow AML to persist in the bone marrow, we conducted a large-scale examination of healthy versus leukemic stroma and focused on three major characteristics: surface markers, growth potential, and differentiation capacity.

Methods: We obtained two AML patient bone marrow samples and a healthy control. We isolated the stroma from each and transferred them into an appropriate amount of Minimum Essential Medium (MEM) with 20% fetal bovine serum (FBS). The cells were grown through passage 1 for each experiment. We subsequently utilized flow cytometry and cell counting techniques to investigate surface markers and growth, as well as the addition of differentiation media to a subset of stroma to identify variations in osteogenesis, chondrogenesis, or adipogenesis.

Results: No significant differences in growth or apoptosis were found between healthy and leukemic stroma. Subsequent studies will include modified experiments that address limitations such as small sample size and altered transcriptome.

Conclusion: While our project did not yield significant results, we are hopeful that modification of our techniques will permit future work to identify differences between healthy and leukemic stroma. Such findings would broaden our understanding of how AML survives despite our chemotherapeutic efforts. Ultimately, these stromal discoveries could be utilized both as a prognostic predictor of which patients might relapse, as well as a guide towards developing more targeted therapies.

Poster: 17

Luke Johnson

In Vivo Fluoresence Imaging of the Pelvic Ureter During Minimally Invasive Surgery for Endometrial and Cervical Cancer

John L. Johnson , Kenneth Kim, MD, Warner K. Huh, MD

Introduction: Over 600,000 hysterectomies are performed each year in the United States. Of these procedures, 70% are performed using minimally invasive approaches. The risk of ureteral injury associated with a minimally invasive approach, is as high as 2%. Previous reviews have shown that this is a significantly higher risk than open and vaginal approaches.

Objectives: The primary objective of this study was to test the viability and efficacy of in vivo fluorescence imaging of the pelvic ureter as a method of minimally invasive surgery in an animal model

Methods: This study was performed using minimally invasive surgical techniques on 12 female pigs. The pigs were separated into three groups of four. Each group was given a varying dose of fluorescent dye 30, 60, 90, and 120 mg/kg, respectively. The pelvic ureters of each pig were then inspected at the following time intervals: 0, 10, 20, 30, 40, 50, and 60 minutes post administration.The pigs were monitored for systemic and injection site adverse effects throughout the study.

Results: The fluorescent dye was used to successfully visualize the pelvic ureters of all 12 pigs at several time points with each dose. No systemic or injection site adverse-affects were observed during the course of the study.

Conclusion: Clear visualization of the ureter was achieved with each dose of the dye. The results suggest that this could be a viable visualization technique to lower the risk of ureteral injury during minimally invasive hysterectomy procedures. However, differences in pig and human anatomy could present an issue in a clinical trial.

Poster: 18

A Novel Near-Infrared (NIR) Dye Can Accurately Measure Human Neuroendocrine Cancer Proliferation

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Introduction: Patient-derived xenografts have potential to test personalized therapies prior to patient administration. However, techniques to measure cancer cell proliferation in these models are lacking.

Objective: To confirm that IR-783 accurately measures neuroendocrine (NE) cancer cell proliferation in vitro and in vivo.

Methods: NE cancer cell lines (TT, H727, UMCII, MZ, and QGP1) and non-cancerous control cells were plated in fibronectin-coated culture slides, then incubated with 20 uM IR-783 before fixation and images acquired with confocal microscopy. Single cell images were obtained with an Imagestream Flow Cytometer, and their signal intensities were measured. Dye uptake in 2D culture was measured with an In Vivo Imaging System (IVIS) and signal intensities compared to the results of the MTT assay. Furthermore, NE cancer cells transfected with Luciferase were injected into Nu/Nu mice, excised after growth, and implanted into a 3D Bioreactor system for growth to 20 days. IR-783 was added to the growth medium. The system was exposed to Luciferin before IVIS imaging for Luciferase activity and IR-783 uptake.

Results: IR-783 was retained to a higher degree in NE cancer cells compared to non-cancerous cells as detected by confocal and flow cytometry. NE cancer cells exhibited a mean maximum pixel intensity (mMPI) of 247 while non-cancerous control cells showed an mMPI of 103 (P=.015). In 2D culture, IR-783 signal intensity increased with cancer cell density. This correlation was also shown in the 3D Bioreactor system (R^2=0.49 and 0.96 for IR-783 signal and Luciferase activity, respectively)

Conclusion: As IR-783 is more internalized by NE cancer cells compared to non-cancerous cells, it is a reliable indicator of changes in NE cancer cell number in 2D culture and the 3D Bioreactor system. It could serve as a tool for detecting the cytotoxicity of drug candidates in the 3D Bioreactor system for patient-derived NE cancer cells.

Poster: 19

Analysis of Gene Expression Patterns and Metabolomics Correlated to Obesity, Diabetes, and Outcomes in Patients with Ovarian Cancer

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Introduction: Diabetes and obesity have been associated with a poor prognosis in ovarian cancer (OVCA); the exact mechanism has yet to be determined. Data suggests that obesity diminishes normal immunological response and better prognoses in non-obese patients may be attributable to an intact immune response.

Objective: To analyze the correlation between gene expression pattern/metabolomics and obesity/diabetes in OVCA patients.

Methods: UAB patients with suspected OVCA undergoing surgery were consented. Tissue was collected during cytoreduction and 35 samples were analyzed using RNAseq technology and mass spectrometry-based metabolomics. DESeq2 was used for RNAseq analysis to identify gene expression differences between diabetics and non-diabetics stratified by BMI: obese (BMI ≥30) and non-obese (BMI <30). Gene set enrichment analysis was conducted to determine whether there was an over-representation of immune pathways among altered genes. Metabolite profiles were normalized using ChromaTOF.

Results: 76 genes (p-value <0.05) were differentially expressed in the tumor samples from patients with BMI ≥30 to those <30. These genes were highly enriched for immune-related genes, including 34 immunoglobulin genes. The list of identified genes also included 3 HLA genes (HLA-G(down), HLA-H(up) and HLA-DMA(down)). Furthermore, when analyzing tumor from diabetics (n=7), there were 18 genes differentially expressed compared to controls. These genes are not statistically enriched for any functional class. Additionally, genes associated with response to platinum-based therapy, differentiating patients with BMI≥30 v. <30 were analyzed. No genes met genome-wide significance; however, there were 14 genes with a genome-wide p-value<0.1. When diabetes status as a covariate was controlled for, this number was reduced to 9.

Conclusion: By evaluating the transcriptomic profiles generated through RNAseq analysis, a significant number of differences in RNA expression were identified in comparing obese to non-obese OVCA patients. Due to the small sample size, no genes were identied as being associated with the presence or absence of diabetes.

Poster: 20

National Characteristics of Emergency Department Visits by Patients with Cancer in the United States

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PURPOSE: The Emergency Department (ED) is an important venue for the care of patients with cancer. We sought to describe the national characteristics of ED visits by patients with cancer in the United States (US).

METHODS: We performed an analysis of 2012-2014 ED visit data from the National Hospital Ambulatory Medical Care Survey (NHAMCS). We included adult (age ≥18 years) ED patients, stratified by history of cancer. Using the NHAMCS survey design and weighting variables, we estimated the annual number of adult ED visits by patients with cancer. We compared demographics, clinical characteristics, ED resource utilization, and disposition of cancer vs. non-cancer patients.

RESULTS: During 2012-2014, there were an estimated 104,836,398 annual ED visits. Patients with cancer accounted for an estimated 3,879,665 (95% CI: 3,416,435 – 4,342,895) annual ED visits. Compared with other ED patients, those with cancer were older (mean 64.8 vs. 45.4 years), more likely to arrive by Emergency Medical Services (28.0 vs. 16.9%), and experienced longer lengths of ED stay (mean 4.9 vs. 3.8 hours). Over 65% of ED patients with cancer underwent radiologic imaging; patients with cancer were almost twice as likely to undergo CT scanning. Patients with cancer were four times more likely to present with sepsis, and twice as likely to present with thrombosis. Patients with cancer were three times more likely to be admitted to the hospital than non-cancer patients.

CONCLUSIONS: Patients with cancer comprise nearly 4 million ED visits annually. The findings highlight the important role of the ED in cancer care and need for addressing acute care conditions in patients with cancer.

Poster: 21

"High-throughput identification of drug resistance mechanisms in pancreatic cancer using pooled CRISPR screening"

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* Authors contributed equally

Introduction: Pancreatic adenocarcinoma (PDAC) is the fourth leading cause of cancer death in the United States, in large part due to few effective therapeutic options and resistance of PDAC to chemotherapy. To date, efforts to identify genetic driver mutations such as $KRAS^{G12D}$ and understand PDAC functional genomics have been insufficient in guiding therapy and stratifying patient risk. Consequently, the identification of novel driver mutations capable of mediating multi-drug resistance to conventional PDAC chemotherapies has important implications for patient outcomes.

Objectives: The objective of this study was to determine mechanisms of PDAC drug-resistance to gemcitabine and three of the chemotherapies in the FOLFIRINOX regimen (5-FU, irinotecan, and oxaliplatin).

Methods: To identify genes whose loss-of-function (LOF) in PDAC confers drug resistance, we performed individual gemcitabine, 5-FU, irinotecan, and oxaliplatin treated CRISPR/Cas9 whole-genome LOF screens. Screens were performed in two different PDAC cell lines with either wild-type (BxPC3) or mutant (Panc-1) KRAS for a total of eight screening conditions.

Results: We identified 206 genes whose LOF conferred drug resistance (FDR<0.1) across five out of eight screening conditions. We confirmed 26 of these genes' expression as being significantly associated ($p<0.05$) with PDAC patient survival in three separate PDAC RNA-sequencing cohorts from ICGC, TCGA, and UAB. Significant genes such as BCL2, VDR, ERBB2 and PET100 implicate known and novel pathways in PDAC pathogenesis such as apoptosis, WNT signaling and mitochondrial biogenesis. Individual validation of these genes is ongoing, with at least VDR LOF in BxPC3 conferring significant proliferation effects and resistance to three out of four tested drugs.

Conclusion: Genome-wide CRISPR/Cas9 screening is a powerful tool for identifying mechanisms of drug resistance. We have identified genes whose LOF confers drug resistance in two PDAC cell lines and whose expression significantly associated with patient survival, providing insight into PDAC pathogenesis and potential targets for therapeutic intervention.

Poster: 22

Regulation of ultraviolet radiation induced cutaneous DNA damage by TIR-domain containing adapter-inducing interferon β (TRIF)

Authors: **Savannah N. Johnson**, Monica J. Lewis, PhD, Mohammad A. Sherwani, PhD, Abdul K. Taufique, *Nabiha Yusuf, PhD*

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INTRODUCTION: The mechanism of the repair of cyclobutane pyrimidine dimers (CPDs) in UVB induced cutaneous DNA damage is currently unknown, however some evidence suggests that type 1 interferons, produced via a pathway activated by the TRIF adaptor protein, mediate the repair.

OBJECTIVES: To determine the role of TRIF in UVB induced cutaneous DNA damage and repair.

METHODS: Mice were irradiated with 90mJ/cm^2 UVB. Both TRIF deficient and wild type (WT) mice were sacrificed at 24-hour intervals and their skin collected for immunostaining.

RESULTS: TRIF knockout mice had significantly more CPDs than the wild type (WT) mice.

CONCLUSION: The TRIF-initiated pathway plays a role in the repair of CPDs following UVB exposure. Further research is needed to establish the exact mechanism through which repair is done.

Poster: 23

An Inducible Cyclin D2 Overexpression Cardiomyocyte Patch for Epicardial Repair Following Myocardial Infarction

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Introduction: Recent advances in the field of tissue engineering have led to a large number of animal studies using stem cell derived cardiomyocytes implanted into damaged myocardium as either injection or patch formulations. However, these therapies have continued to suffer from poor cell survival and low engraftment rates due to the negligible regenerative capacity of cardiomyocytes.

Objectives: The primary objective of this study is to produce a tissue engineered cardiac muscle patch with proliferative potential through a doxycycline inducible mechanism.

Methods: A plasmid containing the cyclin D2 domain with a doxycycline inducible promoter will be transfected into a human induced pluripotent stem cell (hiPSC) line and directed towards cardiac differentiation through a small molecule WNT modulation technique. These cells will then be used to produce a fibrin cardiac patch that will be surgically implanted into a porcine MI model. The integration and engraftment of the patch will then be analyzed through calculating electrical and mechanical coupling with host myocardium as well as histological analysis.

Results: Currently a plasmid has been produced containing the inducible promoter and is being prepared for transfection. The hiPSCs were successfully differentiated into immature cardiomyocytes that begin beating on day 7 of the differentiation process. Further results pending.

Conclusion: The inducible proliferative potential of these cardiomyocytes has the potential to drastically increase cell engraftment and engineered tissue coupling to host myocardium while still minimizing risk of uncontrolled cell growth and tumor formation.

Poster: 24

Role of the extracellular domain of ICAM-2 in conferring a non-metastatic phenotype in neuroblastoma

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INTRODUCTION: Neuroblastoma (NB) is a cancer of childhood that originates from neural crest cells. Approximately half of NB patients are classified as high-risk and 5-year survival rates are less than 40% for these patients. The leading cause of death in patients diagnosed with NB is the development of metastatic disease. Currently, there are no therapies targeting inhibition of metastasis, emphasizing the need for identifying molecular interactions that regulate tumor dissemination and target metastasis.

OBJECTIVES: We noted that NB cell lines and primary tumor cells express various levels of intercellular adhesion molecule-2 (ICAM-2), a member of the immunoglobulin superfamily. Primary NB tumor cells with ICAM-2 expression are associated with a limited metastatic potential phenotype. We will further investigate if the non-metastatic phenotype conferred by ICAM-2 is due to intracellular or extracellular protein interactions.

METHODS: Experiments will compare the phenotype of SK-N-AS cells expressing either ICAM-2 WT, deletion of Ig1, deletion of Ig2, or a protein chimera expressing the extracellular domain of CD89. Vector control cells (neo) will be used. Changes in cell migration, invasion, anchorage-independent growth, and adhesion will be assessed *in vitro.*

RESULTS: Cells transfected with ICAM-2 ΔIg1 displayed inhibited cell-migration. Cells transfected with ΔIg2 and CD89ΔED did not show an inhibition in migration ($P<.0001$). CD89ΔED displays a similar migratory phenotype as controls.

CONCLUSION: We observed that in NB cells, ICAM-2 suppressed cell motility *in vitro*. Cells that expressed the CD89 extracellular domain, which was chosen due to its structural similarity to ICAM-2, demonstrated a more metastatic phenotype. ΔIg2 displayed increased migration whereas ΔIg1 displayed increased adhesion. Therefore, continuing to understand molecular events that mediate the metastatic process would facilitate development of therapeutic agents that target the process of metastasis.

Poster: 25

Prevalence of infection secondary to perioperative methylprednisolone infusion in patients under 60 days old undergoing cardiac bypass surgery

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Section of Pediatric Cardiac Critical Care Medicine

INTRODUCTION: Although many Cardiac Intensive Care Units (CICU) utilize methylprednisolone in the perioperative period for patients undergoing cardiopulmonary bypass (CPB) surgery, there is concern it may by associated with increased infection rates.

OBJECTIVES: To determine whether perioperative methylprednisolone administration is associated with increased infection rates.

METHODS: Retrospective analysis of patients under 60 days old in the CICU from June 2012 to June 2017 after CPB surgery. Cases were defined as patients who received perioperative methylprednisolone while controls were those who did not receive perioperative methylprednisolone. Primary outcome of infection was defined as positive culture or course of antibiotics for longer than 72 hours within first fourteen days post-operatively. Secondary outcomes of interest included length of mechanical ventilation, length of hospitalization, and hospital mortality.

RESULTS: Sixty-five patients were included (26 controls and 39 methylprednisolone). There were no differences between male gender (66.7% vs 53.9%, p = .30) or weight (3.17kg vs 3.28kg, p = 0.05). However, there was a significant difference between age at time of surgery (6 days vs 9 days, p = 0.005). Patients who received methylprednisolone had a significantly higher incidence of requiring antibiotics for more than 72 hours (46.1% vs 11.5%, p = 0.004) and at having least one positive culture during the first 14 days post-operatively (33.3% vs 3.9% , p = 0.005). There was no difference in length of mechanical ventilation (71 vs 69 days) or post-operative length of hospitalization (8.5 vs 12.0 days).

CONCLUSION: Perioperative methylprednisolone is associated with increased incidence of infection in patients under 60 days of age after CPB. However, this association may be skewed due to differences in the demographics of the two groups. Larger studies are warranted to further guide clinical practice regarding the use of perioperative methylprednisolone post-operatively in patients under 60 days old after CPB.

Poster: 26

Resistance Arteries of Humanized Sickle Cell Disease Mice Display Similar Sensitivity to α_1-adrenergic and Endothelin-1 Vasoconstriction

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Introduction: Sickle cell disease (SCD) patients at baseline exhibit lower diastolic blood pressure, decreased systemic vascular resistance, and reduced pulse wave velocity compared to controls. In contrast to these cardiovascular alterations in patients, investigation of the vascular reactivity of isolated aorta from SCD mice has demonstrated markedly enhanced α_1-adrenergic vasoconstriction and has contributed to the hypothesis that enhanced sensitivity to vasoconstrictors plays a role in vaso-occlusive processes in SCD.

Objectives: The aim of this study was to examine vasoconstrictor sensitivity in resistance arteries of SCD mice, as this is directly related to systemic vascular resistance and diastolic blood pressure and has greater relevance to vaso-occlusion in SCD.

Methods: Humanized SCD mice (HbSS) and humanized hemoglobin A control mice (HbAA) were utilized for all experiments. Vascular reactivity to phenylephrine (PE), endothelin-1 (ET-1), and potassium chloride (KCl) was examined in resistance mesenteric arteries (100-150µm diameter) as well as aortic reactivity to PE and KCl.

Results: Resistance mesenteric arteries from HbSS mice displayed similar EC50 (-5.81 ± 0.12 vs. -5.80 ± 0.07 log[PE, M], $p>0.05$) and Emax (133.9 ± 13.4 vs. 118.3 ± 6.7 %KCl], $p>0.05$) in response to PE compared to HbAA mice. In contrast and consistent with previous findings, aorta from HbSS mice displayed lower EC50 (-6.22 ± 0.14 vs. -6.90 ± 0.04 log[PE, M], $p=0.002$) and elevated Emax (118.7 ± 3.2 vs. 155.9 ± 5.2 %KCl], $p<0.001$) in response to PE compared to HbAA mice. ET-1 is also an important vasoconstrictor in resistance arteries and enhanced ET-1 signaling has been implicated in the pathophysiology of SCD. In response to ET-1, resistance mesenteric arteries from HbSS mice displayed similar EC50 (-7.85 ± 0.07 vs. -7.82 ± 0.05 log[ET-1, M], $p>0.05$) and Emax (104.2 ± 10.2 vs. 90.9 ± 16.5 %KCl], $p>0.05$) compared to HbAA mice. Graded concentration responses to KCl were similar between genotypes in both resistance and conduit arteries tested.

Conclusion: These data suggest regional differences in arterial sensitivity to vasoconstriction, with enhanced α_1-adrenergic vasoconstriction isolated to the aorta. Additionally, HbAA and HbSS mice have similar sensitivity to multiple vasoconstrictors in resistance arteries suggesting that enhanced vasoconstriction may not participate in vaso-occlusion and resultant tissue hypoxia in SCD.

Poster: 27

Methods to Estimate Underlying Blood Pressure: The Atherosclerosis Risk in Communities (ARIC) Study

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INTRODUCTION: Antihypertensive medications complicate studies of blood pressure (BP) natural history; BP if untreated (ªunderlying BPº) needs to be estimated.

OBJECTIVES: Our objectives were to compare validity of five missing data imputation methods to estimate underlying BP and longitudinal associations of underlying BP and age.

METHODS: We simulated BP treatment in untreated hypertensive participants from Atherosclerosis Risk in Communities (ARIC) in visits 1±5 (1987±2013) using matched treated hypertensive participants. The underlying BP was imputed: #1, set as missing; #2, add 10 mmHg for systolic, 5 mmHg for diastolic; #3, add medication class specific constant; #4, truncated normal regression; and #5, truncated normal regression including prior visit data. Longitudinal associations were estimated using linear mixed models of imputed underlying BP for simulated treated and measured BP for untreated participants.

RESULTS: Method 3 was the best-performing for systolic BP; lowest relative bias (5.3% for intercept at age 50, 0% for age coefficient) and average deviation from expected (0.04 to -1.79). Method 2 performed best for diastolic BP; lowest relative bias (0.6% intercept at age 50, 33.3% age <60, 9.1% age 60+) and average deviation (-1.25 to -1.68). Methods 4 and 5 were comparable or slightly inferior.

CONCLUSION: In conclusion, constant addition methods yielded valid and precise underlying BP and longitudinal associations compared to regression-based methods. Larger, comparative studies need to be performed to confirm the utility of the constant based methods in more diverse hypertensive patients.

Poster: 28

Influence of Dietary Branched Chain Amino Acids on Cardiac Protein Synthesis: Role of the Cardiomyocyte Circadian Clock

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Introduction: Branched chain amino acids (BCAAs) can impact protein synthesis in a number of cells, through activation of mTOR. We recently reported that the cardiomyocyte circadian clock controls mTOR in the heart. Indeed, cardiomyocyte-specific BMAL1 knockout (CBK) mice, wherein the cardiomyocyte circadian clock is chronically disrupted, results in chronic activation of mTOR and protein synthesis, ultimately causing severe cardiac dysfunction.

Objectives: There are 2 major hypotheses of this project: 1) Diets of low and high BCAAs will cause decreased and increased protein synthesis in the cardiomyocytes respectively; and 2) increased protein synthesis in CBK hearts is dependent on dietary BCAAs.

Methods: The study involves two variables: 1) Genotype [wildtype (WT) vs CBK mice] and 2) Diet [low (A), normal (B), and high (C) BCAA]. Accordingly, there were six experimental groups. The mice were fed their specific diet for four weeks. Three batches of mice (28 total) were tested. Each mouse was injected with radiolabeled phenylalanine for the assessment of protein synthesis, using procedures that are standard within the Young Laboratory.

Results: CBK C mice had the highest average heart weight, while the wildtype A mice had the lowest. When assessing protein synthesis, CBK hearts had the highest protein synthesis rates, as expected. However, mice on diet A unexpectedly had the highest average rate of protein synthesis.

Summary: Circadian disruption and high BCAAs in the diet caused an increase in heart size. These studies are continuing, in an attempt to increase sample sizes in the experimental groups.

Poster: 29

Taylor Jordan

The Utility of three iPhone Pulse Oximetry Apps: A Comparison with Standard Pulse Oximetry Measurement in the Emergency Department with Implications for Use in an Austere Environment.

INTRODUCTION: In recent years there have been an increasing number of Apps available on smart phones that claim to accurately measure blood oxygen saturation. While they could be of great use to someone in an austere environment where conventional medical equipment is unavailable, their accuracy has not yet been verified.

OBJECTIVES: The objective of this study is to determine if there is any correlation between conventional pulse oximetry measurements and those measured on iPhone applications

METHODS: The aim of this study is to perform a correlational analysis of the three selected apps with the standard pulse oximetry measurements that are currently used in UAB's hospital. Participants were recruited from UAB's Emergency Department based on an initial presentation with a Cardio/Pulmonary chief complaint or a blood oxygen saturation level of 94% or less. After verbal consent was acquired from each participant one measurement for each app was taken in a randomized order and their standard pulse oximetry measurement was recorded along with demographic information.

RESULTS:

CONCLUSION:

Poster: 30

Atrial fibrillation in resistant hypertension patients and its correlation with primary aldosteronism

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Background: Atrial fibrillation (AF), one of the most common cardiac arrhythmias, increases mortality and morbidity across the United States. One factor associated with AF is hypertension. However, there are no data of AF in patients with resistant hypertension (RHTN). Furthermore, primary aldosteronism (PA) is found in approximately 20% of these patients who are disproportionally affected by higher cardiovascular morbidity and mortality independent of blood pressure (BP). Overactivation of the renin-angiotensin-aldosterone seems to play an important role for patient outcomes and has been suggested to be related to AF.

Methods: This retrospective study examines the prevalence of AF in the entire cohort of 2,375 apparent resistant hypertension patients from the UAB hypertension clinic seen from 2001 to 2017. The prevalence of AF was further examined by age, gender, and race.

Results: Characteristics including comorbidities and biochemical analysis of the entire cohort, in patients with and without AF, and with and without PA are shown in Table 1. The prevalence of AF was 6.96% for the entire cohort.

Patients with AF had more hyperlipidemia, heart failure, obstructive sleep apnea, chronic kidney disease, and coronary artery disease compared to non-AF patients. Biochemical analysis showed a non-significant trend to higher plasma aldosterone levels, lower renin levels (2.4$\pm$4.9 vs 3.9$\pm$9.2 ng/ml/h, p=0.0011) and a higher ARR than non-AF patients (14.7$\pm$15.3 vs 12.1$\pm$14.5, p=0.044), suggesting that aldosterone excess may play a role. When stratified to PA vs non-PA, patients >60 years with PA had a significant higher prevalence of AF (18.5% vs 6.9%, p=0.009) compared to non-PA resistant hypertensive patients by univariate analysis.

Conclusion: These results suggest that activation of the cardiac mineralocorticoid system may play an important role in patients with atrial fibrillation. Improving our understanding of the mechanisms underlying AF and the potential benefit of mineralocorticoid receptor antagonism are future key steps to develop effective strategies for the prevention and treatment of AF.

Poster: 31

Etiology-Dependent Epigenetic Reprogramming Occurs in Human Heart Failure

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Background: Heart failure (HF) is the clinical endpoint of numerous chronic disease processes, including ischemic heart disease and diabetes mellitus. The cardiac pathophysiology is similarly diverse, with metabolic disruptions that differ between ischemic HF -which reverts to a glycolytic state- and diabetic HF, which remains dependent upon fatty acids. Of the proposed mechanisms, epigenetics is uniquely poised to explain the persistent transcriptional sequelae that occur from even transient exposure to cellular stresses, including hypoxia and nutrient excess. However, the contribution of DNA methylation, a known epigenetic modification, to the development of adverse cardiac remodeling remains unknown. Furthermore, it remains unknown whether HF pathogenesis follows a common pathway, or whether the various etiologies possess distinct mechanisms.

Objective: To test the hypothesis that differential DNA methylation defines etiologic differences in HF, reflecting the known shift in metabolic substrate preference that characterizes ischemic and diabetic HF.

Methods: Left ventricle samples obtained from 11 human subjects with NYHA Class IV heart failure were analyzed via whole-genome DNA methylation and gene expression via Infinium Methyl450k array and RNA sequencing analyses, respectively.

Results: Combined RNA and DNA methylation analysis of ischemic heart failure reflects gene expression consistent with the departure from aerobic metabolism towards anaerobic glycolysis as defined by promoter-associated hyper-methylation and concomitant gene silencing of 22 pathway intermediates involved in TCA cycle, β oxidation, and electron transport chain. In diabetic HF, we identified the epigenetic cofactor GADD45B as a likely mediator of the differential DNA demethylation; which has been previously shown in other tissues to sense oxidative stress associated with fatty acid metabolism.

Conclusion: This study identifies DNA methylation as a likely regulator of the cardiac metabolic response to an etiologic stress. Specifically, we identify GADD45B as a coactivator of DNA demethylation that likely regulates diabetes-associated demethylation of in response to fatty acid-associated oxidative stress.

Poster: 32

Sex-based differences in cardiac function in resolution receptor deficient mice

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INTRODUCTION: Men and women respond differently to the same treatments in cardiovascular pathology leading to heterogenous outcome. The differences in cardiovascular disease between men and women is incompletely undeterstood. Therefore, we aimed to focus on cardiac physiology and mechanisms of ischemic disease between the sexes.

OBJECTIVES: The primary objective was to determine the sex-based differences in cardiac physiology using resolution sensor formyl peptide receptor (FPR2) deficient knockout mouse model that leads to the development of spontaneous obesity within two months of age.

METHODS: The sex-differences of cardiac function in wild-type and FPR2 knock-out mice were determined using high resolution ultrasound (Vevo 3100, VisualSonics Inc.) and electrocardiography (ECG). Myocardial infarctions were induced in mice via ligation of the left anterior descending (LAD) artery using minimally invasive surgery.

RESULTS: There were minimal changes seen in ECG parameters of wild type (WT) versus FPR2KO, indicating no sex-based differences in the heart electrical physiology. Ejection fraction was measured to be higher in male mice compared to female mice in both FPR2KO and WT groups. Global longitudinal strain (GLS) was measured to be -24.61 $\pm$ 2.08 in male WT, and -17.52 $\pm$ 2.02 in male FPR2KO; similarly, female WT GLS measured -17.05 $\pm$ 1.3 and female FPR2KO measured -13.36 $\pm$ 0.73. Female FPR2KO mice showed more strain dyssynchrony comapred with male counterparts. Early stages of strain analysis post-MI day five showed male WT GLS to be -7.11 $\pm$ 1.34, compared to male FPR2KO GLS measuring -3.92 $\pm$ 2.80, indicative of worsening heart function.

CONCLUSION: WT and FPR2KO female mice were found to have lower ejection fraction and lower strain measurements compared with male counterparts, as well as higher dyssynchrony compared to male mice. Preliminary tests showed that male FPR2KO mice had decreased strain compared with WT post-MI, which will be important in future investigations in post-MI analyses of female mice.

Poster: 33

Comparison of E/A Ratio Measurements in the Evaluation of Diastolic Function using Cardiac Magnetic Resonance

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INTRODUCTION: Cardiac Magnetic Resonance Imaging (CMR) is used to evaluate systolic function and has been proposed to evaluate diastolic function. Using Doppler echocardiography, a common way to determine diastolic function is to measure mitral valve inflow using the early:late (E/A) ratio, but while similar assessments are performed with CMR methods, limited data exist for CMR assessment of diastolic filling. There are two methods to determine E/A ratio using CMR. The first uses cine CMR to measure the change in left ventricle (LV) volume over time during diastole. The other uses phase contrast (PC) velocity measurements, to determine the flow through the mitral valve plane during early and late filling.

OBJECTIVE: The objective of this work is to compare the PC and volume method for determining E/A ratios using CMR.

METHODS: Patients were scanned with a GE 1.5-T Magnetic Resonance scanner using both Cine and PC-CMR. Of the 54 patients measured, 15 patients were excluded based on E and A wave fusion due to either atrial fibrillation or uninterpretable PC, leaving 39 total patients, 25 with hypertension and 14 controls. Bland-Altman analysis was performed.

RESULTS: The average E/A ratios were 1.38 (PC) and for 1.46 (volume method). Using Bland-Altman analysis, the mean of the differences was 0.049 ±0.48, with limits of agreement of 1.01 and -0.91. 10 and 12 patients were considered having normal diastolic function for the PC and volume method respectively. For 3 patients, PC considered the patient normal while the volume method considered the patient abnormal, and the reverse occurred one time.

Conclusion:

Agreement between the two methods was generally good for the measure of the E/A ratio. Advantages of PC-CMR include rapid analysis; disadvantages include a significant number of patients with E and A wave fusion. Assessment from cine CMR is robust but more time consuming.

Poster: 34

Neutrophil Expansion in the Failing Heart

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Introduction: Prior work by us and others has demonstrated that heart failure (HF) is a state of chronic and inappropriately sustained inflammation. In other chronic inflammatory diseases such as rheumatoid arthritis and chronic obstructive pulmonary disease, neutrophils play a key role in sustaining inflammation. In the context of HF, however, the role of neutrophils in promoting the inflammatory milieu and tissue damage that leads to pathological cardiac remodeling is unknown.

Objective: The primary objective of this study was to determine if HF is accompanied by neutrophil expansion in failing heart during the late phase of pathological remodeling after myocardial infarction (MI).

Methods: Male C57BL/6 mice (8-12 week old) were subjected to permanent coronary ligation to induce HF, or sham operation, and cardiac (dys)function was quantified by serial echocardiography starting 2 d after operation. Heart function and morphology in sham and HF mice were evaluated at 8 w to establish chronic failure. Immune cells were isolated from heart, spleen, and peripheral blood, and the presence of $CD45^+Ly6G^+CD11b^+$ neutrophils determined by flow cytometry.

Results: Eighteen mice were examined (8 post-MI HF, 10 sham-operated). Mice with HF exhibited cardiac hypertrophy by gravimetry (11.97 ± 0.93 mg vs 9.68 ± 0.81 mg heart weight/mm tibia length, $p < 0.0001$) and reduced left ventricular (LV) systolic function as compared with sham-operated mice (LV ejection fraction 27.92 ± 12.64% vs 56.02 ± 12.47%, $p = 0.0002$). Neutrophils in whole hearts were found to be increased ~3-fold 8 weeks post-MI in infarcted mice as compared with sham (17,254 ± 5,348 vs 5,497 ± 3,816 neutrophils/heart, $p = 0.0005$). Neutrophil levels in peripheral blood and spleen after MI were similar in the sham and HF groups, although there was a trend towards increased neutrophils in the spleen ($3.69 \pm 3.00 \times 10^6$ vs $1.83 \pm 1.30 \times 10^6$ neutrophils/spleen, $p = 0.095$).

Conclusion: Neutrophils were found to be elevated specifically in failing hearts and not in peripheral blood or spleen suggesting they may localize to the failing heart and contribute to persistent inflammation and impaired LV function and remodeling. In future studies, the contribution of elevated neutrophils to depressed LV function and adverse remodeling in HF will be determined in using genetic and antibody-based approaches to neutrophil depletion.

Poster: 35

Assessing the Knowledge of Adults with Congenital Heart Disease with an Emphasis on Pregnancy and Reproduction.

Authors:

Matthew D. Monaco, Marc G. Cribbs, MD, Walter H. Johnson, MD, *Nathaniel H. Robin, MD*.

Introduction:

Advances in the surgical and medical treatment of newborns and children with congenital heart disease (CHD) has had a drastic effect on their survival into adulthood, with this patient population now numbering over 1.3 million. As we have seen with other conditions that were previously associated with limited life expectancy (eg, cystic fibrosis, CF), this has also been accompanied by new challenges. One such issue is reproduction. Pregnancy with a CHD has its own special medical concerns, including the risk of having a similarly affected child. What is unknown is the level of knowledge that adult CHD patients have regarding these topics.

Objectives:

The goal of this study is to ascertain the knowledge of adult CHD patients on their reproductive risks.

Methods:

Our plan is to utilize a survey-based study of adult CHDS patients. The survey will be adapted from that previously used to study the knowledge of their reproductive risks and options of adolescents and young adults with CF (reference).

We will survey subjects ascertained through Alabama Congenital Heart Disease Program (ACHDP). The plan is to have ACHDP physicians distribute the survey during clinic hours to these patients.

To date we have developed the questionnaire and submitted our proposal to the UAB IRB. We plan to distribute the surveys in the Spring-Summer 2018, and analyze survey responses to determine if critical gaps exist in patient knowledge.

Results: TBD

Conclusion: TBD

Poster: 36

Partners for Hypertension – A Qualitative Study of Self-Care Needs Among African Americans with Hypertension and a Designated Health Partner

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Introduction: Hypertension affects 1 in 3 U.S. adults, with even higher rates among certain racial and regional subgroups such as African Americans and residents of the Southeastern U.S. [1]. Although African Americans are more likely to be aware of and to receive treatment for hypertension compared to whites, they are 27% less likely to achieve blood pressure control [2]. Thus, we sought to address the self-care needs of African Americans with hypertension and their designated "health partners" in Birmingham, AL.

Objectives: 1) Determine the self-care support needs of African Americans with hypertension and their designated health partners. 2) Design an educational manual to improve self-care efforts.

Methods: Participants with self-reported hypertension were recruited from New Hope Baptist Church in Birmingham. Participants each identified a designated "health partner"—an acquaintance or family member to participate in self-care efforts. Four semi-structured focus groups were conducted using nominal group technique to include all individuals and prioritize discussed needs. Two coders analyzed the transcripts and identified the most prominent themes, which were corroborated by an advisory board as representative of thoughts expressed in the focus groups.

Results: Eight themes were identified and corroborated: 1) Positive social support is provided through emotional support and participation in self-care activities. 2) Medication non-adherence stems from an aversion to taking medicine. 3) Strict daily routines can optimize medication adherence. 4) Beliefs about the causes of hypertension vary among individuals. 5) Relaxation can improve blood pressure. 6) Efforts to improve blood pressure are driven by a desire to take fewer medications. 7) Symptoms of hypertension are a real-time indication of actual blood pressure. 8) Adherence to self-care behaviors is limited by motivation.

Conclusion: Several beliefs about hypertension and hypertension self-care approaches were identified. These beliefs may inform efforts to create educational content to improve hypertension self-care in similar populations.

1. Go, A.S., et al., *Heart Disease and Stroke Statistics—2013 Update: A Report From the American Heart Association.* Circulation, 2013. **127**(1): p. e6-e245.
2. Howard, G., et al., *Racial and geographic differences in awareness, treatment, and control of hypertension: the REasons for Geographic And Racial Differences in Stroke study.* Stroke, 2006. **37**(5): p. 1171-8.

Poster: 37

Alex Woods

INTRODUCTION: Concussions in youth under the age of 18 is a prevalent issue that every school in the country has to face. School nurses are the designated primary caretakers for these students who become concussed. It is critical that they have proper education on concussions to best care for students.

OBJECTIVES: The objective of this study was to evaluate school nurses level of knowledge on concussion, TBI's, and Post-concussion syndrome in addition to accessing school concussion management policies.

METHODS: A convenience sample of 80 Alabama school nurses were given a survey on concussion management. The survey was developed to obtain demographic information on school nurses and their schools, their previous concussion management experiences, policies the school uses for Return-To-Learn (RTL), information on if the school has a designated person(s) to coordinate concussion care, and their preferences for who that person(s) should be. Additionally, 55 true false questions regarding concussion scenarios and common knowledge were included.

RESULTS: The results indicate school nurses report feeling fairly confident and knowledgeable about concussion management (86%). However, many of their answers to the True/False portion of the survey show a lack of knowledge on concussions and concussion protocol. Interestingly, school nurses reported a lack of a primary school contact person for informing the school about concussions (57%). Furthermore, they reported their school systems did not have a formal concussion management policy on return-to-learn or return-to-play guidelines in place within their school systems (76%).

CONCLUSION: These findings suggest the need for uniform return-to-learn policies to be adopted via State Departments of Education. School nurses also need further training (e.g., continuing education workshops). These results will help inform education efforts for school nurses and rehabilitation providers working with school systems and the potential for the creation of state-wide concussion management policies for return-to-learn following youth concussion.

Poster: 38

Simulation of Well Baby Emergencies

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Background

After birth, stable term and near-term infants are admitted to the Newborn Nursery. Since these are healthy newborns, most of their time is spent rooming in with their mothers in the post-partum unit. Pediatric residents (with a supervising attending) and nurses are the primary healthcare workers caring for these patients. Medical emergencies rarely occur in this low-risk population. However, when a medical emergency does occur, prompt recognition, rapid response and proper treatment of the deteriorating newborn by the healthcare team is paramount.

Hypothesis

Providing simulation training to the Newborn Nursery staff (pediatrics residents and newborn nursery nurses) in caring for newborns experiencing medical emergencies will increase the comfort level of the staff, identify potential systems issues and strategies to improve patient care.

Methods

Two newborn emergency simulation cases were designed and piloted. Case 1 consisted of a newborn with progressively worsening respiratory distress and apnea. Expected management included recognition of respiratory distress and apnea, calling for help, and effectively performing bag valve mask ventilation. Case 2 consisted of a progressively lethargic newborn experiencing a seizure related to hypoglycemia. Expected management included checking a capillary blood glucose level, inserting an intravenous catheter, and administering the correct dose of intravenous dextrose. Debriefing occurred after each scenario focusing on the expected management of each condition, identification of any issues hindering patient care, and strategies to improve identified issues. Participants filled out surveys assessing comfort level with newborn medical emergencies pre- and post- simulation training.

Results

Over a 9-month period, 34 learners (20 nurses and 14 resident physicians) participated in simulation training. 97% (33/34) of participants strongly agreed that the simulations were effective in learning how to respond to newborn emergencies and would recommend the simulations to others. Themes learned during the simulations were coded as follows: emergency response process (n=11), teamwork focus (n=10), seizure management (n=10), and effective bag valve mask ventilation/troubleshooting (n=7). Training was successful in identifying systems issues in the Newborn Nursery, such as a deficit in pediatrics resident knowledge of the hypoglycemia protocol and staff inability to locate the pediatric code cart and infant code button.

Table 1 shows a statistically significant improvement in perceived comfort in all areas for residents and nurses. Interestingly, overall average confidence was higher for nurses than residents in this study (RN 4.28 ± 0.59; MD 3.88 ± 0.70; $p = 0.02$).

	Pre-simulation	Post-simulation	P-value
Respiratory Average	4.03 ± 0.79	4.61 ± 0.38	< 0.0001*
Seizure Average	3.47 ± 0.80	4.33 ± 0.54	< 0.0001*
Emergency Average	3.41 ± 1.01	4.51 ± 0.56	< 0.0001*
Overall Average	3.70 ± 0.78	4.51 ± 0.40	< 0.0001*

*statistically significant

Conclusion

Training of newborn nursery residents and nurses in the recognition and management of rare, newborn emergencies through simulation was successful in improving staff comfort level and in identifying potential systems issues and strategies for improvement.

Poster: 39

Medical Students and Transgender Patients: a Needs Assessment Survey for UASOM Curriculum

Name: **Wilson Alley**, *Shawn Galin, Ph.D.*

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Introduction: Curricular advances that address social determinants of health, cultural humility, and health disparities are vital to produce medical providers ready to care for all patient populations. Individuals who identify as lesbian, gay, bisexual or transgender (LGBT) occupy an increasingly visible place in society and experience clear disparities in health outcomes. Transgender patients shoulder far larger burdens of health inequity. A recent survey revealed 46% of LGBT-identified Alabamians didn't consider their physician LGBT friendly. A 2011 survey of undergraduate medical education showed that 33% of medical schools had no LGBT clinical training.

Objectives: We are utilizing a survey on medical student competencies with transgender patients to assess whether there is a need for further curriculum development around transgender health issues at the University of Alabama School of Medicine (UASOM).

Methods: In 2014, the American Association of Medical Colleges (AAMC) published guidelines to assure the advancement of LGBT specific healthcare competencies among current and future medical students. We developed an anonymous online survey based on objectives within the AAMC guidelines, as well as ten key transgender health concerns outlined by Vanderbilt University. These questions are designed to elicit responses about transgender healthcare content in the medical school curriculum, and medical student knowledge of transgender specific health concerns.

Evaluation/Conclusions: Mean scores will be determined for each individual question and then grouped based on the level of medical training. Quantitative research methods will be applied in data analysis. Survey questions are divided into three content areas or domains which include curriculum preparedness, health disparities, and transgender specific health concerns. Questions will be analyzed using a three-way analysis of variance. This will identify gaps in medical student education concerning transgender patients. The results of this needs assessment can be used to direct and coordinate specific quality improvement of overall LGBT curriculum within UASOM.

Poster: 40

Women in Medicine and Science' Innovative Curricular Elective

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Introduction: Women account for half of all medical school students in the US however, when considering medical leadership positions, women remain a minority. Likewise, when considering compensation and salary, women physicians fall behind their male peers, typically making thousands less per year despite identical work. Marked gaps in leadership training, personal and professional development, as well as sponsorship for women in medicine has contributed to this current gender divergence.

Objective: To increase gender equality through education and self-empowerment, we created an innovative curriculum for female medical students to provide them with focused instruction in leadership skills as well as life and career development.

Method: With the sponsorship of the local American Medical Women's Association (AMWA) chapter, a week-long elective course was developed for female medical students at the University of Alabama at Birmingham School of Medicine (UABSOM). Employing a combination of formal didactics, workshops, shadowing opportunities, as well as flipped classroom techniques, the elective objectives target leadership skills, communication skills, work-life balance considerations, networking and mentorship development, as well as career exploration.

Upon completion of this course, students will be able to:

1. Recognize the impact that improving leadership and negotiation skills will have in medicine and science.
2. Gain the knowledge and tools necessary to be able be a competent leader and negotiator as a woman in medicine and science.
3. Develop confidence in fostering equality in the medical and science fields .

Conclusion/Discussion: This innovative course will provide a unique opportunity for female medical students at UABSOM, promoting gender inequity awareness and providing them with tools and resources so that they might be engaged with subsequent leadership and career development opportunities.

Poster: 41

'Sensitization' of Medical Students Towards Nurse-Physician Collaboration: A Formative Assessment

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INTRODUCTION: Effective nurse-physician relationships are crucial to ensure optimal patient outcomes and a mutually rewarding practice environment. An effective nurse-physician relationship requires respect, communication, and familiarity with each other's role on the healthcare team. Among students of healthcare-related disciplines, however, medical students possess the least positive attitudes toward interprofessional collaboration. Various educational interventions have been implemented to combat this trend, and most experts agree that an optimally effective intervention would likely comprise a combination of educational methods. Despite this, few singular interventions have adopted such a combined approach.

OBJECTIVES: The goal of this project was to design a one-week elective course to sensitize students toward the nursing profession and nurse-physician collaboration.

METHODS: In collaboration with medical and nursing personnel, we created a one-week elective for medical students: "How to Be a Doctor Nurses Don't Hate: Professional Prophylaxis." The course included two lectures (delivered by nursing and medical school faculty, one each), a case-based discussion led by nursing staff, a panel session consisting of nurses from various career backgrounds, and two nurse-shadowing experiences at UAB Hospital (brief 2-hr shadow early in the week, full 12-hour experience as final course activity).
Each student completed two pre-post surveys: the Jefferson Scale of Attitudes toward Physician-Nurse Collaboration (JSAPNC; 15 items) and the Nursing Role Perception Questionnaire (NRPQ; 22 items). Each student also composed a reflection essay describing their perspectives.

RESULTS: Thirteen second-year medical students enrolled in the elective. Student attitudes as assessed by the JSAPNC improved significantly ($p=0.0009$). Student perceptions of nursing roles changed moderately; 9/22 items and 3/7 factors on the NRPQ exhibited changes. Thematic analysis of student reflections is underway; preliminary results are overwhelmingly positive.

CONCLUSION: As a pilot, our one-week elective successfully improved medical student attitudes toward nursing practice and nurse-physician collaboration. We hope to utilize similar interventions in the future.

Poster: 42

The Characteristics that Set Apart an Honors Student in the Internal Medicine Clerkship

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Background: While many U.S. medical schools employ a clerkship grading system to distinguish student performance, there is no common rubric of what defines an "honors" medical student. UASOM uses a standard evaluation rubric that includes multiple dimensions with a check box and written justification for assigning "honors".

Objectives: Our objective was to examine the dimensions that accompany an honors recommendation in the internal medicine clerkship rotation.

Methods: *Design*: retrospective. *Participants/setting*: ward attendings and residents supervising MS-3 students rotating in internal medicine on the Birmingham campus from July 2015-June 2017. *Exclusion*: subspecialty services, consults, and other clerkships. *Measurement*: all student evaluations with 12-items representing a 4-point scale of ratings competency-base descriptors (numerically, 1= low, 4= high) and recommendation for honors. *Analysis*: Student t-test.

Results: We analyzed 1,401 evaluations for 176 students; 655 evaluations (47%) had an honors recommendation. For all twelve evaluation items, students recommended for honors received a higher mean rating compared to students not recommended for honors; all P-values were less than 0.001. The largest differences in mean ratings between students recommended for honors versus students not recommended for honors included presentation skills (0.64), assessment skills (0.61), and fund of knowledge (0.60). The smallest differences in mean scores were students' interactions with other members of the health care team (0.35), response to feedback (0.38), and interactions with patients (0.38).

Conclusion: Students recommended for honors in the internal medicine clerkship received higher ratings in all twelve evaluation domains. The largest differences between the 'honors' and 'non-honors' evaluation groups were in the domains of more easily observed behaviors. In a grading system that is often described as subjective, this information can be used to identify the qualities and skills that can help set apart an honors student in the internal medicine clerkship.

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Simulation in the UAB Surgery Boot Camp

Authors:

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Background/Objectives:

Surgical training has many challenges. Duty-hour restrictions, patient safety issues and the medical-legal environment have decreased operative exposure and autonomy during surgical clerkship and residency (1). Strategies such as simulation can help augment training and improve confidence of trainees. Surgical boot camps, which combine simulation exercises with structured preparatory skills sessions have emerged to address these challenges (2,3,4). A surgical boot camp at UAB was designed to meet the following goals for fourth year medical students pursuing a surgical career: (1) increase knowledge and critical thinking skills for commonly encountered patient scenarios, (2) increase technical skills for commonly encountered bedside procedures and operative cases and (3) increase confidence in preparation for managing commonly encountered intern-level clinical problems.

Setting and Participants:

The simulations took place at the UAB Office of Interprofessional Simulation (OIPS) and utilized OIPS staff and surgical residents and faculty. The learners were fourth year medical students.

Description/Methods:

The learners were exposed to both immersive and procedural simulations. To start the immersive simulations, the learners took over the care of the patient, represented by a high-fidelity manikin. For the procedural simulations, learners experienced expert facilitated training and the opportunity for deliberate practice with coaching. Objectives for learners included: (1) to perform simulated procedures, achieving a minimum safety standard, (2) to effectively manage perioperative problems and (3) to demonstrate effective communication skills to implement crisis resource management principles. Learners were provided a prebrief prior to each simulation experience. Facilitated debriefing followed the simulation sessions, and learners completed surveys to determine the effectiveness of the simulations.

Evaluation/Results:

Survey respondents were fourth year medical students from the surgical boot camps in 2016 and 2017 (N=24). Responses were rated on a five-point Likert scale, with 5 being the most favorable response. One hundred percent of learners strongly agreed/agreed that the experiences would improve their performance in an actual clinical setting, and felt the simulations were valuable enough to recommend it to others. One hundred percent of learners strongly agreed/agreed that the debriefings and/or feedback were valuable, that the simulations were a valuable learning experience and that the objectives for the simulations were met.

Discussion/Reflection:

The immersive and procedural simulation cases provided an effective learning opportunity for fourth year medical students prior to residency. Participation in the simulations allowed learners to gain invaluable experience performing various procedures, as well as perioperative management of surgical patients. The simulations offered learners organic experiences to improve surgical skills, knowledge and confidence prior to starting residency. Future plans include assessing knowledge acquisition provided by the surgery boot camp by giving students pre and post course testing for the boot camp.

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Medical Students in the Surgery Clerkship–Characteristics of Honors Designation

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Introduction: U.S. medical schools utilize a wide-variety of guidelines to designate students as worthy of "honors" (or top grade) in clinical clerkships. At UASOM, honors designation in surgery requires exceeding a threshold on an examination as well as receiving a recommendation for honors on at least 50% of evaluations. There is no standard rubric for what defines an honors student.

Objectives: We aimed to examine the student characteristics that accompany an honors recommendation within the surgery clerkship.

Methods: *Design*: retrospective. *Participants/setting*: attendings/residents supervising MS3 students on the surgery clerkship at the Birmingham campus (July 2015–June 2017). *Exclusions*: subspecialty and consult services. *Measurement*: all student evaluations with 12 items–representing a 4-point scale of competency-base ratings (1=low, 4=high) and recommendations for honors. *Analysis*: student t-test.

Results: We analyzed 1,450 evaluations for 176 students; 522 evaluations (36%) had an honors recommendation. Students recommended for honors received higher average ratings in all 12 evaluation domains when compared with students not recommended for honors (all 12 items, $p<0.001$). The largest differences in mean ratings were for procedural skills and ward/clinic duties (both 0.7). Other domains with large differences in mean ratings were presentation skills, assessment skills, and knowledge. The smallest difference in mean ratings was for response to feedback (0.4).

Conclusion: In the surgery clerkship, students recommended for honors received higher ratings than students not recommended in all domains evaluated. The largest differences were in tangibly observable behaviors. Notably, the average procedural skills rating in the non-honors group was the lowest among all domains–suggesting that evaluators may be particularly critical in areas specifically foundational to surgical practice. Hands-on skills are no doubt foundational for surgical students; the results of this study will help to shed light on what is truly necessary to distinguish oneself during this rotation.

Poster: 45

Why is Hyperparathyroidism Under-diagnosed and Under-treated in Older Adults?

Authors

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Introduction:
Hyperparathyroidism significantly decreases quality of life, yet elderly patients are under-diagnosed and under-treated even though parathyroidectomy offers definitive cure with minimal morbidity.

Objective:
To evaluate why patients aged 75 years and older with hyperparathyroidism fail to be appropriately diagnosed and referred for surgical treatment.

Methods:
We reviewed charts for a random sample of 50 patients aged ≥75 years with hyperparathyroidism and were referred (N=25) or not referred (N=25) for surgical evaluation. Medical records were examined to identify reasons for delay in diagnosis and reasons for referral (or non-referral) for parathyroidectomy.

Results:
The mean age of our cohort was 84 ± 4 years, 90% were women, and 60% were Caucasian. Mean follow up was 6.2 ± 4.8 years. In 58% of patients, an elevated serum calcium was not acknowledged over the course of 257 distinct physician encounters. When hypercalcemia was noted, it was frequently attributed to other causes including calcium supplements (18% of patients), diuretics (12%), dehydration (10%), renal dysfunction (10%), and vitamin D deficiency (16%). In 42% of patients, a non-surgeon decided that surgery offered no benefit. The decision to reject surgical treatment was made for 36% of patients despite their developing new symptoms of hyperparathyroidism or having an increase in serum calcium by > 1 mg/dl. Of the 25 patients who were referred to surgeons, 1 patient did not follow up, and 4 patients did not want surgery. Of the 20 patients who saw a surgeon, 17 (85%) were deemed eligible for surgery.

Conclusions:
Substantial gaps exist in processes for diagnosis and referral of patients with hyperparathyroidism that lead to under-diagnosis and under-treatment. To improve rates of diagnosis and treatment of hyperparathyroidism, strategies are needed to educate non-surgeons and patients about the benefits of surgery and to modify care processes to more efficiently diagnose and refer patients.

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Poster: 46

Racial Disparity in Associations of Insulin Sensitivity and Human Myofiber Type

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African Americans (AA) exhibit much lower levels of insulin sensitivity (SI) in skeletal muscle relative to Caucasian Americans (CA), resulting in greater risk of metabolic and cardiovascular dysfunction. Relative proportions of myofiber type, broadly classed by myosin heavy chain phenotype (MHC I, MHCIIa, and MHCIIx), have been associated with SI in several previous studies. This experiment aimed to test the hypothesis that SI is associated with racial differences in myofiber distributions. SI was determined via hyperinsulinemic-euglycemic clamp (insulin dose 120 mU/m^2/min) and myofiber distributions were determined via immunohistochemistry performed on fresh frozen cross sections obtained from the left vastus lateralis in 28 adults (68% AA, 54% male, age 27± 8) without type 2 diabetes (T2D). Data analysis revealed no significant difference in myofiber distributions between CA and AA. However, SI was ~53% lower in AA ($P<0.01$). In CA, a significant negative correlation was observed with insulin sensitivity and MHCIIx fiber distribution ($R=-0.75$, $P<0.05$). No significant correlation was found in AA, but the race-by-MHCIIx fiber interaction was significant ($P<0.001$). In conclusion, AA do not display the same relationship between insulin sensitivity and MHCIIx distributions, despite no significant difference in relative myofiber proportions. Future research should continue to explore these racial disparities to inform a more targeted approach for improving SI.

Poster: 47

Dyslipidemia in Pediatric Non-Alcoholic Fatty Liver Disease

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Introduction: Amongst children in the developed world non-alcoholic fatty liver disease (NAFLD) is the most common liver disorder. The underlying biochemical etiology of NAFLD remains poorly defined. NAFLD can progress to cirrhosis, hepatocellular carcinoma and liver failure, and may increase the risk of cardiovascular disease.

Objective: The primary purpose of this study was to characterize the metabolic profile of children with NAFLD, and to evaluate whether dyslipidemia is associated with NAFLD.
Methods: A cross-sectional retrospective chart review was conducted among 309 children and adolescents with a diagnosis of NAFLD.

Results: Participants (mean age 12.5 $\pm$ 3.4 years) were 64% male; 63% White, 23% Hispanic, and 14% Black. Hispanic children were found to have NAFLD at a significantly lower age (10.6 $\pm$ 3.1 years, $p < 0.0001$), body weight (162.3 $\pm$ 56.1 lb., $p < .0001$) and BMI (31.5 $\pm$ 6.8 kg/m^2, $p < .0001$) than their White and Black counterparts. For the entire cohort, 41% had systolic hypertension, 14% had diabetes, 42% had elevated cholesterol, 58% had elevated non-high density lipoprotein cholesterol (HDL-C), 36% had elevated low density lipoprotein-C (LDL-C), 88% had elevated triglycerides (TG) and 77% had low HDL-C. Whites had elevated non-HDL-C, LDL-C and TG compared to Blacks or Hispanics. Elevated serum TG and non-HDL-C were significantly correlated to ALT ($r=0.22$, $p=0.003$; $r=0.2$, $p=0.01$), GGT ($r=0.44$, $p=0.0001$; $r=0.24$, $p=0.0009$) respectively.

Conclusion: Cardiometabolic derangements, especially dyslipidemia are highly prevalent in children with NAFLD and differ based on race/ethnicity. Serum TG and non-HDL-C may play a significant role in the pathophysiology of pediatric NAFLD.

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Perceptions of Body Image and Preferences for Nutrition Services Among African-American Women Living with HIV

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Co-investigators: Andrea Cherrington, Ebony Blake, Dafina Ward & Michael Saag

INTRODUCTION: African-American (AA) women living with HIV have a life expectancy with treatment comparable to those living without the virus, yet compared to HIV-negative peers experience greater risk of developing nutrition- and obesity-related health complications. Nutrition needs and body size change with HIV infection; however, it is unclear whether living with HIV impacts women's perceptions of health, body size, and nutrition needs.

OBJECTIVES: Our objective was to investigate the potential impact of living with HIV on body image, perceptions of nutritional and/or exercise needs, and desire for lifestyle interventions.

Methods: In partnership with AIDS Alabama, we conducted focus groups with 35 AA women living with HIV in the Birmingham area. Participants were also administered questionnaires assessing food security, mindful eating practices, and body image.

RESULTS: The median participant age was 52.5 years; 59% had a BMI ≥ 30 (obese), and 21% were diagnosed with diabetes. Overall, the women reported a decrease in HIV-contracting risk behavior following HIV diagnosis, but did not report a change in diet, exercise, or other chronic disease risk behaviors as a result of their positive status. A discrepancy between health perceptions versus actual health practices emerged as a theme among all focus groups. Most women agreed that HIV infection impacted their body shape/size, but did not feel that body size was associated with health outcomes, or that their nutrition needs with HIV were any different than before diagnosis. Several reported dissatisfaction that upon receiving a medical diagnosis such as diabetes they had to make themselves less attractive to attain a body size compatible with metabolic health. In addition, the women emphasized a desire for a broad spectrum of support in the form of formal group sessions led by community health workers, as well as sessions of informal "couch talk," or supportive group dialogue.

CONCLUSION: These findings suggest that despite high risk for obesity and diabetes, AA women with HIV are unaware of changing nutrition needs and metabolic health risks with HIV infection. Further development of effective, educational lifestyle interventions targeted to this demographic living with increased risk for cardiometabolic disorders are needed.

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Racial Differences in Natriuretic Peptide Response to Glucose Challenge

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Introduction: Natriuretic peptides (NP) are hormones released by the heart with primary function being natriuresis and vasodilation. Recent studies suggest that atrial natriuretic peptides (ANP) have beneficial metabolic effects including brown fat activation, improved skeletal muscle oxidative capacity, and glucose utilization. We have previously shown that a high-carbohydrate challenge in healthy individuals is associated with a reduction in N-terminal-proANP (NT-proANP) but not N-terminal-proB-type NP (NT-proBNP) levels mostly in Caucasians. However, there is no literature examining the effects of acute carbohydrate challenge on ANP levels in African-Americans, a population with disproportionately high rates of obesity, diabetes, and cardiovascular diseases.

Objectives: To determine whether NT-proANP levels change in African-Americans in response to glucose challenge and to compare the magnitude of change in ANP to Caucasians.

Methods: Healthy African-Americans and Caucasians were screened and recruited into the study if screening labs were normal. Each eligible participant was provided 3 days of standardized study diet prepared in the dietary kitchen. After the dietary intervention, subjects were brought to the clinical research unit for oral glucose challenge. Venous blood was then collected every hour for 8 hours to measure glucose, insulin, NT-proANP, and NT-proBNP levels.

Results: Baseline characteristics of African-Americans (n=17) and Caucasians (n=20) were similar **(Table)**. We observed plasma glucose levels peaked at 132 ± 38 mg/dl in African-Americans and 148 ± 47 mg/dl in Caucasians after glucose challenge **(Figure, Panel A)**. We observed significantly higher insulin levels in African-Americans compared to Caucasians after oral glucose challenge (p=0.004) **(Figure, Panel B)**. NP levels (primary endpoint) are pending in this ongoing clinical trial.

Conclusions: Ours is the first prospective human trial looking at racial differences in NP response to acute glucose challenge. Racial differences in NP suppression could have public health significance in addressing racial disparities in cardiometabolic diseases. **(NCTClinicalTrials.gov Identifier: NCT03072602)**

Poster: 50

Title: Clinical Characteristics and Outcomes of Pediatric Patients with Severe Hypertriglyceridemia

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Introduction: Severe hypertriglyceridemia (HTG, i.e., serum TG >1000 mg/dl) is extremely rare in children. Very little is known about the etiology and outcome of this condition in children.

Objectives: The primary objective was to evaluate the etiology and outcomes of severe hypertriglyceridemia. A secondary objective was to analyze the morbidity and complications associated with severe HTG.

Methods: This was a retrospective Electronic Medical Record chart review of pediatric patients with severe HTG at Children's of Alabama, University of Alabama at Birmingham from 1999 to 2016. Inclusion criteria were: (1) serum triglyceride concentration >1000 mg/dL (2) availability of lipid panels and complete metabolic panels (3) a weight recorded within 6 months of severe HTG. Patients were excluded if they had insufficient anthropometric information, biochemical testing, or lacked documentation providing clinical care (n=29).

Results: A total of 110 patients with severe HTG met the inclusion criteria. Two patients had primary genetic hypertriglyceridemia. Etiologies for severe HTG included renal disease (n= 12), diabetes (n=32) TPN related (n=15), malignancy related (n=43,) and miscellaneous (n=8). The average number of days for serum TG to decrease to <1000 mg/dL was 147.68± 567.28 days and to further decrease to <500 mg/dL was 136.84±230.9 days. Patients with diabetes took the longest time to improve their TG (165.8± 305.7 days) compared to other groups. There were 11 cases of pancreatitis (diabetes related=5, TPN related=3 and renal diseases related=3). Sixty four patients (58%) had persistent dyslipidemia. Only 14 patients achieved a serum triglyceride level <150 mg/dl.
Conclusion: Severe HTG in pediatrics is often due to secondary causes rather than primary genetic abnormalities and is associated with prolonged morbidity and serious complications. More than half the patients continue to have persistent dyslipidemia indicating underlying genetic susceptibility to hypertriglyceridemia that is phenotypically expressed in the presence of secondary metabolic insult.

Poster: 51

Quantification of endocrine disruptor uptake in zebrafish embryos and larvae

J. Paige Souder & Daniel A. Gorelick

Zebrafish are a powerful model system to assess the molecular and cellular effects of exposure to toxic chemicals during embryonic development. To study the effects of endocrine disruptor compounds (EDCs), embryos and larvae are commonly exposed to supraphysiologic concentrations of these compounds in the water, but their bioavailability is largely unknown. To test the hypothesis that supraphysiologic concentrations of EDCs are required to achieve physiologic levels *in vivo*, we developed an assay using radiolabeled estradiol ([^{3}H]E2) to measure compound uptake at multiple concentrations and exposure durations in zebrafish from 0-5 days post fertilization. We then used this assay to measure the uptake of two other EDCs, bisphenol A (BPA) and ethinyl estradiol (EE2). We found that the uptake of each compound increased with increasing concentration, duration, and developmental stage, but that percent uptake from the total exposure solution remained constant with increasing concentration. When comparing compound uptake, we found that E2 and EE2 uptake was similar under the same exposure conditions, while BPA had comparatively lower uptake. These results support the hypothesis that exposing zebrafish embryos and larvae to supraphysiologic concentrations of EDCs is required to achieve physiologically-relevant concentrations *in vivo*. An application of this assay is to test factors that influence EDC uptake. One hypothesis is that environmental persistent organic pollutants (POPs) inhibit ABC transporters that would normally efflux EDCs and their metabolites, inducing toxicity in aquatic organisms. To test this hypothesis, we used our assay to measure [^{3}H]E2 levels in zebrafish in the presence or absence of the POP PDBE-100, and cyclosporin A, an inhibitor of ABC transporters. We found that neither chemical affected [^{3}H]E2 levels in zebrafish, suggesting that zebrafish can maintain estradiol efflux with ABC transporter inhibition. Using the isotopic uptake assay developed here, future studies will test whether other chemicals influence EDC levels *in vivo*.

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Effects of (PVPON/TA) encapsulation of islets on immunoprotection and vascularization.

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Type 1 Diabetes (T1D) is a chronic pro-inflammatory autoimmune disease consisting of pancreatic β-cell death caused by islet-infiltrating leukocytes. One promising treatment for T1D is islet transplantation; however, its clinical application is constrained due to limited islet availability, adverse effects of immunosuppressants, declining graft survival, and restoring efficient islet vascularization. Islet encapsulation may provide an immunoprotective barrier to prevent immune-mediated rejection and maintain pancreatic β-cell function following transplantation. Using a novel cytoprotective nanothin multilayer coating consisting of tannic acid (TA), an immunomodulatory antioxidant, and poly(N-vinylpyrrolidone) (PVPON), we found that encapsulation of purified islets was efficacious in dampening *in vitro* immune responses involved in transplant rejection and preserving islet function. Recent evidence has demonstrated that modulation of redox status can affect pro-inflammatory immune responses. Therefore, we hypothesized that (PVPON/TA)- encapsulated islets can restore euglycemia in diabetic mice and provide an immunoprotective barrier that would prolong graft function post-transplant. Our results demonstrate that (PVPON/TA) nanothin coatings can significantly decrease chemokine synthesis, diabetogenic T cell migration, and (PVPON/TA)-encapsulated islets restored euglycemia after transplantation into diabetic mice. For future studies, we will transfect genes associated with upregulation of angiogenic factors into murine mesenchymal stem cells (mMSCs) to study vascularization when cotransplanted with islet allografts.

Poster: 53

Small Molecule TXNIP Inhibitors Improve β-cell Function

Harrison Thompson (University of Alabama School of Medicine), Lance Thielen and Anath Shalev, Comprehensive Diabetes Center and Department of Medicine, University of Alabama at Birmingham

Thioredoxin-interacting protein (TXNIP) has been shown to play a multifactorial role in beta cell death and the progression of diabetes. TXNIP was found to be the top gene induced by glucose in human pancreatic islet microarray analysis. Overexpression of TXNIP has been shown to increase beta-cell apoptosis, resulting in loss of functional beta cell mass. Beta cell-specific TXNIP knockout mice, as well as whole body TXNIP-deficient murine models, have shown elevated insulin levels, decreased beta cell apoptosis, and increased functional beta cell mass and are protected from diabetes. Pharmacologically, the calcium channel blocker, Verapamil, has recently been shown to inhibit TXNIP and mimic the protective effects of TXNIP deletion as well as rescue mouse models from overt diabetes. All considered, TXNIP has become an appealing drug target for treatment of diabetes. We therefore hypothesize that TXNIP inhibitors will improve β-cell function by providing protection against type 1 diabetes (T1D) associated cytokines, increasing β-cell mass, and improving insulin production. High-throughput screening of 300,000 compounds in collaboration with Southern Research Institute has yielded a promising small molecule compound TXNIP Inhibitor (TI). To confirm the inhibitory effects of TI on TXNIP, INS-1 cells were treated at increasing doses with the compound and mRNA, and protein levels were measured with qRT-PCR and Western blot, respectively. To show protection against T1D associated cytokines, INS-1 cells subjected to T1D cytokines were treated with or without TI. TXNIP mRNA was then measured. To determine the TXNIP inhibitor effects *in vivo,* mice received multiple low-dose streptozotocin (STZ) to induce diabetes followed by treatment with compound. Compound-treated mice showed reduced levels of blood glucose and increased insulin staining in their pancreatic islets. Taken together, TI has shown promising results for additional *in vivo* experimentation.

Poster: 54

Determinants of Pediatric Type 2 Diabetes Recovery

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Introduction: Factors influencing the outcome and recovery of pediatric type 2 diabetes (T2DM) remains unclear.

Objectives: The primary purpose of this study is to evaluate the clinical and biochemical characteristics of children diagnosed with T2DM who then achieved HbA1C <6.5% at one year from diagnosis (i.e. "remission" from T2DM) and at the end of three years (i.e. maintained remission). A secondary aim was to determine the characteristics of patients who had achieved HbA1C <8.5% (durable glycemic control) at these time points.

Methods: This was a cross sectional, retrospective electronic medical record chart review of pediatric patients with T2DM followed by Children's of Alabama, UAB diagnosed between 1/1/2004 and 7/30/2016. Inclusion criteria were 1) diagnosis of T2DM, 2) patients with a follow-up visit between 10-18 months after diagnosis 3) for the secondary aim patients with a follow-up visit between 2.5-3.5 years after initial diagnosis.

Results: There were a total of 311 patients who had a follow-up at 1 year and 187 patients who also had a 3 year follow-up. Remission (HbA1C <6.5%) was seen in 35% at the end of 1 year and 26% at 3 year. Treatment: 62.1% initially received insulin and metformin, 15.8% received insulin only and 21.2% received metformin alone. Patients who achieved remission at 1 and 3 years had lower non-HDL cholesterol (P=0.04) and better total cholesterol/HDL ratio (P=0.008). Patients treated with insulin had significant lowering of HbA1C at the end of 3 years (11.36±2.17 to 9.17±2.3, P <0.00001), whereas non-insulin treated group did not have a significant change in HbA1C. Insulin treated patients had significant improvement in HDL, P=0.007, whereas non-insulin treated group did not.

Conclusion: Only a minority of patients achieve remission at 1 and 3 year of follow-up. Patients who received insulin treatment achieved better glycemic and lipid outcomes.

Poster: 55

Esophageal function and obesity

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Background: Patients with obesity have been shown to have increased rates of gastroesophageal reflux disease (GERD), an increased gastroesophageal pressure gradient, and increased transient lower esophageal sphincter relaxation (TLESR) events. Patients with obesity also have increased intra-abdominal pressure.

Hypothesis: We hypothesized that obesity would be associated with increased mean basal and residual lower esophageal sphincter (LES) pressures.

Methods: To test our hypothesis, retrospective review was performed on all adult patients undergoing high resolution manometry (HRM) in the Division of Gastroenterology at a single academic institution from 2014 to 2016. Exclusion criteria included patients with achalasia or hiatal hernia. Patients were stratified by body mass index (BMI) in kg/m^2: normal weight, BMI <25; overweight, BMI 25 to 29.9; class I obesity, BMI 30 to 34.9; class II obesity, BMI 35-39.9; class III obesity, BMI ≥ 40. Statistical analyses were performed using Chi-square test, Kruskal-Wallis one-way analysis of variance, or Pearson's correlation as appropriate. Statistical significance was determined as p-value <0.05. All statistical analyses were performed using SAS 9.4 (SAS Institute, Cary NC).

Results: A total of 507 patients were included in the study with mean age of 58 years and the majority were female (63.6%). After stratification, there were 149 (29.4%) who had normal weight, 159 (31.4%) who were overweight, 121 (23.9%) with class I obesity, 46 (9.1%) with class II obesity, and 32 (6.3%) with class III obesity. There were no significant differences among the groups in medications or comorbidities that may impact esophageal and LES function. Mean basal LES pressure was significantly increased in patients with class III obesity (39.9 mmHg; p=0.025), while mean residual LES pressure only trended toward being increased and was still within normal limits (8.7 mmHg; p=0.080). There was no statistical difference in esophageal contraction based on the distal contractile integral (DCI) values (p=0.190). There was a positive linear correlation between mean basal LES pressure and BMI (r=0.127, p<0.001) as well as between mean residual LES pressure and BMI (r=0.0863, p=0.043). There was no correlation between DCI and BMI (r=0.0368, p=0.425).

Conclusions: In conclusion, these data suggest that obesity augments the basal resting and relaxation pressures of the LES without significant changes in esophageal contractility. Further, mean values in obesity still remain within normal limits and standard criteria should be adequate to determine disease states.

Poster: 56

Pharmacogenomic Profiling of Pediatric Patients

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Introduction: The volume of pediatric patients presenting to the pediatric emergency department (PED) for psychiatric complaints and the number of children and adolescents in the US taking at least one psychotropic medication have increased over the past five years. It is unknown whether there is a relationship between the patients who are presenting for psychiatric complaints and their individual genetic ability to metabolize the psychotropic medication that they are taking.

Objectives: To determine if the genetic variation in genes coding for multiple CYP450 enzymes is associated with perceived therapeutic failure and/or adverse effects of the medication a patient is currently taking.

Methods: This study will enroll 100 patients ages 3-18 who are currently taking at least 1 qualifying psychotropic medication and present to the PED with a psychiatric complaint. After informed consent is gained, DNA is collected using a GeneSight buccal swab, blood is drawn, an EKG is taken, and a questionnaire is filled out with the patient and guardian. Data collected includes: patient demographics, current medications, toxicity/adverse drug reactions, number of PED visits/hospitalizations for psychiatric reasons in the past 12 months, global assessment of function (GAF) scale, clinical global impression (CGI-I) scale, and clinical global efficacy (CGI-E) index.

Results: To date, 57 patients have been enrolled in the study. When the target goal of 100 patients has been reached, statistical analysis of the data will begin. Analysis will include the proportion of children who are taking medications in GeneSight red or yellow categories (mismatched) and are presenting to the ED with: acute psychiatric/behavioral crisis, elevated or decreased serum drug concentrations, overdose of drugs, and adverse drug reactions. Additionally, the frequency of reported negative scores on GAF, CGI-I, and CGI-E will be calculated, as well as the relationship between GeneSight match and mismatch and these scores.

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Poster: 57

Genetically engineered pigs as a source for clinical red blood cell transfusion

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Medical and public health interest in discovering viable alternatives to human blood for clinical transfusion has risen dramatically in recent years due to numerous factors, including a shortage of safely screened blood worldwide and increased recognition of potential complications following allogeneic blood transfusion. Transfusion-related adverse events are among the costliest contributors to healthcare expenditures, including subsequent acute and chronic illness, future outcomes, lost wages, and impact on the recipient's quality of life. An ideal alternative to human red blood cells (RBCs) would be readily available, inexpensive, effective in delivering oxygen, compatible with all blood types, nonimmunogenic, and nonpathogenic. Many synthetic and biological alternatives to human RBCs have been pursued, but so far, none have delivered safe, effective clinical results or reproducible outcomes.

Pig RBCs are the most promising alternative to human blood products with many advantages: similarity between human and porcine RBCs, the absence of infectious microorganisms, a high breeding capacity, and the recent progress in porcine genetic engineering. In the past five years, there have been major advances in xenotransplantation, and principles used to overcome these immunological barriers can be applied to tissues and cells, including pig RBCs.

Genetically-engineered pig RBCs may provide a source of blood superior to that of allogeneic human blood, without many of the transfusion-related complications. With the ability to transgenically express human and fetal hemoglobin in porcine RBCs, the potential therapeutic benefit and clinical applicability for using genetically modified pRBCs is immense. There are a number of situations in which pRBCs might prove particularly valuable – i) acute blood loss, where human ABO-compatible blood is not available, e.g., hemorrhage, trauma, accident units, etc.; and ii) patients with hematological and oncological disorders requiring frequent blood transfusions in whom sensitization to human RBCs has developed, e.g., sickle cell disease, thalassemia, chronic liver disease, among others.

Poster: 58

PCSK9 Loss-of-function Variants and Risk of Infection and Sepsis in the Reasons for Geographic And Racial Differences in Stroke (REGARDS) Cohort

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Introduction: Elevated proprotein convertase subtilisin/kexin type 9 (PCSK9) levels have been associated with adverse outcomes in patients hospitalized for sepsis. PCSK9 loss-of-function (LOF) variants are associated with lower low-density lipoprotein cholesterol (LDL-C) levels. Decreased LDL-C is a biomarker of acute and chronic infection and sepsis risk.

Objectives: Our objective is to examine associations between PCSK9 LOF genetic variants and risk of infection and sepsis in a community dwelling cohort.

Methods: We analyzed data from 10,924 Black participants tested for PCSK9 LOF variants in the REasons for Geographic and Racial Differences in Stroke (REGARDS) cohort using data from years 2003-2012. The primary exposure was the presence of a PCSK9 LOF variant. The primary endpoint was hospitalization for serious infection during 2003-2012, identified using hospital admission and Emergency Department records. Within serious infection hospitalizations, we defined sepsis as ≥2 SIRS criteria within the first 28 hours of hospitalization. Using multivariable Cox and logistic regression analysis, we investigated the association between LOF variants and hospitalization for infection and sepsis events, adjusting for sociodemographics, health behaviors, chronic medical conditions, select biomarkers, and SOFA and REGARDS Sepsis Risk Scores.

Results: Among 10,924 Black participants, 244 (2.2%) had a PCSK9 LOF variant. PCSK9 variant presence correlated with lower LDL-C (mean values: 84.8 with vs 117 without, $p<0.001$). Serious infection hospitalizations occurred in 779 participants (14 with PCSK9 variants and 765 without). The presence of PCSK9 variants was not associated with infection risk (adjusted HR 0.84; 95% CI: 0.49-1.40). Among serious infection hospitalizations, 447 (57.4%) met sepsis criteria (11 with variants and 436 without). The presence of PCSK9 variants was not associated with sepsis (adjusted OR 1.32; 95% CI = 0.74-2.39).

Conclusions: PCSK9 LOF variants are not associated with increased risk of hospitalization for infection or sepsis. An alternative pathway may link LDL-C and sepsis risk.

Poster: 59

HIV-Specific CD8 T Cell Cross-Reactivity Following Ad5-Based Vaccination is Shaped by Vaccine Regimen and Prior Ad5 Exposure.

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Introduction/Objectives: The ability of the CD8 T cell response to cross-recognize several variants of a single epitope could be an important factor in optimizing future HIV vaccine design. Some prior work has indicated that CD8 cross-reactivity plays a role in viral control in individuals with protective HLA-I alleles; however, not much is known about CD8 cross-reactivity in the context of HIV vaccination. The purpose of this project was to evaluate the vaccine-induced CD8 cross-reactivity in two preventative HIV-1 vaccine efficacy trials.

Methods: We examined the CD8 responses within two prior vaccine studies, both of which used adenovirus serotype 5 (Ad5) vectors: HVTN 502 (MRKAd5) and HVTN 505 (VRC DNA prime, Ad5 boost). We measured the responses to vaccine-encoded epitopes and their common variants using IFNγ ELISpot assays. We also quantified the antigen sensitivities by measuring the IFNγ responses to log fold serial peptide dilutions.

Results: Overall, CD8 responses to variant epitopes had a lower magnitude and decreased antigen sensitivity than those targeting vaccine-encoded epitopes ($p<0.0001$ and $p=0.014$). A greater number of mutations, less conservative amino acid substitutions, and HLA-I driven mutations negatively affect the immunogenicity of cross-reactive responses ($p<0.0001$, $p=0.0003$, and $p<0.0001$, respectively). Additionally, cross-reactive responses had a higher magnitude in MRKAd5 recipients with low pre-existing Ad5 titers than those with high pre-existing titers ($p=0.0230$). In comparing only Ad5-naïve recipients, MRKAd5-generated cross-reactive responses were decreased in magnitude and proportion in comparison with cross-reactive responses of VRC DNA/Ad5 recipients ($p=0.0052$, $p=0.0488$), despite similar magnitudes towards vaccine-encoded epitopes.

Conclusion: Our data shows that cross-reactive responses are frequently elicited by vaccination and that this cross-reactivity is affected by both the vaccine regimen and pre-existing Ad5 titers. In future work, we plan to investigate the TCR clonotypes mobilized by cross-reactivity and determine the biologic and clinical significance of these vaccine-induced cross-reactive CD8 T cells.

Poster: 60

Preliminary analysis of whole genome sequences of autism spectrum disorder

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Introduction: While large-scale DNA sequencing has led to the discovery of many genes and genetic variants underlying Autism Spectrum Disorder (ASD) risk, many cases remain in which genetic causes have not been identified.

Objective: To this end, we exploit whole genome sequencing (WGS) data of simplex ASD families from the Simons Simplex Collection (SSC) to identify novel genetic variation in ASD-affected individuals, who previously underwent exome sequencing, but no causal variation was detected.

Methods: WGS from ~540 simplex ASD families from the SSC, each of which includes an affected proband, unaffected sibling, and both biological parents, are undergoing variant analysis to identify candidate diagnostic variants. In parallel, computational methods are being used to logically group variants according to biological pathway, known ASD genes/pathways, and mutation type, with an emphasis on annotations of non-coding functionality. Differences between affected probands and unaffected siblings are being assessed using CADD, a quantitative method for scoring variant impacts. Due to ASD's higher prevalence in males, we are also examining variants in sexually dimorphic pathways and assessing variant subsets transmitted from mothers to affected sons to explore a possible "female protective" mechanism for otherwise pathogenic single variants.

Results: Preliminary comparisons between ASD probands and their unaffected siblings reveal no statistically significant difference in burden or CADD score of de novo variants. Furthermore, maternally inherited variants grouped by gene do not have a statistically significant CADD score distribution difference between probands and their unaffected siblings.

Conclusion: A more clear understanding of genetic variant contributions to ASD risk may serve to both increase clinical diagnostic effectiveness and identify ASD-associated genes, pathways, and molecular mechanisms. This data may also be useful for identifying potential future therapeutic targets.

Poster: 61

Effect of High Salt on ET-1 and Histone Deacetylases in Macrophages

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INTRODUCTION: Evidence demonstrates a key role of macrophage (MΦ) activation in salt-sensitive hypertension with pro-inflammatory (M1) phenotype transition following high salt (Na) exposure. Endothelin 1 (ET-1) expression is responsive to high salt diets especially in the kidney. Our lab has shown that high Na regulates histone deacetylase (HDAC) expression in the kidney. However, it is unknown whether high Na regulates MΦ ET-1 and HDAC expression.

OBJECTIVE: To verify that high Na promotes an M1 phenotype and to determine whether high Na regulates MΦ gene expression of ET-1, HDAC1, or HDAC9.

METHODS: MΦ cell line RAW264.7 was cultured in DMEM (10% FBS). MΦ were then exposed to 40mM

NaCl, NaAcetate, or mannitol. As controls, two sets were exposed to 100ng/mL lipopolysaccharide (LPS) or 10ng/mL interleukin-4 (IL-4). Following 24hrs, mRNA expression of HDAC1, HDAC9, NOS2, ET-1, IL-1bLand IL-10 was analyzed.

RESULTS: Data presented as relative expression fold difference ($p<0.05$). LPS exposure leads to M1 MΦ phenotype with increased IL-1b and NOS2 (22.1±1.96 and 97.2±12.35, respectively), and decreased IL-10

(0.6±0.18). IL-4 treatment leads to anti-inflammatory phenotype with decreased IL-1b and NOS2

(0.92±0.13 and 0.63±0.32, respectively), and unchanged IL-10. LPS increased ET-1 (5.45±0.16), while HDAC9 decreased with LPS and IL-4 (0.99±0.22 and 0.85±0.22, respectively) with HDAC1 unaltered. NaCl or NaAcetate increased NOS2 and IL-1b (2.84±0.58, 2.13±0.25, 5.17±1.67, 15.76±1.95, respectively) while mannitol (osmolality control) did not change either suggesting that Na stimulates an M1 phenotype. NaCl, NaAcetate, and mannitol increased ET-1 (0.81±0.35 [p=0.055], 3.46±0.56 and 0.92±0.21, respectively), suggesting that ET-1 is regulated by osmolality, not Na. HDAC9 is decreased by NaCl and NaAcetate (0.76±0.23, 0.62±0.22, respectively), but not mannitol, suggesting a Na-dependent mechanism. HDAC1 was unchanged by all treatments.

CONCLUSIONS: High Na specifically leads to an M1 phenotype. ET-1 is activated with LPS and osmolality indicating that ET-1 expression in MΦ is pro-inflammatory. HDAC9 decreases with LPS, IL-4, and high Na while HDAC1 was unchanged with all treatments suggesting that HDAC1 and HDAC9 in MΦ may not be regulated with MΦ polarization.

Poster: 62

Emma Dean

Induction of the Potent Anti-Inflammatory Cytokine Interleukin 10 by Intestinal Regulatory T Cells

Inflammatory bowel disease is an autoimmune disease of the intestinal tract caused by chronic inflammation that can be relapsing and remitting in nature. This inflammation leads to flares characterized by chronic diarrhea, and it often requires patients be treated with biologic therapies sometimes for the remainder of their lives. Prior studies in both mouse and human have implicated dysregulation of transcriptional programs involved in T cell differentiation and development. Interleukin 10 (IL-10) is an immunosuppressive cytokine produced by effector T cells, especially regulatory T cells, to limit inflammatory responses to both foreign and self-antigens. Although IL-10-producing intestinal regulatory T cells (iTregs) are thought to play a mitigating role in colitis, the transcriptional regulation of the *Il10* locus is not yet understood.

One major barrier to the study of iTregs is that they are extremely difficult to produce and maintain in vitro. In order to begin our investigations into what drives *Il10* induction, we first examined how to produce – both by in vitro and in vivo means – and maintain iTregs that were competent to produce IL-10. Our lab and others have found that, over time in culture, iTregs lose expression of the transcription factor characteristic of all regulatory T cells – Foxp3. Through in vitro studies, we found that, by supplementing the culture media with TGFβ and interleukin-2, we were able to stably maintain Foxp3 expression in vitro. We then performed various in vitro co-culture studies to attempt to induce IL-10 production in this population. Last, we examined how the stimulation of two receptors from the tumor necrosis factor family might expand IL-10 competent Tregs in vivo. In prior studies, these receptors have both been implicated in stimulation of the immune response. We found that activation of these receptors greatly expanded IL-10 producing Tregs in not only the intestinal tract, but also the peripheral lymph nodes and spleen.

With these studies and the data obtained from them, we hope to perform genomics studies to better understand the transcriptional landscape of the *Il10* locus. Ultimately, our goal is to decipher what modulates the induction of *Il10* with the hopes that this knowledge could be used to create an immune-supplementing rather than an immunosuppressive therapy for patients with inflammatory bowel disease.

Poster: 63

Analysis of Low TCD velocities in pediatric sickle cell patients.

Hallman TL, Hilliard LM

Introduction: Abnormally high TCD velocities have been shown to increase stroke risk, however, little is known about abnormally low TCD velocities and stroke risk.
Objectives: The primary objective of this study was to determine if there is a correlation between low TCD velocities and stroke in a pediatric population.
Methods: This was a retrospective chart review of all TCDs performed on pediatric sickle cell patients within the last five years. Our primary goals were to determine the incidence of low TCD velocities (defined as $\leq$ 70 cm/sec), the presence of any vessel abnormalities on MRI/MRA, and record any changes in patient level of health leading up to low TCD reading.
Results: A total of 850 TCDs were performed. 15 patients were determined to have low TCDs, an incidence rate of 1.8%. We reviewed the most recent MRI/MRA scan for the patients with low TCDs. None of the scans showed evidence of vessel abnormality. Additionally, no new physical or cognitive changes were found at the time the low TCD was taken.
Conclusion: Our results showed that low TCD velocities are much less common than abnormally high velocities (10% incidence) and when assessed as part of a comprehensive screening program, are not indicative of vessel abnormality or stroke risk in our population of children with sickle cell disease. Furthermore, a low TCD was not a reliable indicator of past low velocities, nor was it able to predict future low velocities. Additional data that needs further study is to compare clinical features of low, normal, conditional and high TCD velocities. We hope to expand this project to include that assessment and subsequently capture this information in a prospective manner.

Poster: 64

Assessing CD8 Polyfunctionality in HVTN502 Recipients Receiving Pre-Adapted and Non-Adapted Vaccines

Authors**: Jacob K Files**, Sushma Boppana, and Paul Goepfert MD

CD8 T cells play an important role in controlling HIV infection which is partly mitigated by viral adaptation to these responses. Much of this adaptation can be quantified by identifying mutations that accumulate in chronic infection and are associated with a particular HLA-I allele. Recent studies from our lab show that patients infected with a virus pre-adapted to their HLA-I alleles have diminished CD8 T cell responses and poorer clinical outcomes. However, the role of HLA-I adaptation in the context of vaccination remains unknown. We hypothesize that vaccine recipients who are "pre-adapted" to the vaccine insert sequence will have a less immunogenic and less functional CD8 response than those who were not. Using samples from the HVTN502 vaccine efficacy trial, we tested 19 samples from "high adaptation" and "low adaptation" groups. Adaptation scores were generated based on each individual's HLA-I allele in relation to the given HIV vaccine. Through intracellular staining, we measured the effector cytokine response to peptide pools spanning each vaccine-encoded protein (Gag, Pol, and Nef). Surprisingly, we observed that the high adaptation recipients showed stronger CD8 responses, with more individuals producing a given cytokine than the low adaptation group. When comparing polyfunctionality, or the number of cells producing multiple cytokines simultaneously, we saw the high adaptation group produce more polyfunctional responses to Pol1 ($p=0.0247$) while the low adaptation group produced more polyfunctional responses to Nef ($p=0.0308$). Overall, these results suggest that adaptation to the vaccine insert results in a skewed CD8 T cell response. The surprising finding that higher adaptation to the vaccine insert is associated with higher CD8 responses may be explained with single epitope mapping. Ultimately, we hope to definitively illustrate the impact of HLA-I adaptation in generating vaccine responses in order to inform future HIV vaccine design.

Poster: 65

Identifying Personalized Anti-MHC Class II Antibody Targets for Xenotransplant Recipients

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Purpose: Xenotransplantation, using organs from genetically-modified pigs, is a potential solution to the organ shortage. Antibody binding to carbohydrates on the pig cell surface was a previous barrier to clinical application, but the elimination of the aGal, Neu5Gc, and Sda glycan antigens provided a negative crossmatch for ~60% of individuals tested. Some crossmatch positive individuals possess anti-human leukocyte antigen (HLA) antibodies that bind the swine leukocyte antigen (SLA). Identification and mutation of these antibody binding sites would provide personalized crossmatch negative organs for these individuals, expanding the pool of potential xenograft recipients.

Methods: SLA class II single antigen cells were developed through calcium phosphate transfection of the heavy chains in the pBUDCE4.1 plasmid into HEK293T cells. 64 individual sera samples from the UAB transplant waitlist were screened via a flow cytometry crossmatch. 13 sera samples were bound to a SLA-DQ cell line, eluted with a low pH buffer, and the SLA reactive antibodies were tested on a panel of single antigen HLA class II beads.

Results: The screen revealed specific antibody binding to each of the cell lines, with the most immunogenic cell expressing SLA-DQA*0101-DQB1*0601 (19 out of 64 samples binding, 29.69%). Of the 13 elution samples, 5 demonstrated epitope-restricted HLA crossreactivity: 4 bound HLA class II beads corresponding to DQ4,5,6 and 1 bound HLA class II beads corresponding to DQ6,7,8,9 cells. Sequence comparison of the SLA class II sequences to all known HLA class II epitopes revealed a conserved arginine in HLA-DQ4,5,6 at the 55^{th} position, and a conserved threonine at the 71^{st} position of DQ6,7,8,9. Mutagenesis of the 55Arg to 55Pro resulted in significantly decreased antibody binding ($p = 0.0036$) in a flow cytometry crossmatch.

Conclusions: SLA-DQ may be a target of cross-reactive antibodies, specifically for individuals with a sensitization to HLA-DQ. The target of these antibodies, 55Arg and 71Thr, is a potential genetic engineering target that could result in personalized pig organs for the highly sensitized.

Poster: 66

Transcription factor Foxp1 negatively regulates B cell class switch

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Introduction: Antibody class switch recombination (CSR) is a crucial step in the maturation of the adaptive humoral response. Recently, the transcription factor Foxp1 has been shown to function as a critical negative regulator of B cell class switch to IgG1. Overexpression of Foxp1 resulted in impaired B cell IgG1 isotype switch in a Foxp1 transgenic mouse model *in vivo*.

Objective: The goal of this project is to determine whether Foxp1 regulates only IgG1 switch or B cell isotype switch in general.

Methods: An inducible Cre-Foxp1 conditional knockout mouse model (Foxp1 cKO) was used to study B cell class switch recombination in an *in vitro* germinal center culture system. B cells were stimulated under various conditions and the frequency of CSR was compared between Foxp1 cKO and wild-type (WT) B cells using flow cytometry. Additionally, class switched B cells and PCs were sorted to examine the gene expression of some known key transcription factors in class switch and plasma cell differentiation by RT-PCR.

Results: Our preliminary data show that Foxp1 cKO B cells had a greater frequency of IgE and IgG1 class switched B cells in the presence of IL-4 as compared to WT B cells. More importantly, Foxp1 cKO B cells also had an increase in the frequency of IgG2c class switched B cells in the presence of IFN-γ.

Conclusions: Our results strongly suggest that Foxp1 negatively regulates the class switch of all B cell isotypes. Understanding the molecular mechanism by which Foxp1 regulates B cell class switch recombination and antibody maturation could better aid future vaccine efforts and design.

Poster: 68

Regulation of Transcription Factor Foxp1 in T Follicular Helper cell Differentiation During Influenza Infection

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Introduction: T follicular helper (Tfh) cells are essential for germinal center (GC) formation in which high-affinity antibodies and long-lived memory B cells are generated during an immune response. We have previously identified the transcription factor Foxp1 as a critical negative regulator of Tfh differentiation. Foxp1-deficient $CD4^+$ T cells preferentially differentiate into Tfh cells at the expense of non-Tfh cells, and greatly enhance the subsequent GC and antibody responses.

Objectives: The goal of this project is to determine the signaling pathway(s) involved in the down-regulation of Foxp1 expression levels in Tfh cells.

Methods: Naive OT-II T cells expressing TCRs specific for ovalbumin were isolated from OT-II transgenic mice and transferred into recipient SMARTA mice that have T cells expressing TCRs specific for LCMV. Recipient mice were then infected with a modified influenza strain expressing ovalbumin peptide (PR8-Ova) to which only donor OT-II T cells would respond. Two weeks after infection, recipient mice were euthanized and Tfh and non-Tfh donor OT-II T cells were sorted based on the expression of cell surface markers PD-1 and CXCR5. The expression levels of Foxp1 protein and mRNA were measured by western blot and real time-quantitative polymerase chain reaction (PCR), respectively.

Results: Our preliminary data show that Foxp1 protein levels were dramatically decreased in Tfh cells compared to both control naive or activated non-Tfh T cells. Interestingly, the levels of Foxp1 mRNA expression appeared to be down-regulated only marginally.

Conclusion: These results suggest that the down-regulation of Foxp1 expression in Tfh cells is primarily mediated at the post-transcriptional level. Investigation of the signals and regulators of Foxp1 protein expression will be a critical future study, as the manipulation of Foxp1 levels in an immune response may provide a novel way to enhance vaccinations.

Poster: 70

Heme oxygenase-1 Protects Bone-Marrow-Derived Neutrophils Stimulated with Phorbol Myristate Acetate and Reduces Reactive Oxygen Species

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Introduction: Neutrophils are broadly considered the first responders to invading pathogens. They are known to phagocytose and kill pathogens by generating reactive oxygen species (ROS). While ROS can kill pathogens, they are responsible for damaging host cells as well. Antioxidant enzymes are therefore important in limiting neutrophil-mediated damage. The antioxidant enzyme heme oxygenase 1 (HO-1) protects against oxidative stress imposed by free heme by catalyzing its degradation. Additionally, heme degradation products have also been implicated in maintaining antioxidant enzymes in their reduced state, allowing them to carry out their protective functions.

Objectives: The objectives of this research are to: 1) determine if HO-1 plays a protective role in activated neutrophils, and 2) determine if HO-1 reduces ROS within activated neutrophils.

Methods: Bone marrow will be extracted from the femurs and tibias of wild type and HO-1-over-expressing C57BL/6 mice and pooled between groups. Neutrophils will then be isolated from the bone marrow cells via negative selection. Half of the neutrophils from each group will then be stimulated with the well-characterized neutrophil activator, phorbol myristate acetate (PMA). Each group of neutrophils will then be aliquoted into a 24 well plate and serial trypan blue exclusion assays will be conducted to determine neutrophil survival in each condition. Purity, viability, and oxidative stress will be assessed by flow cytometry immediately following stimulation.

Results: We anticipate that HO-1 over-expressing neutrophils will demonstrate improved survival following stimulation by PMA and that this survival will be associated with decreased ROS measured by flow cytometry. We do not anticipate any differences between HO-1-over-expressing and WT neutrophils in the unstimulated condition.

Conclusion: If our hypothesis is correct, we will conclude that HO-1 protects activated neutrophils and attenuates the oxidative stress associated with their activation.

Poster: 71

IDENTIFYING PATIENT-CENTERED SEXUALLY TRANSMITTED INFECTION (STI) TESTING OPTIONS TO REDUCE HIV/STI TRANSMISSION IN MEN WHO HAVE SEX WITH MEN (MSM)

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Introduction:

One in four African American men who have sex with men (AAMSM) will develop HIV in their lifetime, and sexually transmitted infections (STI) facilitate the transmission and acquisition of HIV. The objective of this ongoing study is to understand the preferences of AAMSM for STI testing through qualitative research in order to make STI testing more patient-centered and acceptable.

Methods:

Participants were recruited via flyers at bars, clubs, historically black colleges, and clinical sites at UAB. We included English-speaking AAMSM, age 16 to 35, to participate in a focus group (FG) led by a skilled moderator. Participants were asked questions related to the type of STI screening tests that they prefer. This included urine tests, blood tests, swabs of rectal area and/or genital area conducted by staff, physicians, and/or patients themselves in medical and/or non-traditional settings. Based on the FG transcript, themes were assigned and manual coding was performed to quantify the importance of each theme.

Preliminary Results:

Six of ten eligible men attended the FG . Privacy, mentioned 45 times by four participants, was the most important theme. The major themes discussed along with number of references were 1) privacy (number of responses =45); 2) comprehensive testing, counseling, and treatment (36); 3) access to self-sampling kits (31); and 4) fear of positive results (26). Limitations: 2 participants did not engage with the moderator. Subsequent sessions will allow participants to select in-depth interviews instead of FG if they prefer for reasons of confidentiality.

Conclusion:

Young AAMSM in the Birmingham area view privacy; comprehensive testing, counseling, and treatment; access to self-sampling kits; and fear of positive test results as important factors when seeking STI screening. Tailoring STI screening to these preferences has the potential to reduce the STI/HIV epidemic in this high risk group.

Poster: 72

Enhanced IFN-γ STAT1 Signaling in CD4 T Cell Populations and Attenuated IL-2 STAT5 Signaling Contribute to the Pathogenesis of Rheumatoid Arthritis (RA)

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Background: Type I (IFN-α) and type II (IFN-γ) interferons are important mediators of autoimmunity. However, there is conflicting evidence regarding the contribution of IFN-γ to the pathogenesis of RA. We recently showed a strong association of IFN-γ receptor 1 (*Ifngr1*) expression and of IFN-γ receptor 2 (*Ifngr2*) expression in peripheral blood mononuclear cells (PBMC) with the presence of RA and its radiographic severity, respectively (*Arthritis Rheumatol*. 2015 67:1165). IL-2 has essential regulatory function in inflammatory diseases and is considered as a potential therapy for autoimmune disease. In this study, we tested the hypothesis that RA is associated with alterations in IFN-γ and IL-2 STAT signaling within certain subsets of PBMCs.

Methods: We used a high-definition phospho-flow approach to evaluate the activation of STAT1 (assessed using antibody to phosphorylated tyrosine at position 701 [pY701]), STAT3 (pY705) and STAT5 (pY694) after stimulation with IFN-γ or IL-2. We analyzed subsets of PBMCs from 35 RA patients and 12 healthy controls (HC) as shown in Table.

Subset	**Markers**
CD4 T cells	
Naïve	CD45RA+CCR7+
Central Memory	CD45RA-CCR7+
Effector Memory	CD45RA-CCR7-
Follicular Helper T cells (Tfh)	CD4+PD1+CX3CR5+
Regulatory T cells (Treg)	CD4+CD25hiCD127lo
CD8 T cells	
Naïve	CD45RA+CCR7+
Central Memory	CD45RA-CCR7+
Effector Memory	CD45RA-CCR7-
B cells	CD20+
Monocytes	CD14+CD11b+

Table. Subsets of PBMCs analyzed in this study.

Results: We found that IFN-γ induced STAT1 activation was significantly greater in naïve, central memory, Tfh and Treg subsets of CD4+ T cell populations from RA patients compared to HC ($p<0.05$). IFN-γ induced STAT1 activation in RA was similar to HC in effector memory CD4 T cells, all CD8 T cell populations, B cells and monocytes. Phosphatases dephosphorylate STATs to regulate the activation of cytokine induced signals. We found that phenyl-arsine oxide (PAO), a broadly active phosphatase inhibitor, had no effect on IFN-γ induced STAT1 activation in any T cell population from RA or HC. This result indicates that IFN-γ induced acute activation of STAT1 is not regulated by a phosphatase in RA or HC. IFN-γ did not activate STAT3 any mononuclear cell population among RA or HC. IL-2 very efficiently activated STAT5 in all T and B cell populations in RA and HC. The activation of STAT5 in RA was significantly greater than HC in only one population: effector memory CD4 T cells ($p<0.01$). Remarkably, treatment with PAO greatly enhanced IL-2 induced activation of STAT5 in RA, but not HC CD4 T cell populations (naïve, central memory effector memory, Treg, Tfh). PAO had no effect on STAT5 activation in CD8 T cell populations from RA and HC. This result suggests that the regulatory activity of IL-2 in RA CD4 T cell populations is attenuated by a STAT5-specific phosphatase.

Conclusions: Our results indicate that CD4 T cell subpopulation dependent enhanced IFN-γ STAT1 signals and attenuated IL2-STAT5 signals (possibly due to a phosphatase inhibitor) contribute to the pathogenesis of RA. Future studies will focus on stratifying patients by disease activity and other covariates.

Poster: 73

The Proteome of *Chlamydia trachomatis* Plasmid Regulated Genes

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Introduction: The *Chlamydial trachomatis* plasmid has been identified a key virulence factor; however, an in depth proteomic analysis of the plasmid's role in virulence factor gene regulation of has yet to be conducted.

Objectives: The primary objective of this study was to determine the role of the plasmid proteomically by comparing site directed plasmid gene product (pgp) null mutants to wild-type organisms.

Methods: We performed a liquid chromatography tandem mass spectrometry proteome analysis of cervical epithelial cells infected with plasmid-positive, plasmid-negative, plasmid-negative complemented, pgp3 and pgp4 null mutants. Gene Ontology enrichment analysis was performed on each sample to determine relative differences in host proteome responses to each respective mutant. The proteomic findings were validated by immunoblotting and confocal microscopy.

Results: Overall protein expression patterns for infection conditions P+, P-, P- Complement, pgp3 and pgp4 null mutants revealed similar clusters of conditions by 1-Pearson analysis: (P+, P- Complement and pgp3 null) versus (pgp4 null and P-). These clusters indicate a stronger similarity between P+ and the P- Complement than between P+ and P-, and a significantly smaller impact on other Chlamydia proteome by pgp3 null mutant than by pgp4 null mutant. The overall expression pattern of P- is significantly ($P<.05$) more similar to the pgp4 SNP than other strains. 10 out of the 118 proteins in pgp4 null are down-regulated with greater than 2-fold change and all shared by the P- strain. These proteins were: CT798 (glgA), CT702 (conserved uncharacterized protein), CT412 (polymorphic outer-membrane protein A, pmpA), CT049, CT050, CT051 (pmp-like proteins) and CT142, CT143, and CT144 (putative type III effectors). Gene Ontology enrichment analysis of host proteins revealed a stronger host defense response as well as higher tumor necrosis alpha induced protein 2 and 3 (TNAP2-3) protein levels in P+ samples compared to P- strains and mutants. Confocal analysis of intra-inclusion space revealed intense staining of CT143 and CT144 in the plasmid bearing, the P- complement and the pgp3 null strains and a loss of signal in both the pgp4 null and the P- strain.

Conclusion:

We conclude that the restricted core of pgp4 regulated chromosomal genes identified herein are the key plasmid-dependent virulence factors whose function in chlamydial pathogenesis is unknown. By focusing on this subset of genes, it should now be possible to achieve this important goal using recently developed genetic tools for generating chlamydial mutants.

Poster: 74

Breast Cancer MHCII Expression and Radiation on T Cell Response and Repertoire

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Introduction: The MHCII molecule, part of the antigen presentation pathway normally expressed on dendritic cells and macrophages, has been correlated to better prognoses when ectopically expressed on breast cancer cells. Studies have shown that this effect is dependent on an adaptive immune response and that cancer cell MHCII expression leads to increase infiltration and decreased exhaustion of T cells as well as a broadened T cell repertoire. In addition, radiation therapy is a treatment for many cancers which has also been shown to broaden the T cell repertoire.

Objectives: The objective of this study was to determine the effects of breast cancer MHCII expression and radiation therapy on T cell response and repertoire.

Methods: TS/A cells, a murine mammary adenocarcinoma cell line, were transfected with CIITA, the transcriptional activator for MHCII, or an empty vector. These cells were then injected into the mammary fat pads of syngeneic BALB/c mice, and after a period of growth, the tumors were irradiated with either 6, 9, or 12 gray in a split dosing schedule. The tumors were then harvested and processed for analysis by flow cytometry for lymphocyte markers of activation and exhaustion, among others.

Results: At all doses of radiation, the tumors from MHCII expressing cells had reduced growth when compared to controls. The flow cytometry analysis has not been completed for all of the samples at this time. However, it is expected that the MHCII expressing tumors will show greater T cell activation and decreased exhaustion, and the tumors which were irradiated will show broadened repertoire leading to an overall increased anti-tumor response.

Poster: 75

Investigating the Cumulative Burden of Chlamydia in Women Presenting to an Emergency Department

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INTRODUCTION

Chlamydia trachomatis (CT) infection is asymptomatic in most women, and untreated infections can cause reproductive morbidity. Young women have the highest CT infection rates. For some young women, emergency departments (EDs) are the primary site of medical care and only site to access CT screening. Revising CT screening and treatment standards in EDs is important in addressing health care disparities in women.

OBJECTIVES

The primary study objective was to determine the cumulative burden of CT infection in women presenting to an ED.

METHODS

Females ages 16-29 years without genitourinary symptoms presenting to the UAB ED signed consent and were enrolled in a UAB IRB approved study. At a single study visit, subjects were interviewed on their medical and sexual history, provided a self-collected vaginal swab for testing for current CT infection and gonorrhea by nucleic acid amplification testing (NAAT), and underwent phlebotomy to obtain sera for CT antibody testing by CT Elementary Body ELISA to identify previous CT infections. The cumulative burden of CT infection was defined as the percentage of subjects with reported previous CT infection, positive NAAT for CT, or CT seropositive.

RESULTS

Of 67 subjects enrolled, 78% were African-American. Previous CT infection was reported by 23 (34%) subjects. Two subjects had a NAAT positive for CT and neither reported previous CT infection. Not factoring in CT antibody testing (currently pending), the cumulative CT infection burden was 37%.

CONCLUSION

Over one-third of women presenting to the ED reported previous CT infection or had current infection. CT antibody testing will likely reveal many subjects with unknown previous CT infection. High cumulative burden of CT infection in young women presenting to the ED suggests the ED may be a site where frequent CT screening is warranted for young women to address missed opportunities for CT detection and treatment.

Poster: 76

Circulating levels of pro-inflammatory cytokines are associated with increased pain sensitivity and greater clinical pain severity in people living with HIV (PLWH) and chronic pain

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Human immunodeficiency virus (HIV) is a chronic infectious disease that causes inflammation. Antiretroviral therapy (ART) reduce inflammation, but not to normal levels. Inflammation can substantially exacerbate, if not cause, many types of chronic pain. The burden of chronic pain in PLWH is substantial, with prevalence estimates ranging from 39 to 85%. While chronic pain disorders are often heterogeneous (neuropathic, musculoskeletal) among PLWH, inflammation may represent a common contributor to poor chronic pain outcomes, yet this remains unknown. This study examined whether circulating pro-inflammatory cytokine levels were associated with experimental pain sensitivity and clinical pain severity in PLWH with chronic pain. Thus far, 28 PLWH with chronic pain (median CD4+ = 682.4; 11% detectable viral load >200; 89% on ART) were recruited from an HIV clinic that provides comprehensive medical and social services. Blood samples were collected initially for the assay of circulating pro-inflammatory cytokine levels, specifically interleukin-6 (IL-6) and tumor necrosis factor – alpha (TNF-□). Participants then completed the Brief Pain Inventory prior to quantitative sensory testing of sensitivity to painful heat and mechanical stimuli. Analyses revealed that higher circulating IL-6 was significantly associated with greater temporal summation of heat pain at 44^0C ($r = .627$, $p < .001$) and 46^0C ($r = .602$, $p = .001$), greater temporal summation of mechanical pain at the trapezius ($r = .558$, $p = .002$), and greater self-reported clinical pain severity ($r = .372$, $p = .05$). Higher circulating TNF-□ was significantly associated with temporal summation of mechanical pain at the hand ($r = .457$, $p = .015$) and trapezius ($r = .440$, $p = .019$). These results tentatively suggest that inflammation may represent a shared mechanism underlying heightened experimental pain sensitivity and greater clinical pain severity in PLWH with chronic pain, which may have implications for treatment of this important co-morbidity in HIV.

Poster: 77

Late Onset Sepsis in Neonates with Dysbiosis from Altered Succession

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INTRODUCTION: Primary succession of microbial species that populate the mammalian intestinal tract is critically important to host health. Newborn mice share a similar microbiome to preterm infants and offer an underutilized model to study colonization dynamics of the premature intestinal tract. In this developing ecosystem, opportunistic pathogens commonly overgrow and translocate into the bloodstream, causing Late Onset Sepsis (LOS). Clinical investigations have suggested a role for the microbiome in the pathogenesis of LOS, but the exact mechanisms remain unclear.

OBJECTIVES: The objective of this study was to develop a murine model of LOS and identify how the microbiome offers buffering capacity against intestinal blooms to prevent blood-borne infection.

METHODS: We used a variety of methodologies in this study. Virulent and avirulent strains of *Klebsiella pneumoniae (Kp)* were engineered to express luminescent and fluorescent proteins for *in vivo* and *ex vivo* monitoring of LOS. Culture-based methods and 16s rRNA sequencing technology was employed to study microbiome communities. Various immunologic and histological methods were also employed.

RESULTS: We were successful in developing a model of LOS. We find protection from *Kp* overgrowth coincides with the presence of anaerobic bacteria in the neonatal microbiome. Gnotobiotic rearing of adult mice make them susceptible to *Kp* overgrowth and sepsis. Interestingly, susceptibility in neonatal mice without any obligate anaerobes correlates with presence of *Lactobacillales*. Altering *Lactobacillus* colonization with maternal antibiotic exposure changes susceptibility to LOS and correlates with colonic epithelial cell hypoxia. Fecal transplantation increases *Lactobacillus* species in neonates and protects against LOS.

CONCLUSIONS: Taken together, these data suggest that pioneering members of the microbiome offer an important buffering capacity to prevent overgrowth and blood-borne infections by opportunists. Perturbing colonization dynamics of the microbiome through the use of broad-spectrum antibiotics may dramatically reduce this capacity and lend an already vulnerable host further susceptible to opportunistic infections.

Poster: 78

Evaluation of the Cumulative Burden of *Chlamydia trachomatis* Infection in Females at an Adolescent Medicine Clinic.

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INTRODUCTION: The Centers for Disease Control and Prevention recommends testing sexually active female adolescents annually for *Chlamydia trachomatis* (CT) infection. Despite these recommendations, CT rates continue to rise, leading to complications such as pelvic inflammatory disease. CT often goes undiagnosed and untreated in asymptomatic women, so a better understanding of the true cumulative burden of CT infection could improve CT screening recommendations.

OBJECTIVES: Evaluate the cumulative burden and predictors of CT infection in female adolescents.

METHODS: Female adolescents seen at the Children's of Alabama Adolescent Medicine Clinic were enrolled for a single study visit after providing written informed consent. Participants were interviewed regarding demographics, symptoms, medications, prior sexually transmitted infections, and sexual history. They were asked to self-collect a vaginal swab for CT and *Neisseria gonorrhoeae* testing by nucleic acid amplification (NAAT). Participants underwent phlebotomy and serum extracted from the blood was tested for CT antibodies using a CT Elementary Body ELISA (Bakshi RK, et al. J Infect Dis 2017 Jun 1;215:1653-6). The cumulative CT burden is the proportion of subjects reporting a prior CT infection, having a positive CT NAAT, or being CT seropositive. The project is approved by the UAB IRB.

RESULTS: 30 patients have been enrolled to date. One patient (3.3%) reported prior CT infection and tested CT NAAT positive. CT antibody testing is ongoing and it is expected that the cumulative CT burden will likely be much higher than 3.3% once CT antibody testing results are considered.

CONCLUSION: Results from CT antibody testing are pending, but they will likely show CT seropositivity is much greater than vaginal CT NAAT positivity or reported prior CT infection. This is because most CT infections go undetected and asymptomatic women are often not tested. More frequent routine CT screening could improve CT detection in this patient population.

Poster: 79

Universal Screening for Hepatitis C in an Inpatient Psychiatric Patient Population: Preliminary Results

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Introduction: Individuals infected with Hepatitis C virus (HCV) represent a significant burden on the American healthcare system. The seriously mentally ill population and its' relationship to HCV infection has not been well characterized beyond the establishment of a substantially increased risk and reduced access to both screening and treatment services.

Objective: Our objective is to identify the prevalence of HCV infection among persons admitted to the UAB Centers for Psychiatric Medicine (CPM) and to determine the characteristics of persons identified with HCV infection.

Methods: Systematic universal screening for HCV in individuals admitted to the Center for Psychiatric Medicine at UAB Hospital was implemented in December of 2016. Data was gathered on individuals tested between December 2016 and June 2017. Only unique individuals were included in our analysis. Basic descriptive statistics were used to characterize the population.

Results: 556 of 995 individuals admitted during the study window were tested. The overall HCV prevalence rate in the population was 18.35%. 27% of white individuals were positive; while 7% of black individuals were positive. 22% of males were positive; while 14% of females were positive. 28% of negative patients were uninsured; while 52% of positive patients were uninsured.

Conclusions: Our preliminary results further confirm that individuals with psychiatric diagnoses are at a significantly elevated risk for contracting HCV. If the demographic patterns hold, in this population white males are at highest risk. This may be related to higher incidence of IVDA in this population. Significant barriers to treatment will exist for this population since over half of those testing positive are uninsured. If we wish to slow the spread of this disease, public health initiatives aimed at providing treatment to this population will be essential. In the future, we hope to provide more granular information on primary diagnoses in the population and to assess the results of our linkage to care program.

Poster: 80

Reverse Syphilis Screening Algorithm Fails to Demonstrate Cost Effectiveness in Persons Living with HIV

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Background: The reverse syphilis screening algorithm is widely used for annual syphilis screening in persons living with HIV (PLWH) even in the absence of comparative and cost effectiveness data justifying its use. We hypothesized that the reverse syphilis screening algorithm would not be cost effective in PLWH with a high seroprevalence of treponemal EIA, which requires additional and costly confirmatory testing.

Methods: A decision tree analysis compared the cost effectiveness of annual syphilis screening for PLWH engaged in care using 1) the reverse and 2) the traditional algorithms. The Incremental Cost Effectiveness Ratio (ICER) calculated the cost of providing the reverse relative to traditional screening algorithm per QALY using TreeAge Pro 2016, Williamstown, MA.

Results: The ICER (incremental cost effectiveness ratio) of the reverse relative to traditional algorithm is $300,817/QALY. There were more false negative results using the traditional (0.8%) relative to reverse algorithm (0%). There were more patients incorrectly identified as having syphilis infection using the reverse (2.5%) relative to traditional algorithms (0.1%), all of whom had previously treated syphilis.

Conclusions: The reverse syphilis screening algorithm is more costly than the traditional algorithm when used for routine screening in PLWH. Health systems should consider the costs before adopting the reverse algorithm.

Poster: 81

Prevalence and Assessment of Pseudobulbar Affect in the Multiple Sclerosis Patient Population

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Introduction

Pseudobulbar affect is often under-recognized, misdiagnosed, and undertreated. There is also few and divergent data indicating a lack of uniformity of evidence (3). Governmental and professional entities have often reported a higher prevalence of PBA than what is cited in textbooks[(4)]. Studies have reported that PBA occurs in approximately 10.1% across the commonly associated neurological conditions and is under-recognized.

Objectives

The primary objective of this study is to affirm the prevalence of Pseudobulbar Affect (PBA) in the Multiple Sclerosis (MS) population via well-accepted survey criteria. We also seek to analyze modalities of diagnosis of PBA in MS populations: Center for Neurologic Study – Liability Scale (CNS-LS) and Pathological Laughing and Crying Scale (PLACS) versus Physician Diagnosis and (3) Who also seek to stratify the diagnosis of PBA versus Clinical Depression based on the CNS-LS and Patient Health Questionnaire (PQH-9) questionnaires.

Methods

The study population will include patients with a diagnosis of multiple sclerosis. Participants will be invited to take a survey will either be mailed to them at home or will be presented to them in follow-up clinic. The survey will assess whether the patient exhibits signs and or symptoms of PBA and/or clinical depression based on the Pathological Laughing and Crying Scale (PLCS) and the Center for Neurologic Study – Liability Scale (CNS-LS). The Patient Health Questionnaire-9 to distinguish PBA from Major Depressive Disorder. Data will be analyzed using JMP statistical software.

Results

Still in process. Results will be completed in the month of October.

Conclusion

We hypothesize that the prevalence of PBA in is higher than the reported prevalence of PBA amongst the population of neurological conditions. Using the CLS-LS, PLACS, and physician impression, we think that the surveys will be able to detect the PBA via CNS-LS>17 with the reported sensitivity of 0.94 and 0.825 respectively[(5)] in comparison to physician impression. We suspect that in conjunction to use of the PHQ-9, we hypothesize that due to the wording of the questionnaire a significant amount of the population diagnosed with PBA will have Major Depressive Disorder as a confounding factor as excessive tearfulness can also be symptoms of both PBA and MDD.

Poster: 82

Antiviral Antibodies in CMV Transmission via Breast Milk

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Introduction:

Congenital CMV infection is a leading non-genetic cause of hearing loss and other neurodevelopmental disabilities in children. Breast milk transmission of CMV is important in the epidemiology of CMV infection in the population and infected children shed virus in saliva and urine prolonged periods serving as reservoirs of virus spread to caregivers and other children. Although CMV infection acquired via breast milk in healthy infants is not associated with sequelae to the infant, this setting provides a unique opportunity to understand immunologic determinants of CMV transmission at the mucosal surface.

Objectives:

Our objective was to characterize CMV-specific IgG antibodies in breast milk and their role in transmission.

Methods:

The levels of CMV-specific IgG in serial breast milk samples were quantitated by an ELISA using whole virus lysate as the antigen. The presence and levels of antiviral antibodies were compared between women whose infants acquired CMV via breast milk (transmitters) and those with uninfected children (non-transmitters).

Results:

Breast milk collected at 1, 3 and 6 months postpartum from 119 CMV positive mothers were tested. Of those, 54 (45%) had babies that acquired CMV. CMV-IgG was detected in 70% of breast milk samples from transmitters compared with 55% of non-transmitters (p=.08). None of the specimens from 13/54 (24%) transmitters and 18/65 (28%) non-transmitters were positive for CMV-IgG. When the levels of CMV-IgG were compared, breast milk from transmitters had significantly higher levels than non-transmitters (p=.02).

Conclusion:

These results suggest that majority of CMV-seropositive women have detectable CMV-IgG in breast milk. The presence of antiviral antibodies was not different between transmitters and non-transmitters. However, higher levels of anti-CMV antibodies in breast milk from non-transmitters suggest a protective role for antiviral antibodies. Studies are ongoing to define the specificity and functions of anti-CMV antibodies in breast milk.

Poster: 83

Retinal Pigment Epithelium (RPE) Phenotypes in Donor Eyes with Age-Related Macular Degeneration (AMD)

AUTHORS:

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INTRODUCTION: AMD causes vision loss among the elderly and can be diagnosed and managed with clinical fundus autofluorescence (AF) imaging. Organelles acquired in RPE cells over time, lipofuscin (LF) and melanolipofuscin (MLF), are the primary AF signal sources. AMD tissue microscopy can elucidate the subcellular basis of AF imaging.

OBJECTIVES: We aimed to define and characterize phenotypes of RPE morphology and AF in donor AMD eyes and to analyze frequencies and associations between these phenotypes.

METHODS: We analyzed images previously acquired from 25 RPE-Bruch's membrane flatmounts of 25 donors with AMD. To visualize LF/MLF granules and phalloidin-labeled actin cytoskeleton, a wide-field epi-fluorescence microscope was used to create 0.4 µm apical-to-basal z-stack images. Using a custom ImageJ plugin, >18,000 RPE cells were classified for morphology (Polygonal (P), Round-Mixed-Misshapen (R-Mx-Ms)) and AF pattern (Unremarkable (Ur), Aggregating/Degranulating-and-Aggregating (AD-A), and Degranulating-Empty (D-E)). Categories were pooled for statistical tractability. For each cell, we included previously determined total AF and number of neighboring cells (NN, derived from Voronoi diagrams).

RESULTS: P, Ur, and P/Ur were the most abundant morphology, AF pattern, and combination, respectively. Compared to the reference combination P/Ur, considered normal, all combinations differed significantly in mean cell area, AF intensity, and/or NN. R-Mx-Ms/AD-A and P/U had the largest and smallest mean area, respectively. R-Mx-Ms/Ur and R-Mx-Ms/D-E had the brightest and dimmest mean AF, respectively. R-Mx-Ms/AD-A and P/D-E had the most and fewest mean NN, respectively.

CONCLUSION: We quantified the frequency of RPE phenotypes in a systematic unbiased sample of AMD tissues. RPE cells expand in area as they lose normal cytoskeletal and AF properties and lose AF intensity as LF/MLF granules are disbursed, aggregated and eventually shed. Data support recent evidence from clinical quantitative AF imaging that AMD eyes exhibit low AF rather than high AF as originally expected from studies in animal models.

Poster: 84

Development and Validation of dried blood spot assay to determine maternal cytomegalovirus seroprevalence in differing racial/ethnic groups

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Background: Congenital cytomegalovirus (cCMV) infection is the most common cause of congenital infection worldwide leading to permanent disabilities. Rates of cCMV are higher in populations where maternal CMV seroprevalence is higher. In the US, significant racial disparities exist in the prevalence of cCMV with offspring of non-Hispanic black women being two times more likely than non-Hispanic white infants to have cCMV. In a recent CHIMES study, it was found that Hispanic white infants have significantly lower cCMV rates than black and white infants.

Objectives: The objective of this study was to validate a newborn dried blood spot (DBS) assay for CMV antibodies to allow for the assessment of maternal CMV seropositivity and their correlation with the differing cCMV rates in across racial and ethnic groups across ages.

Methods: To validate the DBS assay with an in-house ELISA technique to detect CMV IgG antibodies, 40 paired serum and DBS control samples from ongoing studies of CMV seropositive and seronegative women were utilized. These 40 serum specimens were also run on a commercial CMV IgG kit to determine CMV IgG status. Whole blood from controls was blotted on filter paper and samples were punched in 2-3 diameter discs and soaked overnight in elution buffer at 4ºC with the resulting blood eluate used for CMV IgG testing. 597 DBS samples randomly selected from the CMV and Hearing Multicenter Screening (CHIMES) Study repository at UAB were used to determine maternal CMV seroprevalence.

Results: The results from the 40 paired serum and DBS control samples ran on the in-house ELISA were concordant. The overall maternal CMV seroprevalence was 73.5% across all three racial and ethnic groups, with seroprevalence increasing with increasing age in all groups. Non-Hispanic white women had the lowest seroprevalence with rates ranging from 34.2%-58.95%. Black women had higher seroprevalence ranging from 63.8%-87.5%. Hispanic white women had the highest seroprevalence rates ranging from 86.1% in women <20 years of age to 95.04 in women 30-34 years of age.

Conclusions: Neonatal DBS cards can be successfully utilized to determine maternal CMV antibody status. Higher CMV seroprevalence was observed in non-Hispanic black women and Hispanic white women compared with non-Hispanic white women. Maternal seroprevalence was highest in Hispanic white mothers. Further research is needed on the paradox of why Hispanic white mothers do not have corresponding higher rates of cCMV observed in their offspring.

Poster: 85

Impact of exercise and sleep hygiene on depressive symptoms in Parkinson's disease patients

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Introduction

Exercise has beneficial effects on motor symptoms and quality of life in patients with Parkinson's disease (PD), but its effect on depression is less certain.[1] Poor sleep quality is associated with depression in the general population.[2]

Objectives

Ascertain the differential effects of exercise and sleep hygiene on depression in PD.

Methods

This ongoing, randomized, controlled trial investigates the impact of a novel exercise intervention, compared to sleep hygiene instruction, on symptoms of depression in PD. Participants in the exercise (Ex) group receive 16 weeks of supervised exercise training focused on strength, power, balance, and endurance exercises three times weekly. The Sleep Hygiene (SH) participants do not exercise but receive instruction on improving sleep hygiene. All participants were evaluated with the Beck Depression Inventory (BDI-II) at baseline and following the 16-week intervention. In the BDI-II, a higher score indicates more symptoms of depression. Statistical analysis was performed in Jmp Pro12, using repeated measures ANOVA. Thus far, data at baseline and post-intervention has been collected for 32 PD participants: 14 in the Ex group and 18 in the SH group.

Results

BDI-II in the Ex group was 9.21±9.46 (mean±SD) at baseline and 10.57±9.49 post-intervention, (F=0.45, p=0.51). The BDI-II was 9.67±6.43 at baseline and 6.72±4.60 post-intervention in the SH group (F=7.52, p=0.014). Evaluation of participants with baseline depression (BDI-II>11) showed a change from 22.5±4.8 at baseline to 18.5±3.9 post-intervention in the exercise group (F=0.92, p=0.41) (N=4) and 16.9±3.24 at baseline and 10.4±4.1 post-intervention in the SH group (F=21.24, p=0.004) (N=7).

Conclusions

A sleep hygiene intervention significantly improved depressive symptoms in PD patients. The exercise intervention did not change symptoms of depression, as measured by BDI-II. These findings highlight the importance of sleep quality on symptoms of depression in patients with PD.

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Poster: 86

Statistical Modeling of Immunogenetic Determinants of Chlamydia Reinfection in African American Women

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INTRODUCTION: Chlamydia in women may lead to severe sequelae, including pelvic inflammatory disease and infertility. African Americans have the highest rates of chlamydia, with nearly six-fold higher rates than Caucasians. Even after controlling for sociodemographic factors, African American women still have higher rates of chlamydia, suggesting immunogenetic factors could influence chlamydia risk. Preliminary data from our group suggests one allele, HLA-DQB1*06, contributes to chlamydia reinfection. A more comprehensive approach is needed to understand immunogenetic markers associated with chlamydia reinfection.
OBJECTIVES: The primary objective was to statistically model the immunogenetic determinants of chlamydia reinfection in African American women.
METHODS: A comprehensive DNA array for screening single nucleotide polymorphisms within the major histocompatibility complex (MHC) and other immune genes was performed on genomic DNA collected from 400 African American women diagnosed with genital chlamdyia infection at the Jefferson County Department of Health STD Clinic. Statistical imputation will facilite the analysis of differences in immunogenetic markers between women with vs. without chlamydia reinfection detected at a 3- or 6-month follow-up visit after treatment, controlling for potential demographic and clinical confounders.

RESULTS: Of 185 African American chlamydia-infected women evaluated in our preliminary analysis, the median age was 22 years (range 16-38). 94 (51%) reported prior chlamydia. Co-infection diagnoses at baseline included trichomoniasis (5%), candidiasis (13%), and bacterial vaginosis (26%). Chlamydia reinfection occurred in 42 (20%) of participants. We did not find a significant association between demographical or clinical characteristics with reinfection. Imputation analyses are ongoing.

CONCLUSION: Evaluation of genetic markers such as HLA-DBQ1*06 may offer important clinical guidance, including warranting more frequent chlamydia screening in patients with this allele and a test of cure after chlamydia treatment. Comprehensive genotyping and statistical modeling may help determine whether HLA-DQB1*06 is a causal gene variant or a surrogate for other causal genetic markers in the MHC.

Poster: 87

Lysosomal Dysfunction in Progranulin-Deficient Primary Neurons

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Introduction: Loss-of-function mutations in progranulin (GRN) are a major genetic cause of frontotemporal dementia (FTD). It is known that these mutations cause lysosomal dysfunction; however, the role progranulin plays in normal lysosomal function is not well-established. Lysosomal proteins and enzyme activity are elevated in both FTD-GRN patients and a mouse model, but this elevation had not been shown in primary cortical neuron culture. We have also observed abnormal exosome secretion, which may be a mechanism to compensate for lysosomal dysfunction.

Objectives: One objective was to demonstrate that primary cortical neurons lacking progranulin exhibit a phenotype of lysosomal dysfunction similar to human patients and mouse models. Another objective was to show that, upon inhibition of exosome release from neurons, the lysosomal phenotype would be worsened.

Methods: Primary cortical neurons were harvested from day-in-vitro 15 embryos and were grown in Neurobasal™ media for 8 days. Protein was analyzed using western blot. Activities of β-hexosaminidase, β-glucocerebrosidase, β-galactosidase, and β-glucuronidase were assessed using 4-methylumbelliferone enzyme assays. Acid sphingomyelinase activity was assessed using an Amplex Red enzyme activity kit. Exosome release was inhibited by treatment with the neutral sphingomyelinase inhibitor GW4869 (5, 10, or 20 μM) for 48 to 72 hours.

Results: Progranulin knockout neurons showed increased activity of lysosomal enzymes like what is seen in FTD-GRN patients and progranulin knockout mice. Treatment with GW4869 worsens this phenotype, with lysosomal enzyme activity increased even further.

Conclusions: The primary neuron model of progranulin deficiency exhibits a similar phenotype to the previously-accepted model of disease, supporting the idea that neuronal lysosomal dysfunction contributes the disease state. Exosome release seems to alleviate some of this dysfunction, as treatment with GW4869 appears to worsen lysosomal phenotype. These studies lay the foundation for further mechanistic investigation of the role of progranulin in lysosomal function.

Poster: 88

Identification of Herpes Simplex Virus (HSV) Shedding In The Female Genital Tract Of Pregnant Women By The Xpert HSV 1/2 Assay and Routine PCR

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Introduction: Despite advances in treating neonatal HSV, many babies continue to die or develop long-term neurologic sequelae as a result of intrapartum transmission. Screening of women at deliver to detect those who are shedding HSV has the potential to provide targeted preemptive therapy to their exposed neonates, thereby preventing neonatal HSV disease in the first place. Currently, real time PCR is the standard for diagnosis of HSV, however this method consists of many steps and requires technical training to perform the test correctly. The Xpert HSV 1/2, a new assay that requires little training, runs in a much shorter time than standard PCR, and may allow large scale screening in the labor and delivery suite.

Objectives: To estimate the positive percent agreement and negative percent agreement of the Xpert HSV 1/2 Assay relative to routine PCR for detecting HSV DNA in the genital tract of pregnant women admitted with the intent of delivery.

Methods: Vaginal swabs were obtained from 12,500 asymptomatic pregnant women with the intent to deliver and no evidence of HSV lesions. Approximately half of the samples are being assessed by Xpert HSV1/2 PCR and routine PCR, while the other half are being stored for possible future testing. Xpert and routine PCR results from samples tested will be compared, and positive and negative percent agreements will be calculated.

Results: Routine PCR and Xpert PCR runs are in progress. Preliminary results from an interim analysis of 1301 samples yielded 99% negative agreement and 66% positive agreement for either HSV-1 or HSV-2. This interim analysis also showed an excellent relationship between viral loads determined by the real time PCR assay and the HSV-2 cycle threshold values from the Xpert HSV 1/2 Assay.

Conclusion: These interim results from routine real time PCR and Xpert PCR results suggest that this new method holds promise and may eventually become useful for potentially screening in pregnant women.

Poster: 89

Visual-Vestibular Integration Tasks As Possible Biomarkers for Concussion Injury

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Introduction: Concussion affects 1.6 to 3.2 million athletes. Impairments are heterogeneous but athletes typically present with dizziness, balance and visual disturbances. The purpose of this study was to examine vestibular and visual function in athletes with and without concussion. **Objectives:** Determine which, if any, visual or vestibular measures may be implicated commonly in concussion injury.

Methods: Concussed (n= 39) and non-concussed (n= 84) athletes completed a robust oculomotor and vestibular testing protocol in a Neurokinetics™ enclosed rotary chair system equipped with a 100 Hz eye tracker. A number of cognitive, visual, and vestibular measures were ascertained to include oculomotor tests (e.g. saccades, smooth pursuit and optokinetic), tests of VOR function (e.g. sinusoidal harmonic acceleration and step test), visual and auditory reaction times, and visual/vestibular interaction (e.g. VOR cancellation and enhancement). **Results:** VOR gains were not affected by concussion injury themselves, but performance on tests integrating VOR and vision such as VOR suppression (Non-concussed (NC) Gain: 0.17±0.06, Concussed (C): 0.22±0.10, p-value <0.001), VOR enhancement (NC Gain: 1.03±0.08, C: and subjective visual vertical (NC Average Variance: 0.86±0.86, C Variance: 2.25±2.00, p-value<0.001) were significantly lower in the concussed participants. Saccadic data are currently under further analysis. **Conclusions:** Based on this preliminary data, it seems that peripheral vestibular function is intact in concussion. However, cortical sensory integration of vestibular signals may be impaired, specifically vestibular-visual integration. Further investigation needs to be done to see changes in a single individual from baseline function to post-concussion function, and to ascertain whether these deficits are due to sensory integration problems or higher level processes known to be impaired already in concussion such as attention.

Poster: 90

Cytotoxicity of human monocyte-derived macrophages and THP-1 cells infected with *Mycobacterium tuberculosis*.

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Lack of knowledge about the metabolically quiescent state of macrophages infected with *Mycobacterium tuberculosis* (*Mtb*) is hindering our ability to model and understand clinically latent tuberculosis infection. The primary objective of this study was to determine whether bioenergetically quiescent PMA-differentiated THP-1 cells (a human leukemia monocytic cell line) and human monocyte-derived macrophages (hMDMs) infected with *Mtb* are viable or undergoing cell death. Lactate dehydrogenase (LDH) released from *Mtb*-infected THP-1 cells and hMDMs was quantified spectrophotometrically as an indicator of cell membrane compromise, implicating cytotoxicity. Quantification of LDH released from uninfected cells controlled for spontaneous LDH production, while quantification of LDH released from uninfected cells lysed with 0.1% Triton controlled for maximum LDH production. THP-1 cells were infected at multiplicity of infection (MOI) of 1 to avoid inducing toxicity and cell lifting, while hMDMs were infected at MOI 4 to simulate metabolic quiescence. PMA-differentiated THP-1 cells infected with *Mtb* exhibited more cytotoxicity than those infected with BCG vaccine strains of *Mycobacterium bovis*, while cells infected with heat-killed *Mtb* displayed the least cytotoxicity. Infected hMDMs retained the same cytotoxicity trend observed in infected THP-1 cells, with most cytotoxicity observed in *Mtb*-infected hMDMs and the least in heat-killed *Mtb*-infected hMDMs. The cytotoxicity in *Mtb*-infected macrophages shown in this study warrants further investigation of the potential mechanism(s) of cytotoxicity occurring in these cells, including apoptosis, necrosis, and autophagy. The mechanism(s) driving the lack of viability of these macrophages may provide molecular targets that could prevent reactivation of latent TB in the clinical setting.

Poster: 91

Short latency cortical potentials elicited by DBS for movement disorders: an electrocorticography study

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INTRODUCTION: Deep brain stimulation (DBS) can remarkably improve severe motor symptoms from Parkinson's disease and other movement disorders. Despite this, its therapeutic mechanism is unclear, and we lack robust biomarkers to implement increasingly complex device technologies. Prior electroencephalography studies suggest that clinically effective high frequency DBS elicits short latency scalp potentials, such that stimulus-evoked electrophysiology could eventually be used to guide DBS therapy.

OBJECTIVES: To investigate whether stimulation elicits short latency activation of ipsilateral cerebral cortex with electrocorticography (ECoG) during DBS surgery.

METHODS: In two patients with Parkinson's disease, we delivered pairs of DBS pulses in the subthalamic region at clinically effective amplitudes and recorded cortical activation with ECoG over primary somatosensory cortex. We delivered single and paired pulses in a randomized block permutation with interstimulus intervals ranging between 0.04 and 30 ms. We measured the amplitude, latency, absolute/relative refractory periods, and spatial distribution of short latency cortical potentials elicited by DBS.

RESULTS: ECoG detects activation of ipsilateral cortex elicited by subthalamic DBS. In both participants, the potentials display short latencies (1.18 and 0.87 ms) and absolute (0.54 and 0.7 ms) and relative refractory periods (1.76 and 1.8 ms), consistent with neuronal activity. During the relative refractory period, response latency and amplitude increase and decrease, respectively, as the interstimulus interval approaches the absolute refractory period.

CONCLUSION: Single and paired DBS pulses in the subthalamic region activate ipsilateral cerebral cortex at short latencies. The timing and refractory periods of these responses are consistent with retrograde activation of cortical axons that project into the stimulation site. Our findings validate prior electroencephalography studies and suggest that stimulus evoked cortical could represent a viable biomarker to guide emerging directional and closed loop stimulation paradigms.

Poster: 92

Effects of brain illness on visuospatial search patterns in patients undergoing acute inpatient rehabilitation.

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Introduction

Cancellation tests have been used to predict rehabilitation outcomes, but without evaluating the coordination between hand and eye movements. In this preliminary study, we tracked subjects' hand movements and eye movements during a task that involves crossing out symbols on a screen on a tablet. The exercise evaluates how well the hands and eyes work together during the exercise.

Objectives

To determine whether brain illness causes individuals to be more disorganized while completing tasks.

Methods

5 adults with acute brain injury and 5 non-hospitalized control subjects completed the Star Cancellation Test 5 times each on a touchscreen computer. Software recorded the movement of the subjects' hand in space while completing the exercise. Concurrently, a Tobii eye-tracking device placed on top of the computer recorded the movement of the eyes during each test. We calculated the time it took to complete each test, the speed of hand movements, efficiency in completing each test, best R value, and average distance between the hand and eye during each test.

Results

On average, patients took a longer amount of time to complete each of the 5 Star Cancellation tests as compared to healthy controls. The average speed of hand movements was faster in patients than it was in controls. Patients were less efficient in completing the cancellation test. Patients displayed a wider range in eye movements than hand movements.

Conclusions

Results preliminarily suggest that patients with brain illness display a more disorganized approach to completing tasks than healthy controls. The increased time taken to complete a task appears to be due to the inefficiency of exploring the overall test area, rather than a difference in speed of exploration. Patients move as fast as healthy controls, but may be more distracted, lack self-organization or a strategy for skillfully completing the cancellation test.

Poster: 93

Regionally Enhanced CO_2 Sensitivity Suggests a Role for Astrocytes in Respiratory Function During Early Postnatal Development

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Introduction: The retrotrapezoid nucleus (RTN) of the brainstem modulates respiratory drive. Evidence suggests astrocytes in the RTN respond to elevated CO_2 via inhibition of astrocyte-specific inwardly rectifying $K_{ir}4.1$ channels. It is not known, however, whether this response is developmentally regulated or specific to the RTN

Objectives: To confirm that RTN astrocytes respond to CO_2 via inhibition of $K_{ir}4.1$-mediated current and determine if this response is regionally enhanced in early postnatal development.

Methods: Western blotting and immunofluorescence were performed to assess developmental $K_{ir}4.1$ protein levels. Astrocytes of postnatal day (PND) 2-3, 4-7, or 9-13 rats were patched using whole cell voltage clamp electrophysiology. ACSF bubbled with 5% (control) or 10% (hypercapnia) CO_2 with or without the $K_{ir}4.1$ channel blocker Barium chloride was perfused over slices and hypercapnia or barium-induced current changes were measured.

Results: Early postnatal expression of $K_{ir}4.1$ protein in brainstem was confirmed. In the first postnatal week (PND 4-7), RTN astrocytes demonstrated lower input resistance (p=.01) and a larger proportion of linear IV relationships (19% RTN vs 0% cortical) relative to cortex. In response to hypercapnia, RTN astrocytes showed enhanced pH-sensitive current relative to cortical astrocytes at PND 4-7 (p=.0018) and PND 9-13 (p=.005) that reversed near E_{rev} for K^+, suggesting a $K_{ir}4.1$-like dominant mechanism. RTN astrocytes also displayed a higher average CO_2/barium current amplitude inhibition (PND 4-7 p=.001; PND 9-13 p=.003). Response to CO_2 increased with age in RTN (p=.0430), but not cortical, astrocytes; however, no cortical astrocytes could be identified prior to PND 4.

Conclusions: RTN astrocytes display increasing CO_2 sensitivity in early postnatal development that is enhanced relative to cortical astrocytes, suggesting spatiotemporal significance of $K_{ir}4.1$-mediated currents. Implications for normal respiratory function as well as respiratory dysfunction in neurodevelopmental diseases suggests further investigation into the mechanisms governing regional expression of pH-sensitive $K_{ir}4.1$ channels is warranted.

Poster: 94

Analysis of Factors Contributing to Concussion Risk in the NFL

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Introduction: Among male athletes, football holds the highest rate of concussion incidence. Unfortunately, little is known about the contributing factors to concussion. As counting individual plays for athletes is time-consuming, most concussion risk measures use number of games on an active roster, which doesn't indicate the player's true game involvement.

Objectives: The purpose of this study is to examine factors that may contribute to concussion incidence in professional football players. The study focuses on position, helmet manufacturer, impact, previous concussions, play type and snap counts to determine correlation to concussion risk.

Methods: This is an epidemiological study that took documented concussion data and analyzed video of NFL games to identify the conditions of specific impacts that caused concussion. Athletes from the 2014-15 and 2015-16 National Football League(NFL) seasons were included in this study. Concussion incidence was calculated using an established Position Play (PP) metric which utilizes snap counts to calculate concussion incidence. Game film via NFL Game Pass was utilized to identify impacts that caused concussion. NFL plays were analyzed to determine helmets worn and additional data. Statistical analyses were conducted.

Results: Utilizing the PP metric, running backs and offensive skill players have the highest risk for concussion incidence. Skill players as opposed to lineman were also found to be more likely to wear a Schutt helmet. However, helmet type was found to not be statistically significant in terms of concussion incidence. Passing plays compared to running plays revealed a trend toward significantly higher concussion rates and the percentage of concussions caused by helmet-to-helmet hits have declined in the past 20 years.

Conclusion: Concussion incidence of NFL players is related to position and not to helmet manufacturer. Interestingly, the 2^{nd} and 4^{th} quarters had statistically greater numbers of concussions suggesting that fatigue may play a role in concussion incidence.

Poster: 95

Pregnancy, Labor, and Delivery Outcomes of Women with and without Spinal Cord Injury

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Introduction: Pregnancy with spinal cord injury (SCI) poses challenges to the healthcare provider and patient. Knowledge gaps exist in many areas of obstetrical and maternal management for women with SCI.

Objectives: The primary objective of this study was to examine the incidence and prevalence of complications and other outcomes in pregnant women with SCI during pregnancy, labor, and delivery and which factors differ from their non-SCI peers.

Methods: Data was gathered longitudinally and retrospectively through chart review and self-reported measures. Vital signs, urinalysis, and pregnancy-related complications were collected bi-monthly along with fetal, labor and delivery outcomes for all women. Autonomic dysreflexia, pressure sores, and UTIs were collected monthly from women with SCI.

Results: Eighteen patients were included, consisting of six SCI and twelve matched able-bodied (AB) peers based on age (+/- 4 years), parity (firstborn vs. multiparity), and race. Three (50%) of the women with SCI, compared to four (33%) of AB women experienced complications at time of delivery. Newborn mean birth weight (2854 vs 3578g, p=0.12), length (49.3 vs 45.8 cm, p=0.32), and head circumference (30.3 vs 34.5 cm, p=0.04) were all lower for women with SCI. Mean APGAR scores at 1 minute (p=0.80) and 5 minutes (p=0.31) were similar between the two groups.

None of the newborns to women with SCI and two (17%) newborns to AB women experienced breathing problems. One (17%) newborn to women with SCI and two (17%) newborns to AB women required visitation to NICU after delivery.

For SCI-specific complications, three women (50%) had UTIs, one (17%) had pressure sores, and none had autonomic dysreflexia.

Conclusions: Women with SCI tend to have more complicated courses of pregnancy and smaller newborns than their peers. Larger, comparative studies should be performed to inform women with SCI seeking childbearing and their clinicians about challenges they may experience.

Poster: 96

Utilizing a ketogenic diet to improve neuro-recovery and metabolism following spinal cord injury (SCI)

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Introduction: Implementing a ketogenic diet (KD) in acute stages after an SCI in humans may offer neuroprotection and improve glucose homeostasis. The KD is a high-fat, low carbohydrate diet designed to increase circulating levels of ketones which can confer neurons with greater ability to resist negative metabolic challenges.

Objectives: Determine if 8 weeks of KD vs. standard hospital diet (SD) following SCI significantly improves motor and sensory function, glycemic control, and gut microbial composition in patients with acute SCI.

Methods: This is an ongoing pilot study in which 3 patients are randomly assigned to either the KD (n=2) or SD group (n=1). KD composition included ≈72% total energy as fat, ≈25% as protein, and ≈3% as carbohydrate via tube feeding and 62.4% fat, 27.3% protein, and 8.3% carbohydrate via solid-feeding. American Spinal Injury Association (ASIA) neurological classification test was performed to measure neurological function, and fasting glucose and insulin were measured to determine glycemia status. Fecal samples were collected to identify changes in gut microbial composition before, 4, and 8 weeks after interventions.

Results and Conclusion: Patients in the KD group demonstrated 12.95% increase in light touch sensation, 16.1% increase in pin prick sensation, and 9% increase in motor scores. There was an 11% decrease in fasting glucose and 51% increase in fasting insulin levels in the KD group as compared to 5% increase in fasting glucose and 61% decrease in fasting insulin levels in the SD patient (pre vs. 8 weeks). In addition, there was 80% increase in Firmicutes to Bacteroidetes ratio (F/B ratio) and 25% increase in Lachnospiraceae families in gut microbiota in the KD group. F/B ratio did not change, and the percent of Lachnospiraceae families decreased in the SD group. Our preliminary results suggest KD may improve sensory function and microbiota composition in individuals with SCI.

Poster: 97

Optic nerve pit maculopathy: giant maculoschisis and treatment

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Introduction: Congenital pits form around the optic nerve head and can be associated with schisis-like activity between retinal layers. There have been reports of Optical Coherence Tomography (OCT) imaging of the optic nerve pit (ONP) maculopathy, however, a large and obvious connection between the schisis cavity and an ONP has not been previously reported.

Objectives: We present imaging of a "giant" maculoschisis cavity in direct communication with an ONP, along with its successful closure by vitrectomy and gas tamponade.

Methods: An ONP and "giant" communicating maculoschisis cavity was confirmed by spectral domain(SD)- OCT in a 24 year- old female. The central macular thickness (CMT) measured 906 microns (normal= 261.31 ± 17.67), and macular volume was 20.8mm^3 (normal =10.6$mm^{3)}$. Snellen visual acuity was 20/80. Vitrectomy with short term gas tamponade failed to resolve the schisis. Lens extraction and placement of an intraocular lens enabled repeat vitrectomy with prolonged (C_3F_8 15%) gas tamponade followed by a supplemental office liquid/gas exchange (C_3F_8 30%).

Results: After treatment, OCT imaging showed definite closure of the pit connection, with substantially reduced CMT. Sequestered from its ONP source, all schisis fluid spontaneously resolved. At final follow-up, 28 months after presentation, the macula remained dry with CMT of 331 microns and normal foveal contour. Macular volume reduced to normal (10.6mm^3), and visual acuity improved three lines to 20/50.

Conclusion: SD-OCT imaging shows the first "giant" maculoschisis cavity communicating with an ONP, which cannot be quickly displaced from the macula since there is no adjacent potential space. However, closure of an ONP communication with resolution of all schisis fluid can be accomplished by vitrectomy and prolonged gas tamponade alone. Laser barrier application to the peripapillary choroid and surgical treatments that produce traction on fragile maculoschisis tissue can be withheld unless a recurrence is detected with prolonged monitoring.

Poster: 98

Semi-automated, Multi-modal Brain Parcellation Workflow for PET/MR Neuroimaging Analysis

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Introduction: Our novel, semi-automated Multi-Modal Brain Parcellation (MMBP) workflow allows for rapid evaluation of PET/MR images, avoiding the need for lengthy, manual delineation of brain contours for PET and MR quantification.
Objective: The purpose of the study was to assess MMBP for amyloid-PET SUV and MR volumetric analysis using a pool of cognitively normal, mild cognitive impairment, and Alzheimer's dementia volunteers from the Alzheimer's Disease Neuroimaging Initiative (ADNI) database.
Methods: 112 subjects in this study were selected from ADNI, which was approved by the local Institutional Review Board at each institution. All included subjects had structural MR and AV45-PET performed within 1 year of each other. In summary, our semi-automated MMBP workflow consisted of the following steps: volumetric MPRAGE images were segmented simultaneously using parallel computing by FreeSurfer v6.0.0 (Boston, MA) loaded on a supercomputer environment (Cheaha, Birmingham, AL). Parcellated, segmented brain output files along with source MPRAGE and post-processed PET scans were then visualized and quantified using an automated workflow on FDA-approved, multi-modal imaging software – MIM v6.6.13 (MIM Software Inc., Cleveland, OH). In summary, the user selects the source images to analyze, our workflow then co-registers the three imaging modalities in succession with one another, utilizes the segmented brain to delineate the various brain regions, and transfers these contours to the PET. Corresponding scans between MMBP and the reference standard[1] were analyzed statistically with MedCalc v17.7.2 (MedCalc Software, Mariakerke, Belgium) and Matlab vR2016b (MathWorks, Natick, MA).
Results: Parallel computing allowed segmentation for all MPRAGEs to be completed in 8-10 hours overnight with additional post-processing taking less than 10 min/patient. In terms of accuracy, both global and regional relationships were shown to be highly correlated and significant with the reference standard: global SUVR ($r = 0.991$, $p < 0.0001$), frontal lobe SUV ($r = 0.997$, $p < 0.0001$), parietal lobe SUV ($r = 0.993$, $p < 0.0001$), temporal lobe SUV ($r = 0.991$, $p < 0.0001$), cingulate ($r = 0.996$, $p < 0.0001$), and entire cerebellum ($r = 0.977$, $p < 0.0001$). Additionally, high precision (<5% error) between MMBP and the reference standard was shown for global SUVR values (95% CI: -3.0% to 3.5%, Bias=0.23%) as well as all regional values (CI < ±5%). Volumetric measurements showed slightly larger 95% CI but the relationships were still within acceptable range (CI < ±10% for global). ICC values showed excellent inter-operator reproducibility for all global and regional, PET and MRI measurements (>0.97 for all).
Conclusion: A novel, semi-automated MMBP workflow allows for rapid, accurate, and reproducible PET/MR SUV measurements, proving highly suitable for both research and clinical workflow. Further validation is needed for volumetric measurements to determine source of error.

1. Landau SM, Fero A, Baker SL, et al. Measurement of longitudinal beta-amyloid change with 18F-florbetapir PET and standardized uptake value ratios. *J Nucl Med.* 2015;56(4):567-574.

Poster: 99

Synergistic Effects between Cystic Fibrosis Transmembrane Conductance Regular (CFTR) Potentiators.

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INTRODUCTION: Mutations in the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) gene result in defective anion transport (i.e. Cl^-), and lead to chronic bacterial infections in the airways of cystic fibrosis (CF) patients, including severe chronic rhinosinusitis. Ivacaftor is a CFTR potentiator that improves Cl^- transport through the CFTR channel in CF patients with at least one copy of the G551D mutation. Resveratrol has also been identified as a potent CFTR potentiator of wild type CFTR that increases mucociliary transport.

OBJECTIVES: Our overall hypothesis is that resveratrol will synergistically improve Cl^- secretion in G551D CFTR when combined with ivacaftor over either agent alone.

METHODS: Fisher rat thyroid cells (FRT) transfected with G551D CFTR and human sinonasal epithelial cells (HSNE) containing the CFTR G551D mutation were subjected to pharmacologic manipulation of transepithelial ion transport using Ussing chambers. Sequential administration of amiloride (sodium channel inhibitor), potentiators (10 µM ivacaftor and/or 100 µM resveratrol), and forskolin (20 mM, indirect activator of CFTR) was performed.

RESULTS: In FRT-G551D cells, resveratrol and ivacaftor acted synergistically to significantly increase Cl^- transport (change in short-circuit current, ΔI_{SC} = µA/cm_2) over resveratrol or ivacaftor alone and dimethyl sulfoxide (DMSO) vehicle controls (resveratrol+ivacaftor, 4.97+/-0.57 vs. ivacaftor, 0.74+/-0.12 vs. resveratrol, 2.96+/-0.52 vs. DMSO, 0.74+/-0.12; $p<0.05$ ANOVA). Maximal Cl^- secretion was also significantly enhanced (resveratrol+ivacaftor, 254.5+/-7.53 vs. ivacaftor, 217.61+/-8.27 vs. resveratrol, 148.2+/-8.28 vs. DMSO, 92.93+/-4.22; $p<0.05$). In G551D HSNE cells, the synergy between resveratrol and ivacaftor was confirmed (resveratrol+ivacaftor, 4.48+/-0.39 vs. ivacaftor, 1.05+/-0.11 vs. resveratrol, 0.84+/-0.3 vs. DMSO, 0.0+/-0.02; $p<0.05$), and maximal Cl^- secretion was enhanced with both agents (resveratrol+ivacaftor, 32.2+/-1.17 vs. resveratrol, 10.73+/-0.84 vs. ivacaftor, 21.29+/-0.85 vs. DMSO,3.88+/-0.85; $p<0.05$).

CONCLUSION: Resveratrol and ivacaftor synergistically improve CFTR-mediated Cl^- secretion and maximal activation of G551D CFTR suggesting that resveratrol could enhance current ivacaftor therapy for CF patients harboring the G551D CFTR mutation.

Poster: 100

Methylation of NF-κB RelA by SETD6 initiates histone mehylation in the hippocampus during fear memory consolidation.

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Introduction: Epigenetic changes, such as the post-translational modification of histones, have emerged as critical regulators of gene transcription in the brain; however, little is understood about the initiation of these mechanisms during memory consolidation. Furthermore, the nuclear factor kappa B (NF-κB) is required for learning and synaptic plasticity and has known epigenetic functions.

Objective: To test whether methylation of the RelA subunit of NF-κB by SETD6 plays a role in the recruitment of the GLP histone methyltransferase and initiate increases in histone 3, lysine 9 dimethylation (H3K9me2) levels at memory-associated gene regions in the hippocampus during memory consolidation.

Methods: Using protein immunoprecipitation, western blot analysis, RNA sequencing, electrophysiology, and context fear conditioning, we determined whether knockdown of SETD6 is sufficient to alter RelA methylation, H3K9me2, gene transcription, neuronal LTP, and memory behavior in rats.

Results: We found that SETD6, RelA, and GLP associate in the dorsal hippocampus during memory consolidation and that learning triggers increases in methylation of RelA at lysine K310 in the dorsal hippocampus in association with increased global H3K9me2. siRNA-mediated knockdown of SETD6 prevented increases of both RelA methylation and H3K9me2, and attenuated LTP, gene (what gene???) expression, and fear memory behavior.

Conclusion: These findings suggest that SETD6-mediated methylation of NF-κB RelA is involved in the initiation of H3K9me2 methylation required for fear memory processing.

Poster: 101

Shivani Ananthasekar

Purpose: Fifty million people worldwide suffer from chronic lung diseases with treatment being limited to lung transplantation; less than 1% benefit. An alternative is engineering bioartificial lungs which are generated by decellularizing donor lungs followed by autologous recellularization. Identifying properties of the microenvironment of the endothelial cell would reveal why achieving a functional vasculature is a reigning problem in the field. Vessel recellularization requires each cell to go through processes of attachment, migration, division, and barrier formation. However, regulation of these processes is unclear.

Methods: The goal is to explore the extent to which cellular function can be constructed around a measurable mechanical property of the cells. Key components of this mechanical work comprise of forces that the cell exerts on the substrate and its neighbors. Deformation of the substrate is also calculated. These properties are obtained using the technique called Monolayer Stress Microscopy (MSM). MSM enables a novel and straightforward quantification of the mechanical work that each cell in an advancing monolayer does on its substrate, U. We report mechanical work by three different cell types: pulmonary artery endothelial cells (AEC), microvascular endothelial cells (MEC), and pulmonary vein endothelial cells (VEC).

Results: Each cellular system had an advancing front. AECs were most uniform, being cobblestone and having negligible motion. On the other hand, VECs had non-uniform mesenchymal morphology and appreciable migration were least quiescent. The more quiescent cell type, AEC, were doing the least amount of work on their substrate, while the less quiescent cells were doing the most work.

Discussion/ Conclusion: When the cells were migrating, they moved as a sheet rather than individually. Using advancing sheets of pulmonary endothelial cells, we have built the analytical framework and opened a window onto the relationship of the mechanical work with the processes including cellular attachment, migration and proliferation.

Poster: 102

Ketamine induced NMDA-receptor blockade effects on regional cerebral blood in healthy volunteers.

J. Edward Bryant, Nina V. Kraguljac, Michael A. Frölich, Steve Tran, David M. White, and Adrenne C. Lahti

I**ntroduction**: Abnormal glutamatergic signaling in the brains of schizophrenic patients is thought to alter the interaction between the hippocampus and regions of the frontal lobe (Mickell et al 2009). These aberrations in turn might drive the behavioral changes that characterize schizophrenia such as executive disfunction, reward processing and memory formation (Bahner and Meyer-Lindenberg 2017, Kraguljac et al 2016). These changes can be mimicked in healthy participants pharmacologically with sub-anesthetic ketamine (Moghaddam B, Javitt D 2012). In order to assess the metabolic changes accompanying ketamine administration, we have used arterial spin labeling MRI to quantify cerebral blood flow in the whole brain.

Purpose: Our goal is to compare metabolic changes in these regions of interest with changes in hippocampal glutamate obtained with magnetic resonance spectroscopy to test if ketamine produces changes similar to those seen in schizophrenic patients.

Methods: Pseudo Continuous Arterial Spin Labeling scans were collected for 15 healthy participants before and during a ketamine challenge. T1 scans were also acquired. The scanner was a 3T Siemens Allegra. pCASL scans were corrected for motion, registered to T1, smoothed and CBF was quantified using the ASLtbx SPM plugin algorithms developed by Ze Wang. We reweighed the contribution of each pair to the final image according to a DVARS based approach Developed by Tanenbaum at al. Finally, The CBF images themselves were segmented and normalized to MNI space using the DARTEL toolbox. Whole brain activation was assessed using a paired t-test model with a FWE correction for multiple comparisons ($p<.05$) and the contrast was ketamine CBF-baseline CBF. ROIs were identified as a conjunction between statistically significant activation and anatomically defined regions from the Harvard cortical and subcortical atlases. Further statistical analysis was done in SPSS.

Results: We identified ROIs in te frontal pole, MPFC, insula, ACC, PCC, thalamus, amygdala, hippocampus, putamen, and pallidum.

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Poster: 103

Distribution and correlation of C-reactive protein and erythrocyte sedimentation rate in the pediatric emergency department

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Introduction: C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) are inflammatory markers often clinically ordered in tandem. Data is lacking on CRP and ESR levels in pediatric emergency department (PED) populations. Accurate understanding of these values and their interrelation will inform clinical decision-making.

Objectives: To describe the distributions of CRP and ESR values in PED patients. Secondarily, we investigate the correlation between CRP and ESR, and the potential correlations of each test with age.

Methods: This planned sub-analysis of a large retrospective study reviewed patients who had both CRP and ESR performed during a visit to a tertiary PED from 2014-2017. Values are reported as medians and interquartile ranges (IQR), as well as percentiles. Pearson's test was performed to determine correlations, with $P<0.05$ considered statistically significant.

Results: The ED visits of 3,204 patients were analyzed. The **Table** displays overall representative values, as well as values by percentile and age. There was moderate correlation between ESR and CRP among the cohort ($R=0.46$; $p<0.0001$). There was mild correlation between decreasing age and higher ESR values ($R=0.1$; $p<0.0001$), but no significant correlation between CRP and age.

Conclusion: For PED patients, inflammatory markers fall within traditional ranges of normal. Younger patients have higher ESR values. A lack of strong correlation between CRP and ESR indicates that there may be clinical scenarios in which one test may be preferable, but further investigation is necessary to delineate these specific scenarios.

Poster: 104

Peripheral Monocyte Entry is Required for Alpha-Synuclein Induced Inflammation and Neurodegeneration in a Model of Parkinson Disease

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Parkinson disease is a progressive neurodegenerative disease histologically characterized by inclusions of aggregated alpha-synuclein (α-syn) proteins. These aggregations – termed Lewy bodies – recruit the innate immune system, ultimately driving production of inflammatory cytokines and chemokines and furthering neurodegeneration. In this study, an adeno-associated virus overexpressing α-syn were injected into the brains of mice with heterozygous knock-in of fluorescent reporters in place of the first exons of the fractalkine receptor (CX3CR1) and the C-C chemokine receptor type 2 (CCR2). Here, we report that in response to expression of full-length human α-syn, pro-inflammatory peripheral monocytes (CX3CR1-/CCR2+) are mobilized to the site of injection without significant proliferation of resident microglia (CX3CR1+/CCR2-). In the same model, deletion of the CCR2 gene inhibits monocyte infiltration and attenuates dopaminergic neuron degeneration. Our results suggest a key role of peripheral monocytes in driving neurodegeneration associated with α-syn aggregate-induced inflammation and raise these monocytes as a potential target for disease-modifying therapies.

Poster: 105

The DAF-7/ TGFβ Cascade Affects Prostaglandin Metabolism, Sperm Guidance, And Sperm Gene Expression In The Adult Hermaphrodite Gonad

Authors: **Muhan Hu, BS**; *Michael Miller, PhD*

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Introduction: Successful fusion of the sperm and egg is fundamental to the development of sexually reproducing animal. It is well established that oocytes of certain marine species secrete chemoattractants to promote sperm guidance. Accumulating evidence suggest that activated sperm of internally fertilizing animals also respond to chemotactic cues in the female reproductive tract. In *C. elegans*, we have identified a group of structurally similar F-series prostaglandins (PGFs) that help guide the sperm towards the spermatheca. These PGFs are synthesized via a novel mechanism and are found in mammalian ovaries, suggesting that PGF regulatory mechanisms may be conserved. Previous studies showed that the DAF-7/ TGFβ pathway is essential for sperm guidance and PGF levels.

Objectives: The purpose of this project is to uncover the mechanism by which DAF-7/ TGFβ regulates PGF levels.

Methods/Results: Using liquid chromatography tandem mass spectrometry, I measured PGF levels in wild-type, *daf-1(m40),* and *daf-1 (m40); daf-3 (mgDf90)* mutant adults. The data indicate that the DAF-3 co-SMAD transcription factor regulates PGF metabolism. As the type I TGF-β receptor *daf-1* is partially required in the germ line, I hypothesized that DAF-3 transcriptional activity is critical in the germ line to affect PGF levels. To test this hypothesis, I conducted RNA-sequencing on wild type, *daf-1(m40)*, and *daf-1(m40); daf-3 (mgDf90)* mutant adults. I focused on a set of 179 genes that are expressed in the germ line. RNAi screening of these 179 genes identified 32 genes that might act downstream of DAF-3. Of particular interest, 25 of 32 positive RNAi clones encode for genes that are highly enriched in developing spermatocytes.

Conclusions: My data thus far support the model that DAF-3 promotes increased sperm gene expression in the adult hermaphrodite germ line, thereby down-regulating PGF levels. Current efforts are underway to understand how these sperm genes affect PGF metabolism and fertilization.

Poster: 106

Empirical argument against using placebo controls

Sadhvi Batra

Introduction: The revised Declaration of Helsinki allows placebo-control trials to be used even when there is an established therapy, provided there are adequate 'methodological' reasons for doing so. This seems to violate the principle of beneficence: where there is an established therapy, physicians treating patients with a placebo are withholding a known effective therapy.

Objective: Because of this problem, we hypothesized that clinical researchers may be unwilling to risk violating the principle of beneficence and employ placebo controlled trials in cases where there is an established therapy. In this paper, we began to investigate this hypothesis.

Methods: After summarizing the arguments for and against using placebo controls in clinical practice, we investigated the extent to which placebo-control trials are used in cases where there is an established therapy. To do this, we conducted as systematic search for all placebo-controlled trials published in 2015 in the five highest impact general medical journals.

Results: We identified 70 placebo-controlled trials. Of these, 66 were for indications where there was no established effective therapy. Only 4 used a placebo control in spite of there being an available effective therapy.

Conclusions: The infrequent use of placebo controlled trials where established therapy exists highlights a seeming discrepancy between what the Declaration of Helsinki allows and what clinical investigators believe to be ethically acceptable. The evidence presented in this paper suggests that the Declaration of Helsinki be reconsidered, and perhaps revised, in light of actual practice.

Poster: 107

Shreya Kashyap

Introduction: Radiation therapy (RT) is frequently used to treat brain tumors, but distinguishing viable tumor from treatment effects can be challenging with conventional imaging alone. Positron emission tomography (PET) with radiolabeled amino acids (AA) targeting system A and system L AA transport may be useful after RT, but characterizing early changes in PET tracer brain uptake after RT is key to using them most effectively.

Objective: Our primary objective was to compare the uptake and kinetics of [^{18}F]FAMPe (mixed System L and System A transport), [^{18}F]MeFAMP (System A transport), and [^{18}F]FDG in a rodent radiation necrosis (RN) model.

Methods: Mice treated with Gamma knife (gRT) at a dose sufficient to induce RN at 4-6 weeks later were scanned 0-60 minutes, 2 hour and 4 hour after PET tracer injection at 1 week, 4 weeks, and 8 weeks after irradiation. Imaging data were analyzed using an automated MIM workflow to evaluate PET tracer uptake and kinetics. gRT lesions was defined as the segmented contour with greater than 60% of the mean radioactivity of the whole brain contour. Radiation injury to brain ratios (RIBRs) were derived by dividing mean radioactivity per tissue volume in the gRT lesion by the mean radioactivity per tissue volume in the whole brain contour with the gRT lesion subtracted from it.

Results: [^{18}F]MeFAMP RIBRs were higher than other tracers at just 1 week after irradiation. [^{18}F]MeFAMP displayed a sustained retention pattern, unlike [^{18}F]FAMPe and [^{18}F]FDG. Average [^{18}F]FAMPe RIBRs were greater than [^{18}F]MeFAMP RIBRs at the 4 week timepoint, and identical to [^{18}F]MeFAMP at the 8 week timepoint.

Conclusion: This study shows the dynamic nature of gRT lesions in vivo, Changes in AA transporter over time after RT may inform time based PET strategies to identify and monitor radiation injury and RN.

Poster: 108

Exercise During Pregnancy

Sellers Boudreau

Background/ Intro

American Congress of Obstetricians and Gynecologists (ACOG) recommendations on exercise during pregnancy state that a woman with a low-risk pregnancy can participate in moderate exercise for ≥ 30 minutes per day on most, if not all, days of the week. However, there is limited data to support the safety of exercise during pregnancy in the obese and/or previously sedentary pregnant population.

Exercise in this population is particularly important. The CDC reports that maternal obesity is associated with chronic disease, cesarean section as mode of delivery, and elevated blood pressure during pregnancy.[3] Further, maternal obesity is the highest ranking modifiable risk factor for stillbirth in high-income countries, with population attributable risks of 8-18% and contributing to approximately 8,000 stillbirths annually.[4] Every 5-unit increase in maternal BMI increases the risk for stillbirth, neonatal death and infant death.[5] Infants born to obese mothers and those who gain more than the recommended amount of weight during pregnancy are at a higher risk for developing cardiovascular disease, hypertension, and obesity and are more likely to have lower math, reading, and spelling scores.

Methods

For our study, we will survey all postpartum women prior to hospital discharge. By personally delivering and collecting the surveys post-delivery yet prior to discharge, we will potentially increase the rate of completed surveys as well as minimize recall bias. The survey includes questions about type, frequency, duration, and perceived intensity of exercise during each trimester separately. Medical charts of the participants will then be accessed and assessed for different criteria. The primary outcome is presence or absence of gestational diabetes, and the secondary outcomes include mode of delivery, GA delivery, and gestational weight gain. Other Information about the newborn will be obtained as well including gender, APGAR score, birth weight, head circumference, body length, umbilical cord pH, maternal hemoglobin and hematocrit levels. These parameters are all quantifiable indicators of fetal health for which “normal” standards exist and therefore can be compared to. The data will be analyzed using multivariate multiple linear regression and correlation tests. Secondary analyses will then be used to identify specific morphometric components such as maternal age and ethnicity that might explain differences observed in the primary outcome parameters. All database management will be conducted through Redcap, a platform specifically designed as a secure, web-based application for building and managing online surveys and databases.

Results/ Conclusion

-Pending-

68 of the 313 patients entered into the database were ruled ineligible for this study. Data has been sent for analysis.

Poster: 109

Induced MHCII Expression on Breast Cancer Cells Impairs Tumor Growth by Broadening the Responding T Cell Repertoire and Delaying Tumor-Specific T Cell Exhaustion

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Introduction: We recently reported that aberrant expression of Major Histocompatibility Class II (MHCII) on human triple negative breast cancer cells correlates with increased tumor infiltrating lymphocytes and prolonged progression free survival.

Purpose: To demonstrate that tumor cell expression of MHCII enhances the intratumoral CD4+ T cell response, thereby bolstering the tumor-specific CD8+ T cell response, leading to impaired tumor growth.

Methods: To test this, we transfected the murine breast cancer lines TS/A and 4T1 with the human class II transcriptional activator (hCIITA) or empty vector, creating MHCII-expressing and MHCII-negative cell lines, respectively. Next we used the histone deacetylase inhibitor Entinostat to induce MHCII on non-transfected cancer cells in vitro and in vivo.

Results: We found that MHCII-expressing tumors grew slower than controls in immunocompetent recipients, but this difference was abrogated in CD4-depleted and lost in SCID mice. Within hCIITA-transfected tumors, CD4+ T cells produced more IFNγ and CD8+ T cells produced more IFNγ and granzyme B for longer times, but both eventually became exhausted regardless tumor MHCII expression. We then demonstrated the ability of Entinostat to substantially upregulate MHCII on tumors in vivo, which correlated with reduced tumor burden. This effect was lost when treating tumor-bearing SCID mice or depleting IFNγ from WT mice, suggesting HDACis potentiate adaptive immunity, as reflected by enhanced effector T cell functions. Finally, TCR repertoire analysis demonstrated increased breadth and magnitude of T cell responses to MHCII-expressing tumors.

Conclusions: Inducing MHCII on tumors, through transfection or HDACis, can potentially avail an augmented T cell response to all patients for enhanced tumor control. Since progressive loss of T cell functionality through exhaustion is a common mechanism by which tumors escape immune control, the strategies described herein may be broadly applicable to reversal of T cell exhaustion and control of tumor growth in many cancers.

Poster: 110

Target Miss: The Failure of MRI/US Fusion Biopsy to Accurately Localize Prostate Cancer in Conjunction with Systematic Core Biopsy

Background

The advent of multiparametric magnetic resonance imaging with ultrasound fusion core biopsy has advanced the accurate espial and localization of prostate cancer paralleled to that of standard systemic core biopsy. Unfortunately, a small percentage of patients have low to high grade prostate cancer discovered by virtue of standard systemic core biopsy alone, while being incorrectly localized using the fusion core biopsy technique. The purpose of this study is to identify potential sources of failure as to why MRI/US fusion biopsy was unsuccessful in the discernment of accurate confinement for clinically significant prostate disease to the correct prostate sextant in relation to the standard twelve core systemic biopsy.

Materials & Methods

We conducted a retrospective review of a patient database consisting of 478 patients who underwent either MRI/US fusion biopsy plus standard systemic core biopsy or MRI/US fusion biopsy alone from January 2014 to April 2017. Of these, 262 had MRI/US fusion biopsy plus standard core biopsy. For patients determined to have clinically significant prostate cancer (defined as Gleason Score ≥ 3+3), for whom the lesion was incorrectly localized by MRI/US fusion biopsy, a distance from target sextant to lesion sextant, identified through standard core biopsy, was calculated using standard sextant mapping of the prostate.

Results

Of the 262 patients with MRI/US fusion biopsy plus standard core biopsy, 35 patients had lesions incorrectly localized by the fusion biopsy. Of these, 15 (42.86%) were identified as misregistrations; defined as negative targeted biopsy of the correct prostate sextant identified by standard biopsy. 12 (34.29%) targeted biopsies were one sextant away from the lesion, 8 (22.86%) targeted biopsies were two sextants away, and 0 targeted biopsies were three sextants away. 7 (20.0%) patients were determined to have a higher grade prostate cancer on pathology (Gleason Score ≥ 3+4). Of these 7 higher grade, incorrectly targeted lesions, the majority, 4 (57.14%), were incorrectly localized one sextant away.

Conclusion

Multiparametric magnetic resonance imaging with ultrasound fusion core biopsy was able to correctly localize 227 out of 262 patients (86.6%) with regard to the prostate sextant containing cancer determined by standard core biopsy. Continued study will progress the identification of error in the accurate localization of prostate cancer when utilizing MRI/US fusion biopsy along with standard systemic core biopsy.

Poster: 111

Outcomes of Indicated Preterm Births differ by Indication

Authors: **Michelle Wang**, Spencer Kuper, Robin Steele, Rachel Sievert, Alan Tita and Lorie Harper

Objective: Preterm birth (PTB) is associated with significant morbidity and mortality and is modified by gestational age, birth weight, and antenatal corticosteroids. We aim to examine whether outcomes are further modified by the indication for delivery.

Study Design: We performed a retrospective cohort study of all singletons delivered at 23-34 weeks from 2011-2014. Women were classified by their primary indication for delivery: maternal (preeclampsia, other medical illness), fetal (growth restriction, non-reassuring fetal status), or obstetric (PROM, vaginal bleeding). The primary neonatal outcome was a composite of neonatal death, cord pH <7 or base excess <-12.5, 5-minute Apgar ≤3, CPR during resuscitation, sepsis, intraventricular hemorrhage, and necrotizing enterocolitis. Secondary outcomes included the individual components of the primary outcome. Maternal outcomes examined were maternal composite outcome of postpartum hemorrhage, transfusion, intensive care unit admission, operative complications, chorioamnionitis, and endometritis. Groups were compared using ANOVA and χ^2 tests, as appropriate. Logistic regression was used to adjust for confounding variables.

Results: Of 636 women, 403 (63.4%) were delivered for maternal, 112 (17.6%) for fetal and 121 (19.0%) for obstetric indications. Compared to those delivered for a maternal indication, those with a fetal indication for delivery had an increased risk of the composite neonatal outcome (AOR 2.0, 95% CI 1.15-3.47) and acidemia at birth (AOR 3.55, 95%CI 1.53-8.23) while those with an obstetric indication did not (AOR 1.40, 95%CI 2.67, AOR 0.70, 95%CI 0.19-2.60, respectively). Maternal complications were not significantly different by delivery indication despite an increase in unadjusted rate of cesarean delivery for fetal indications.

Conclusion: Preterm infants delivered for fetal indications have poorer outcomes compared to those delivered for maternal indications. Additional research is needed to further tailor counseling specific to the indication for delivery in addition to gestational age and fetal weight.

Poster: 112

Herpes Simplex Virus Testing in Young Infants: Are we doing it right?

AUTHORS:

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INTRODUCTION:

The clinical presentation of herpes simplex virus (HSV) infection in young infants can range from a single vesicle to fulminant sepsis. Despite the infant's condition, comprehensive testing is essential to guide antiviral therapy and prevent morbidity and mortality.

OBJECTIVES:

Our primary objective was to determine if, for infants for whom HSV disease is suspected, comprehensive testing (as recommended by the American Academy of Pediatrics,) is performed. We hypothesized that viral cultures and polymerase chain reaction (PCR) assays of skin and mucosal surfaces would not be performed in most cases, in contrast with published guidelines.

METHODS:

Using an electronic database query, records were reviewed for infants 0-60 days old in the emergency department (ED) at Children's of Alabama from January 2005 - July 2007. The study population was defined as infants who underwent lumbar puncture (LP) and received acyclovir in the ED. Our study is part of a large, multicenter study of HSV disease in infants.

RESULTS:

During the study period, 104 infants received an LP and were prescribed acyclovir in the ED. Mean age was 25 days, and 57 (55%) were male. Cerebrospinal fluid HSV polymerase chain reaction (PCR) was conducted on 99 patients (95.2%). Viral surface cultures were done on 25 subjects (24.0%). PCR assays of mucosal surfaces were performed on 4 infants (3.8%), with no skin/vesicle PCRs ordered. Two patients (1.9%) had blood PCRs.

CONCLUSION:

In contrast to established guidelines, infants in the ED who are treated for HSV disease do not often receive the comprehensive battery of tests for HSV as recommended. If our single-center findings prove generalizable, our study represents an educational opportunity that could considerably impact the care for young infants with this potentially devastating infection.

Poster: 113

Association between Macular Pigment Optical Density (MPOD) and Delayed Rod-Mediated Dark Adaptation in the Early Stages of Age-Related Macular Degeneration (AMD)

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Introduction: AMD is the leading cause of blindness in the industrialized world, with more than 1.75 million people effected by end stage AMD in the U.S. There are currently no treatments for the earliest non-exudative form of the disease. An early visual symptom in early stages of AMD is delayed rod-mediated dark adaptation, i.e., taking a long time to adapt or adjust to darkness. Functional biomarkers are important for understanding the pathophysiology of the disease. It is hypothesized that the macular pigment in the retinal epithelium is protective, and its loss correlates to the severity of the disease stage.

Objectives: Compare MPOD to delayed rod-mediated dark adaptation tests and determine if MPOD is associated with delayed dark adaptation in early AMD.

Methods: Two-wavelength auto fluorescence method was used to quantify macular pigment optical density (MPOD) of the retina and volumetric spectral domain optical coherence tomography (OCT) images of the macula are being obtained from 60 subjects. Distribution of subjects will be approximately evenly between no AMD, early-stage AMD, and late-stage AMD. The MPOD is being compared to delayed rod-mediated dark adaptation tests done on the same day.

Results: Data collection is in progress.

Conclusion: Results will inform whether higher levels of MPOD is associated with faster dark adaptation in patients with early AMD.

Poster: 114

Exercise in Pregnancy: The Effects of Exercise on Post-Partum Weight Loss

Jamal Egbaria, *Sara Gould M.D*

Introduction

The American Congress of Obstetricians and Gynecologists (ACOG) states that women with uncomplicated pregnancies should be encouraged to engage in both aerobic and strength conditioning exercises before, during and after pregnancy.[1] The literature states that exercise in pregnancy is not only allowed, but it is recommended in many cases because of its ability to help with weight management and reduce the risk of developing gestational diabetes mellitus.[2,3] Despite evidence indicating that exercise during low-risk pregnancy is beneficial, there is not much research indicating the effect that exercise during pregnancy has on maternal weight at the 6-week post-partum follow up appointment. The main aim of this project is to determine if women who exercise regularly during pregnancy are more likely to return to their baseline weight post-partum when compared to women that did not exercise during pregnancy.

Primary Objective

We hypothesize that women who exercise during pregnancy are more likely to return to their baseline weight at the 6-week post-partum follow-up when compared to women who did not exercise during pregnancy.

Secondary Objective

Further, we hypothesize that weight will correlate to activity level, defined as low exercise level, moderate exercise level and high exercise level, with women who are highly active losing the most weight at their 6 week post-partum visit.

Methods

We distributed surveys to all postpartum women prior to their hospital discharge. Included in the survey are questions about the type, frequency, duration, and perceived intensity of the exercise during each trimester separately. The charts for each of the participants were acquired and assessed for the variables listed under the secondary aims for the project (gestational age, mode of delivery, hemoglobin and hematocrit levels, etc.).

Results/Conclusion

318 total surveys were administered, and 68 of the patients did not meet eligibility criteria for the study. The data from the remaining 250 patients have been sent off for statistical analysis and the results are pending.

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Poster: 115

Evaluating nutritional and health science understanding through use of an integrated mobile kitchen curriculum in children of East Lake, Alabama

Author Information: **Daniel P. McNeill**, MD Candidate University of Alabama at Birmingham School of Medicine, Class of 2019; *Dr. Krista Casazza, PhD RD, Department of Pediatrics, School of Medicine, University of Alabama at Birmingham, Birmingham, Alabama*

Introduction: Diet quality during childhood has a significant impact on overall health and wellness. As children become more autonomous in dietary choices, understanding the link between nutrition and chronic disease prevention is paramount. While strides have been made to address wellness in this population, innovative approaches to enhance behavior changes are warranted.

Objective: An integrated mobile kitchen nutrition curriculum was implemented in the community of East Lake, Alabama to determine if nutritional understanding may be improved through experiential learning with cooking demonstrations in children ages 5-14.

Methods: Children were recruited from the Aletheia House summer camp located in East Lake, Alabama. Inclusion criteria included the ability to complete surveys and basic literacy. An experiential nutrition curriculum was administered to participants through a classroom setting in the form of a 90-minute nutrition lesson and a 60-minute cooking demonstration each week for five weeks. Pre and post-intervention scores on the General Nutritional Knowledge Questionnaire (GNKQ), dietary intake surveys, physical activity questionnaires, and handgrip strength were collected from each participant (N=30). Significance tests were performed for GNKQ scores and dietary surveys between pre- and post-intervention.

Results: Participants were stratified into groups by age: group 1(n=7)=age 5-7; group 2(n=11)=age 8-9; group 3(n=5)=age 10-11; and group 4(n=7)=age 12-14. Average scores for section 1 of the GNKQ increased significantly (p=.01; pre-mean=43.2%, post-mean=54.6%). Group 1 and group 2 separately showed increased average scores for section 1 of the GNKQ (p=.03, p=.02 respectively). There were no significant differences in section 2 of the GNKQ (p=0.36; pre-mean=36.7%, post-mean=34.6%) among groups 3 and 4. In addition, 43% of participants reported decreased beef intake on the post-intervention dietary survey (p=.01).

Conclusion: A five-week integrated mobile kitchen curriculum has the potential to be tailored as an effective means for increasing nutrition knowledge and eliciting dietary behavior changes in children ages 5-9 in communities like East Lake, Alabama.

Poster: 116

Surgical Outcomes Comparison of Canaloplasty during CEIOL and Trabecular Stenting: Combined Phacoemulsification, Trabecular Bypass Stenting, and Canaloplasty Versus Combined Phacoemulsification and Trabecular Stenting Alone

Authors: Marius J Heersink, BS; Mila Heersink, MD; Jesse A Dovich, MD

Introduction: Glaucoma management has been revolutionized by micro-invasive glaucoma surgeries that can be performed during cataract removals, but little is know about the combination of various interventions at the same time.

Purpose:

To compare the 6-month surgical outcomes of patients after combined phacoemulsification with intraocular lens implantation, trabecular meshwork bypass stenting, and canaloplasty versus combined phacoemulsification with intraocular lens implantation and bypass stenting alone.

Methods:

This study comprises a retrospective, non-randomized comparative case series of primary open-angle glaucoma surgeries in which 71 eyes of 65 patients underwent combined phacoemulsification with IOL, trabecular bypass stenting, and canaloplasty and 93 eyes of 66 patients underwent phacoemulsification with IOL and bypass stenting alone. All operations were performed by a single surgeon and all patients were followed postoperatively for a minimum of 6 months. Main outcome measures were: pre- and postoperative intraocular pressure (IOP), number of glaucoma medications used, and best corrected visual acuity (BCVA).

Results:

By 6 months postoperatively, mean IOP had declined by 24±7% in the phacoemulsification, trabecular bypass stenting, and canaloplasty group, compared to only 15±5% in the phacoemulsification and bypass stenting alone group (P=0.045). No statistically significant difference was found between the two groups in number of glaucoma medications used (pre- or postoperatively), or BCVA after surgery, and no intra- or postoperative complications (including persistent hyphema or hypotony) were experienced in either group.

Conclusion:

Phacoemulsification, trabecular meshwork bypass stenting, and canaloplasty achieved a statistically significant, additional IOP lowering effect compared to phacoemulsification and bypass stenting alone.

Poster: 117

Marijuana Use and In-Hospital Mortality following Orthopedic Surgery

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INTRODUCTION: The association between marijuana use and orthopedic surgical procedures is a matter of increasing societal relevance that has not been well studied in the literature. Improving our understanding of potential associations may assist in optimizing surgical management of this growing population.

OBJECTIVES: The primary objective of our study is to evaluate the relationship between marijuana use and in-hospital mortality, as well as to assess associated comorbidities in patients undergoing commonly billed orthopedic surgeries using data collected from a national database.

METHODS: This is a retrospective study of prospectively collected data. The National Inpatient Sample (NIS) database from 2010 to 2014 was used to determine the odds ratios for the associations between marijuana use and in-hospital mortality, heart failure (HF), stroke, and cardiac disease (CD) in patients undergoing five common orthopedic procedures: hip, knee, and shoulder arthroplasty, spinal fusion, and traumatic femur fracture fixation.

RESULTS: Of 9,561,963 patients who underwent one of the five selected procedures in the four-year period, 26,416 (0.28%) were identified as marijuana users. In hip and knee arthroplasty patients, marijuana use was associated with decreased odds of mortality compared to no marijuana use ($p<0.0001$), and increased odds of HF ($p=0.018$), stroke ($p=0.0068$), and CD ($p=0.0123$). Traumatic femur fixation patients had the highest prevalence of marijuana use (0.70%), which was associated with decreased odds of mortality ($p=0.0483$), HF ($p=0.0076$), and CD ($p=0.0003$). For spinal fusions, marijuana use was associated with increased odds of stroke ($p<0.0001$) and CD ($p<0.0001$). Marijuana use in patients undergoing shoulder arthroplasty was associated with decreased odds of mortality ($p<0.001$) and stroke ($p<0.001$).

CONCLUSION: More research is needed to provide insight into these associations in the orthopedic surgical population.

Poster: 118

Maani Kamal

The Assessment of Microscopic Material Properties in Guinea Pig Sclera

Introduction

Myopia is a prevalent ocular disease and can lead to serious vision problems. High myopia is caused by an elongation of the eye and linked to an alteration in structural and mechanical properties of the sclera.

Objective:

The objective of this study is to examine the microscopic material properties of guinea pig sclera with scanning acoustic microscopy. Specifically, we want to compare the microscopic material properties of control and myopic eyes

Methods:

We studied eyes of 13 guinea pig (13 myopic and 13 control, 26 total eyes) who were treated with form deprivation myopia (FD). To induce myopia, each animal wore a translucent diffuser in front of the right eye from 4-12 days of life. Then scanning acoustic microscopy (SAM) was used to examine 12-μm-thick cryosections of sclera from the healthy and myopic eyes.

Results:

The main findings from our study were: there is a difference of 0.045 GPa between the bulk modulus of superior (SUP) and inferior (INF) regions of myopic and control eyes ($p<0.05$) and there is a layered distribution of material properties that likely correspond to anatomical layers of the sclera. From the horizontal sections, the results show that the myopic eye is less stiff than the control eye, and there is no consistent significant difference between microscopic material properties of the nasal (NAS) and temporal (TMP) regions of the sclera.

Conclusion:

The fine resolution data we have acquired about the microscopic material properties of the sclera help us gain a better understanding how myopia affects the material and structural properties of this tissue, providing mechanistic insight to the pathogenesis of myopia, and leading toward novel diagnostic and therapeutic approaches.

Poster: 119

Personal Protective Equipment Donning and Doffing using NIEHS approved Low Output Ebola Checklist: A Simulation Experience

Authors:

Ashley J. Pettaway, BS, UASOM class of 2018, Andres F. Viles, MSN, RN, CCNS, Elena Kidd, MPH Joseph M. Castongia, BA, *Marquita N. Hicks,* MD, FACEP

Introduction:

In 2015, six first responders, were exposed to an individual exhibiting signs/symptoms of the Ebola virus disease (EVD). As of July 30, 2014, the Centers for Disease Control and Prevention updated recommendations for hospitalized patients under investigation for EVD. However, there was a need to extend recommendations to non-hospital workers and to disseminate information to individuals with limited access. As part of UAB SHPEP, the Deep South Biosafety Worker Training Program (WTP) trained undergraduates in a simulated environment to respond to infectious disease threats.

Objectives:

1) Provide learners with hands-on experience donning/ doffing low output personal protective equipment (PPE) without contamination
2) Develop effective teamwork and communication strategies while donning/ doffing low output PPE and adhering to a NIEHS approved checklist

Methods:

Learners were placed in groups of three. Groups were equipped with one PPE kit and low output PPE donning/ doffing checklists. Learners assumed one of three rotating roles: donning/doffing expert (DE), provider, and evaluator. During the simulation, the DE used the checklist to instruct the provider as he/she donned/ doffed PPE. The evaluator ensured checklist adherence and monitored for contamination. Post simulation, learners participated in a group debriefing and completed evaluations.

Results:

Evaluation results demonstrated increased perception of effectively donning/ doffing low output PPE using an approved NIEHS checklist (71.2% of the seventy-three learners strongly agree; 28.8% agree) and of adherence to the checklist without contamination (68.5% strongly agree; 31.5% agree). Overall, 98.6% agreed that the training increased awareness of infectious disease hazards.

Conclusions:

This simulation was intended to offer training of proper PPE usage. This was the first course offered to undergraduate learners by the Deep South Biosafety WTP. Results show that after completion, learners feel they could take proper measures to protect themselves and decrease the risk burden for the population they plan to serve.

Affiliations:

Office of Interprofessional Simulations for Innovative Clinical Practice, UAB University Hospital, Birmingham Al; The Deep South Biosafety Worker Training Program is funded by the National Institute of Environmental Health and Science (NIEHS); The UAB Summer Health Professions Education Program (SHPEP) is supported by the Robert Wood Johnson Foundation

Poster: 120

Methods for Analyzing Big Alert Data from the Electronic Health Record

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Introduction

Alerts in electronic health records (EHRs) have been created to help prevent medical errors or provide patient suggestions. However, most medical have high overrides rates occurring between 49 – 96%. Research points to the clinical irrelevance of many alerts in the context that they are triggered as an explanation for this high override rate. Therefore, it is critical to understand alert overrides to ensure relevance of medical alerts.

Objective

Our objective was to review the literature to find articles discussing methods of analyzing alert override data and present an overview of the advantages and disadvantages here.

Methods

We searched PubMed, Embase, and Scopus for articles discussing three different methods for analyzing this information: statistics, machine learning, and dashboards. The search strategy was divided into three groups based on the previously listed methods of analysis. Duplicates from each group were removed and screened first by title and abstract and then full text.

Results

Each method of analyzing alert data provides varying strengths and weaknesses. Statistics creates interpretable models that can provide insight into the reasons behind overrides, and machine learning has its strength in predicting whether an alert is needed in each context. Dashboards provide alert override summary information but require further analysis to act on the information presented

Conclusion

Each of these methods can be used to understand different aspect of the alert override problem. Analyzing alert overrides to help understand and improve the clinical relevance of alerts is a potentially valuable approach to the improvement of the EHR as tool for assisting clinicians in patient care.

Poster: 121

Exploring the Correlation between Lifestyle, Diabetes, and Obesity Among a Low Socioeconomic Population in Granada, Nicaragua

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INTRODUCTION: In June 2017, seven students from the UAB School of Medicine traveled to Granada, Nicaragua to volunteer at Clínica Alabama-Granada, dedicated to serving the low-income, underserved population of the area. The World Health Organizationstates that 46.1% of the Nicaraguan population is overweight and 15.5% is obese. Little data is reported regarding physical inactivity and diet as contributing factors to the prevalence of obesity and diabetes.

OBJECTIVES: The primary goal of this study was to explore the correlation between overweight and obese patients and associated diseases (hypertension, diabetes), taking into consideration diet and physical activity.

METHODS: The data for this work was collected through patient surveys after their appointments, with questions targeting their diets, lifestyles, and chronic medical conditions.

RESULTS: Of the study's patient population, 31.96% are male with an average patient age of 57. After calculating BMI, 37.75% of patients were classified as overweight and 39.77% as obese. The most common chronic health conditions included 49.18% of patients suffering from hypertension and 47.81% of patients having diabetes. Compared to the world population, obesity is three times more prevalent in this study's patient population. Further data analysis revealed links between these conditions -- obesity, diabetes, hypertension -- and dietary and exercise habits, as well as average control of blood glucose.

CONCLUSION: The typical diet and lack of physical activity among our patient population likely contribute to the high prevalence of overweight and obese individuals, with strong links to conditions of hypertension and diabetes. Equipping patients with exercise routines and diet alternatives will improve patient health outcomes among this population. This study provides insight into the social and cultural barriers that impede treatment of relevant chronic conditions in Nicaragua and developing nations, and these health data supply the foundation for health action and policy formation.

Poster: 122

Daily Immune Monitoring to Identify Peripheral Biomarkers in Chronic Fatigue Syndrome.

Authors: **Natasha Mehra**, B.S., Kate Wesson-Sides, B.S., Alexis Lambert, *Jarred Younger, Ph.D.*

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Introduction: Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) is characterized by persistent, debilitating fatigue that is not alleviated by rest, and is seen in patients with fibromyalgia. Widespread, chronic, full-body pain is what separates fibromyalgia from ME/CFS, though the disease pathologies are thought to be related.

Objectives: The primary goal of this study is to identify immune drivers ME/CFS by collecting daily blood samples and screening for biochemicals that relate closely with fluctuations in fatigue severity. The project is funded for 5 years, and our goal is to identify specific biomarkers that predict symptom severity and to study them more closely. We also hope that a better grasp on disease pathology will help us develop targeted treatments.

Methods: Patients monitor their daily symptoms on a tablet while having their blood drawn for 25 consecutive days. Many biomarkers, including several pro-inflammatory cytokines (TNF α, IL-1β, etc.), leptin, fractalkine, and C-reactive protein were measured, while patients were keeping track of their symptoms. For this project, we were specifically looking at different biomarkers predicting fatigue severity.

Results: Preliminary results show that there are three subgroups of patients with ME/CFS, who have different biomarkers elevated. About 1/3rd of the patients had elevated C-reactive protein that corresponded to fatigue levels. Interestingly, the patients had CRP levels within the normal range, but fluctuations within the normal range corresponded with symptom severity. In another 1/3rd of the patients, fractalkine predicted symptom severity, but not CRP.

Conclusion: Preliminary results suggest that there are different subgroups of CFS being caused by different triggers and immune processes. The study is still actively recruiting patients, meaning further data analysis is forthcoming.

Poster: 123

Findings from a structured Needs Assessment in a Student-Run Free Clinic

Collier S. Williams B.S, Pranaya Chilukuri B.S, Shima Dowla B.S, PhD, Shejuti Paul B.S, Lindsay Sheets B.S, *Nicholas Van Wagoner MD, PhD, and Anne Zinski PhD*

Introduction: Student Run Free Clinics (SRFC) are common across the United States, yet there is a wide gap in knowledge about their performance from a patient's perspective. Equal Access Birmingham (EAB) is a SRFC that aims to provide high-quality healthcare to the underserved and vulnerable populations in Birmingham, Alabama.

Objectives: To date, a strategic needs assessment of patients receiving care at EAB has not been performed. The purpose of this study was to identify and explore EAB clients' perceived health needs, behaviors, and access to healthcare.

Methods: Data for this study was collected using a total of sixteen semi-structured interviews that were audio recorded. Patients were recruited in the waiting area of EAB and interviews were held in a separate, private setting. All interviews were transcribed and qualitatively coded for themes by a trained research team.

Results: Major themes included barriers to healthcare, primary health concerns, individual health behaviors, and patterns of clinic utilization. With respect to barriers to seeking treatment, participants listed cost (100%), transportation (53%), and lack of reliable housing (27%). Respondents' principal health concerns were blood pressure (21%), diabetes management (21%), arthritis pain (21%), and mental health (21%). Patients reported exercise (44%), improving nutrition (44%), and smoking cessation (22%) as strategies for improving health. Most used the clinic for medication refills (94%). One quarter of respondents reported accessing the clinic for addressing mental health concerns (25%), and more than half named EAB as their primary healthcare provider (56%).

Conclusion: Despite numerous barriers, including cost and transportation, EAB was the source of primary healthcare for many respondents and provided access to medication refills for nearly all participants. In addition to shaping EAB's strategic plan, results of this qualitative investigation also document specific concerns and priorities of SRFC users, which highlight noteworthy strengths and areas for improvement for Student Run Free Clinics.

Poster: 124

Hannah Turner

Interactive Tabletop Simulation for Testing Workflow Processes

Objective:

Our project seeks to apply an interactive tabletop simulation to assess workflow processes before implementation in a new clinic setting.

Methods:

The Office of Interprofessional Simulation for Innovative Clinical Practice team used the clinic's process map to develop the simulation. The room was set up to simulate the clinic and its processes.. Participants included front desk staff and patient access specialists. Observers included various other staff. Participants were instructed not to talk to other participants in different parts of the clinic. The computer systems were simulated with worksheets, and printers were simulated with plastic bins. Observers were given cases to bring to the front desk. The front desk staff were instructed to fill out the worksheet and guide the patient to the appropriate clinic areas by using their process map. Several patient scenarios were simulated. This was followed by a complete debriefing session to evaluate the successes and opportunities with the clinic flow process map.

Results:

Data was collected using program evaluations completed by participants and observers. The initial evaluations demonstrated that the overwhelming majority of responders felt the simulation and debriefings were valuable experiences. Comments were made that the simulation was very helpful in identifying issues in the current workflow process, and that a second simulation would be needed before the clinic opening.

Conclusions:

Participants discovered areas in the process map that needed to be re-worked, and would like to test the process again by using this simulation format in the actual clinic space. This tabletop simulation provided an opportunity for clinic staff to work interprofessionally to identify strengths and opportunities with the current workflow process before moving into a new clinic space.

Poster: 125

Asthma Severity and Obesity: Examining the Relationship Among West Alabama Children

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INTRODUCTION: The relationship between obesity and asthma severity has been defined in adults, but fewer studies have been conducted in children. Asthma and obesity have a higher prevalence in the state of Alabama and Tuscaloosa County than nationally. We sought to investigate the relationship between the two in our unique patient population.

OBJECTIVES: The purpose of this study is to examine the relationship of asthma severity and obesity defined as greater than 95th percentile BMI among West Alabama children seen at the University Medical Center (UMC) between ages 2-18.

METHODS: This was a retrospective chart review conducted of children with an asthma diagnosis seen at a community medical center from January 1st, 2016 to January 1st , 2017. The primary endpoint was to determine if increased asthma severity, by ICD-10 diagnoses, is associated with obesity in our unique patient population.

RESULTS: There were 785 children included in the study. Our sampled patient population has higher rates of obesity than the state and national average. When compared with mild intermittent asthma, patients with mild persistent asthma (OR=1.45, 95% CI 2.18-0.96) nor moderate persistent asthma (OR=1.04, 95% CI 1.84-0.58) showed statistically significant odds of being obese. Patients assigned an ICD-10 code of Unspecified Asthma had the highest mean BMI percentile when compared with other asthma classifications. (Mean = 73.1%, N= 170)

CONCLUSIONS: In this study, we found no significant relationship between obesity and the asthma severity. Limitations of this study are small number of patients with severe persistent asthma (5) and large percentage of patients with no asthma severity specification (21.7%). Subsequently, this study highlights the need for better provider documentation of appropriate asthma severity for patients.

Poster: 126

Developing a Procedural Simulation Curriculum for Vascular Access Device Insertion

Authors: **Avery M. Berlin, BS** [1]; Lisa B. Bagby, MSN, RN [2]; Nancy G. West, RN [3]; Heather E. Jones, RN [3]; Kierstin C. Kennedy, MD, MSHA [1]; *Marjorie L. White, MD, MPPM, MA* [1,2]
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Introduction:
To improve vascular access services provided to UAB patients, a vascular access service was formed, known as the Comprehensive Vascular Access Team (CVAT). The multi-professional team includes experienced specialists and newly hired members with varied experience. To standardize onboarding training, CVAT and Office of Interprofessional Simulation (OIPS) collaborated to develop and pilot a simulation-based training program.

Objectives:
The program provides multi-professional CVAT members with necessary training to insert ultrasound-guided peripheral intravenous catheters (USGPIV), external jugular intravenous catheters (EJ), and peripherally inserted central catheters (PICC).

Methods:
This curriculum used the Learn, See, Practice, Prove, Do, Maintain framework. Two distinct courses were created—USGPIV/EJ and PICC insertion—with didactic learning modules taught by vascular experts followed by a facilitator-guided simulation session. Additionally, PICC inserters participate in vendor-sponsored education. Following simulation completion, learners are prescribed clinical supervision for a predetermined number of insertions and learner-perception data is collected with standard OIPS evaluation.

Results:
The CVAT training, attended by 14 Advanced Practice Providers and 24 Registered Nurses, took place March - May 2017. Learners in both the USGPIV/EJ and PICC simulation sessions overwhelmingly agreed the experience will improve clinical performance and the course, debriefing and/or feedback were valuable. One noted, “This will make me a better nurse. Trying the procedure on a trainer arm is so valuable to the patient.” Learners documented learning sterile technique and benefitting from step-by-step instructions.

Conclusion:
CVAT and OIPS provided over 150 learner-hours in a safe, engaging environment during the initial pilot-phase of training. Based on results, training will be revised for future iterations. Computer-based training modules will replace the didactic lecture, allowing more time for facilitated-simulation training. PICC insertion checklists will be refined to align clinical practice, training, and evidence-based best practice. Future measurements can include analysis of patient outcome data, CVAT consults versus successful insertion rates, and decreased unnecessary CVL insertions.

Poster: 127

Validation of the Acute Care Mobility Assessment as a Measure of Hospital Mobility Among Older Adults

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Purpose: To validate the ability of a brief mobility assessment to accurately measure frequency of out-of-bed activity.

Methods: Cognitively intact patients ≥ 65 years, admitted to a medical ward of UAB Hospital were eligible. A StepWatch accelerometer was placed on the patients' leg and worn continuously for 24 hours to document steps taken, after which the Acute Care Mobility Assessment (ACMA) was completed. ACMA measures self-reported hospital mobility over previous 24 hours and ranges from bed-rest (score = 0) to walking off the hospital unit four or more times (score = 16). Medical records were abstracted for the Johns Hopkins (JH) mobility score, a nursing report of a patient's mobility during hospitalization which ranges from bed-bound (score = 0) to walking more than 250 feet (score = 8). Kendall-Tau correlation coefficients were calculated comparing scores for ACMA, JH Mobility score to StepWatch data.

Results: Of 46 enrolled, 37 patients had complete data and were used in this analysis. Mean age was 73.8±5.7 years, 40% (18/37) were male, and 43% (19/37) self-identified as black. Mean ACMA score was 8.1±3.2, reflecting mobility mainly restricted to the patient's room. Likewise, the mean JH score was 5.9±1.2 indicating nurses reported patients walking in rooms. We identified strong associations between ACMA scores and total steps ($r=0.66$; $p<0.0001$) and total mobile time ($r=0.53$; $p<0.0001$). Significant associations were also observed between JH scores and total steps ($r=0.51$; $p=0.0003$), total mobile time ($r=0.53$; $p=0.0025$), and ACMA scores ($r=0.58$; $p<0.0001$).

Conclusions: ACMA is a valid, reliable measure of mobility among cognitively intact older patients. Using ACMA and the nurse-reported mobility, such as the Johns Hopkins mobility scale, may help to identify patients at risk for adverse health outcomes due to low hospital mobility.

Acknowledgements: UABSOM

Poster: 128

Outcomes Following Abdominal Trauma in Pregnancy After 1st Trimester Motor Vehicle Accidents

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Introduction: Currently, there is limited data on how many miscarriages experienced in the first semester are caused by abdominal trauma. By assessing records of pregnant women who experienced abdominal trauma during the first trimester, this will hopefully shed light on the current ACOG guidelines and potentially lead to revision to allow female athletes to continue playing during the first 10-12 weeks of pregnancy. This will help address part of the disparity between males and females who play professional sports.

Objectives: Primary: The purpose of this study is to determine whether or not blunt force trauma sustained to the abdomen during the first trimester of pregnancy leads to a greater risk of miscarriage. Secondary: Determine if the data is significant enough to halt women from playing sports in the first trimester of pregnancy, since this has an impact on their careers.

Methods: We purpose to perform a retrospective chart review of the trauma registry at the University of Alabama at Birmingham from 2000-2015. We will identify women age 15-44 who were restrained drivers or passengers in a motor vehicle collision with a positive BHCG (serum or urine) with an abbreviated injury scale (AIS) score of 2 or less. We will further select for women who had a pelvic ultrasound for confirmation of pregnancy dates, which documented that the woman was in the first trimester at the time of injury. These women will then be further screened for women who received prenatal care at UAB. The outcome of their pregnancy (miscarriage or GA at delivery) will be documented. Based on the response, we anticipate calculating the prevalence of miscarriage among pregnant women who sustained a blunt abdominal trauma in the first trimester of pregnancy. We will compare this to the nationally reported prevalence of miscarriage in the first trimester to determine if isolated abdominal trauma appears to be a risk factor for miscarriage.

Results: The data from the trauma registry is currently being reviewed.

Conclusion: If confirmed and replicated, the hope is that the miscarriage rates for women who have sustained abdominal trauma in the 1st trimester will be lower than the national miscarriage rates. This would allow potential review of the ACOG guidelines, and allow women to continue to play professional sports during the 1st trimester of pregnancy.

Poster: 129

AN INTERVENTION TO INCREASE 24-HOUR URINE COLLECTION COMPLIANCE

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Abstract Category: Stone Disease

Introduction and Objectives: Compliance with 24-hour urine collections for assessing stone risk is important for assigning appropriate preventive therapy. The objectives of this study were to determine factors associated with compliance and the impact of an intervention introduced to improve this outcome.

Methods: In 2015, the patients in our stone clinic in whom 24 hour urine testing was desired were instructed to contact the vendor (Litholink®) and given an instructional sheet provided by this company to arrange for the collections. In 2016, a practice change was implemented and clinic staff sent all urine study requests to the vendor by FAX. During this 2-year period, 24-hour urine studies were ordered by the treating physician in 368 adult stoneformers (SF). Demographic data analyzed included age, gender, race, insurance status, partner status, income, and education. Statistical analysis methods included ANOVA, Fisher's exact test, Chi-squared, and t-test analyses. Compliance was determined based on completion of 24-hour urine collections. Data were analyzed for 2015, 2016, and both years combined (2015/2016).

Results Obtained: Average age of SF was 49.6 years at time of collection. 47.5% of SF were female. The majority were Caucasians (83.2%) and 14.8% were African Americans. Most patients were adequately insured (90.5%) and the majority had domestic partners (61.4%). Compliance increased after the intervention from 46.9% to 65.1% ($p<0.001$). Adequate insurance was associated with increased compliance for both years combined (58.3% vs 37.15%, $p=0.017$). Partner status and older age were associated with increased compliance in 2015 (54.2% vs 32.8% $p=0.006$; 52.9 years vs 47.1 years $p=0.014$), but following intervention in 2016 were no longer contributing factors.

Conclusion: A simple intervention increased compliance with 24 hour urine testing for stone risk parameters by 18% and eliminated health disparities (age, partner status). Inadequate insurance status resulted in poor compliance despite this intervention.

Source of Funding: AUA Research Scholar: "Friends of Joe", Endourology Society
Conflict of Interest and Disclosure Statement: All authors have no conflicts of interest or disclosures
Keywords: metabolic evaluation, compliance

Poster: 130

Use of Simulation During Patient Care Tech Orientation to Improve Patient Safety.

Wilson C DeLaney, *Andres Viles MSN, RN, CCNS*

Introduction

Patient Care Technicians (PCTs) are key members of the healthcare team and are often the first to detect patient safety concerns. Their ability to communicate those concerns to the healthcare team can have a direct impact on patient outcomes.

Objective

The goal of this study is to evaluate the effectiveness of immersive simulation to teach PCTs to 1)use the AIDET communication tool with the patient and healthcare team, 2)recognize and report patient care concerns using TeamSTEPPS CUS language.

Methods

PCTs in their first week of orientation receive training on AIDET and CUS language. In the simulation, PCT pairs enter a patient room to obtain vital signs on a standardized patient. They are to use AIDET, perform hourly rounding and report any concerns to the RN facilitator. PCT pairs receive immediate feedback on these tools using a plus/delta format. The process is repeated for a second patient. The PCTs are then debriefed and fill out a survey.

Results:

Data was collected using standard internal OIPS evaluations completed by the PCTs. Each evaluation included items using a 5-point Likert scale to evaluate their simulation experience. Qualitative data was obtained about the simulation from learners. The data thus far has been overwhelmingly positive with >91% “Strongly agree” that the experience was valuable, the objectives were met and the experience would improve clinical performance.

Conclusions

The positive response from the learners demonstrates the usefulness and need for simulation to improve the communication skills amongst PCT hospital staff. This simulation provides important training that learners feel was valuable and will improve competence in the clinical setting. The most repeated complaint in the surveys was that the simulation was too short. The desire for more practice is evident.

This project provides important, evidence-based practice to improve new PCT’s performance before they enter the clinical setting.

Poster: 131

Understanding the lived experience of diabetes among African Americans in the rural south.

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Introduction: Understanding the lived experience of individuals in rural Alabama with type-2 diabetes could enhance efforts to improve health outcomes and quality of life.

Objectives: The study's goal was to qualitatively explore perspectives of individuals in the Alabama Black Belt regarding reaction to diagnosis, lifestyle changes made after diagnosis and coping strategies felt to be most effective in dealing with diabetes.

Methods: Transcripts of three focus group were analyzed by two reviewers for common themes and subthemes using a combined inductive-deductive approach. results. Participants (n=16) were residents of the Alabama Black Belt region and taking medications for type-2 diabetes. Twelve participants were over the age of 50, 15 had graduated from high school or college, and 10 worked full or parttime.

Results: Participants reported feelings of fear, shock/disbelief and devastation in reaction to diabetes diagnosis. Many described a state of denial following diagnosis. After diagnosis, participants reported the need for extensive planning, particularly related to food and medicine. Fear of low blood sugar drove much of the behavior. Participants noted physical limitations, feeling they could no longer do what they once were able to do. Participants also described coping mechanisms for dealing with diabetes including religion, exercise, support from family/friends and active participation in self-management.

Conclusion: These findings demonstrate the psychological burden many individuals face at the time of diagnosis and after. Future studies aimed at improving outcomes and quality of life in this region of Alabama should take a holistic approach that acknowledges individuals' perspectives related to their disease.

Poster: 132

Patient Perspectives on Post-Hospitalization Health Services and Readmissions

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Introduction: Literature on readmission focuses on the health system and physician perspectives, but insight into patients' perspectives can allow for new and more precise targeting of interventions.

Objective: To utilize themes from qualitative studies in a quantitative approach on understanding patients' perspectives underlying readmissions

Methods: The population included patients readmitted within 30 days to hospitalist units at a tertiary care center between May 16, 2016 and May 16, 2017. Patients completed a survey regarding demographic information, primary care follow-up, and decisions to seek further care. Four investigators jointly coded patient responses into themes. Survey questions and response themes were derived from prior patient-centered studies. Chi-squared and Fisher Exact tests evaluated associations between demographic data and patient responses.

Results: A total cohort of 111 patients was analyzed with a median age of 42 years, 55% white vs. 56% black; 69% male vs. 41% female; 46% with a partner. Seventy-eight percent of patients reported having a PCP and 72% cited knowing their follow-up, but 71% reported no PCP evaluation prior to readmission. Blacks were significantly less likely to see their PCP than whites (38% vs. 62%, p <0.01). Forty-seven patients reported the following reasons for not seeing their PCP: 43% had symptoms worsen prior to evaluation and 34% lacked access. Worsening symptoms was reported in greater number by 50-65 year olds (50%), blacks (75%), and patients with no partner (60%). Lack of PCP access was reported greater in <50 year olds (56%). Patients reported acute symptoms (59%) as the most commonly perceived reason for readmission, whereas 20% of patients reported referral from another provider.

Conclusion: Our analysis suggests a mismatch between PCP availability and patient access in readmitted patients. Furthermore, subpopulations reported different reasons for this lack of PCP access. The quantitative analysis of perspectives can help interventions better target the causes of readmissions.

Poster: 133

A Systematic Review of Missed HIV Primary Care Visits and Mortality

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INTRODUCTION: Engagement in HIV care is a critical component of preventing new HIV infections and improving the health of people living with HIV. However, over half of people diagnosed with HIV are not retained in care. Missing or "no show" of scheduled visits is associated with increased mortality and has been independently associated with mortality beyond the "kept-visit" retention measures currently used as quality benchmarks by the Institute of Medicine and the Department of Health and Human Services. We believe missed visits are likely an important indicator of health behavior which leads to the observed increased mortality.

OBJECTIVES: The objective of this review is to provide a more precise estimate of the effect of missing HIV clinic visits on all-cause mortality by comparing multiple studies with slightly different measures in various patient populations.

METHODS: We systematically searched PubMed, Embase, PsycINFO, and CINAHL using a combination and variation of the following keywords: HIV, mortality, missed visits, and care continuum. The standardized inclusion criteria were applied in duplicate by two separate reviewers to identify primary epidemiologic studies published after 2000 which associated missed HIV clinic visits with an outcome of all-cause mortality. Studies were assessed for quality according to the Newcastle-Ottawa Assessment Scale. Prospero registration number: CRD42017064966.

RESULTS: We retrieved 4,153 studies in the original search. After deduplication 3,632 studies remained which were screened on the basis of title and abstract. Approximately 65 studies are currently being reviewed in full-text and assessed for quality.

CONCLUSION: This study is an important step in evaluating the effect on mortality of missed visits as a measure of poor retention in HIV care. The results from studies retrieved in this review will be pooled by meta-analysis to provide a summary effect estimate and thus a stronger conclusion than is currently in the literature. This work may also have implications for other chronic diseases in which health outcomes depend on patient engagement in medical care.

Poster: 134

Perceived Susceptibility to Cervical Cancer among African American Women in the Mississippi Delta

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Background: Although preventive measures have decreased the burden of cervical cancer in the United States, racial/ethnic and geographic disparities remain, including the disproportionate cervical cancer incidence and mortality among African American(AA) women in the Mississippi Delta. It has been shown that in addition to structural barriers, health perceptions and cultural beliefs influence screening rates with perceived risk being an important construct to be considered. This study aimed to describe the perceived susceptibility to cervical cancer within among AA women in the Mississippi Delta. **Methods:** Data was collected as part of a larger study assessing the feasibility of self-collection for HPV testing as a potential screening modality. Three groups of AA women 26 to 65 years old (women attending their cervical cancer screening appointments, women in the colposcopy clinic, and un/under-screened women recruited in the community) were recruited in four counties, and were administered a questionnaire assessing demographics, health care access, and knowledge and beliefs (including perceived susceptibility) concerning cervical cancer. Women were asked “do you think you are at risk for cervical cancer”, and responses included “yes, “no”, and “I don’t know”. Multinomial logistic regression models were performed to compare variables associated with each answer among the three groups. **Results:** Among un/under-screened women, older current age and younger age at first intercourse were associated with increased odds of answering “yes”. In women attending screening and colposcopy appointments, family history of cancer-related deaths and self-reported perceived exposure to human papillomavirus (HPV) were associated with increased odds of answering “yes”. **Conclusions:** Differences in perceived susceptibility to cervical cancer exist between women in the Delta. Understanding these variations can help in developing targeted strategies to promote future screening behaviors.

Poster: 135

Do fears matter?

Bigyan Mainali, Stefan Kertesz

Homelessness poses serious challenges to health and well-being and remains a common experience among Americans. Although homeless individuals often experience health problems requiring care, there are limitations to available research concerning the scale of their needs and the accessibility of safety net agencies to meet them. A small body of research has documented unmet need for health care among persons experiencing homelessness in the USA, however no study has attempted to correlate patient's subjective worries about inability to obtain care with tangible barriers and actual unmet need. We examined a combined database from two community-based cross-sectional survey of homeless persons in Birmingham (2010 and 2013, collected separately) and sought to examine how well perceptions and fears (such as could not pay for care, race or ethnicity, sexual preferences etc.) about care accessibility correlate with tangible barriers to care (such as transportation, payment, wait times, etc.) and actual instances of inability to get care when it was needed. Worries of inability to get care for unmet healthcare needs were determined for General Health Care (OR, 2.76; 95%, 1.46-5.22), Specialty Health Care (OR, 5.14; 95%, 1.93-13.68), Mental Health Care (OR, 2.54; 95%, 0.88-7.34), and Dental Health Care (OR, 4.54; 95%, 2.01-10.27) using a logistics model, adjusted for predisposing, enabling/impeding, and need factors.

Poster: 136

Unnecessary Transfers: Common Characteristics Among Pediatric Interfacility Emergency Department Transfers

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Introduction: As care for pediatric patients becomes more regionalized and transfers to tertiary pediatric centers become more common, so does the potential burden of unnecessary transfers to pediatric emergency departments (ED). The patient characteristics of unnecessary transfers is limited in literature.

Objectives: Our goal was to describe common characteristics of children who were unnecessarily transferred. By identifying these, future studies can target this population to be better utilize limited healthcare resources.

Methods: In this retrospective cohort study from January 1, 2013 to December 31, 2015 of Pediatric Hospital Information System (PHIS) data, we evaluated patients transferred to 45 participating pediatric hospitals. The primary outcome was unnecessary ED transfers, defined as transfers that resulted in discharge directly from the receiving ED or following admission less than 24 hours, and without the requirement for sedation, operation, or advanced imaging. Covariates included standard patient demographics, rurality, and weekday/weekend status of transfer. Routine statistical analysis was performed with SAS 9.4.

Results: The study cohort included 148,260 transfers, with 75,757 defined as unnecessary. Patient age was significantly associated with risk of unnecessary transfer, with a 2.1% decrease in probability of unnecessary transfer for every 1 year increase in age ($p<0.01$, 95% CI: 1.9% to 2.3%). Patient ethnicity was significantly associated with unnecessary transfers, with Hispanic patients being more likely to have an unnecessary transfer (OR = 1.17, 95% CI: 1.13 to 1.21, $p < 0.001$). Non-urban children had 31 percent decrease in odds of unnecessary transfer ($p<0.01$, 95% CI: OR 0.67 to 0.71). Gender and weekend status were not statistically significant.

Conclusion: Younger children, non-rural zip codes, and Hispanic/Latino ethnicity are at increased risk of unnecessary ED transfers. Future studies can use this data for targeted intervention efforts to increase resource utilization efficiency.

Poster: 137

Inadequate Intake of Dietary Protein and Micronutrients Among Older Adults with HIV

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INTRODUCTION: Diet-related comorbidities have become the main medical concerns for people living with HIV (PLWH) who may require more protein and micronutrients than HIV-uninfected individuals. Additionally, meeting dietary needs with aging becomes increasingly difficult due to the required increase in nutrient density but decreased need for total calories. Understanding the dietary intake of older PLWH (defined as ≥50 years) is necessary to minimize the burden of comorbid conditions.

OBJECTIVES: This study aims to assess the dietary intake and diet quality of adults over age 50 living with HIV.

METHODS: Sixty PLWH aged ≥50 years completed three 24-hour dietary recalls and demographic surveys. Average intake was compared to the Dietary Guidelines for Americans 2015-2020. Alternate Healthy Eating Index-2010 was used to compute diet quality score. The association of demographic factors with dietary intake was assessed with spearman correlations and linear regression.

RESULTS: On average, participants were 54.5 years old, 68% men, 80% minority, 38% obese, and 55% food insecure. Only 42% met dietary protein recommendations of 1.2 g/kg body weight/day, while only 40% met recommendations for total calories and fat. Only 10% consumed adequate dietary fiber, with similarly poor micronutrient intake: calcium (18%), Vitamin D (0%), folate (48%), and Vitamin C (47%). Median AHEI-2010 score was 45.5 (range 26.6-87.0). Better food security and normal body weight were not associated with improved protein or micronutrient intake, or AHEI-2010. Men were more likely than women to meet goals for carbohydrate (66% vs. 32%; p=0.01) and folate (61% vs. 21%; p<0.01) intake.

CONCLUSION: We identified universally poor dietary intake in older PLWH, in particular inadequate intake of dietary protein, fiber, and Vitamin D. These results highlight the need for improved communication of how dietary recommendations change with aging and HIV diagnosis, as well as tangible ways to assist aging PLWH in meeting dietary needs.

Poster: 138

EVALUATION OF HOSPITAL ELDER LIFE PROGRAM

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INTRODUCTION: The Hospital Elder Life Program (HELP) is an evidence-based program using trained volunteers to deliver targeted interventions to prevent delirium in hospitalized older adults.

OBJECTIVES: This study evaluated the outcomes of implementation of HELP at UAB Hospital.

METHODS: This was an observational study of hospitalized patients age 65 and older at risk for delirium who did (intervention) or did not (control) receive interventions. Delirium risk included any of cognitive impairment (abnormal admission assessment or diagnosis of dementia), dehydration (BUN/Cr ratio ≥18), or functional impairment (activities of daily living score ≤9/12). For intervention patients, volunteers visited up to three times daily and provided cognitive stimulation, feeding assistance, and range of motion activities. The primary outcome was days until new delirium based on research assistant assessment using the Nurses Delirium Screening Scale (NuDESC), and the main secondary outcome was length of stay.

RESULTS: This study analyzed Sixty-five intervention patients and 38 control patients. Baseline characteristics of the intervention vs control patients included: mean age (77.5 years vs 76.1), cognitive impairment by abnormal admission assessment (N=19/65, 29.2% vs N=14/38, 36.8%), admission BUN/Cr ≥ 18 (N=38/65, 57.4% vs N=17/38, 28.8%), and activity of daily living score ≤9 (N=35/65, 53.8% vs N=21/38, 55.3%). Twelve (18.5%) of enrolled patients received no HELP interventions. The median time until first abnormal NuDESC score was 4.27 days (intervention) vs 2.5 days (control). The number of patients with any abnormal NuDESC was 22/65 (33.8% intervention) vs 10/38, 26.3% control). The median length of stay was 4.59 days (intervention) vs 1.9 days (control).

CONCLUSION:

Implementation of HELP at UAB Hospital did not show a difference in delirium onset or duration of delirium in the intervention group. More evaluation is needed with more consistent volunteer interventions.

Poster: 139

Statistical Modeling of Immunogenetic Determinants of Chlamydia Reinfection in African American Women

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INTRODUCTION: Chlamydia in women may lead to severe sequelae, including pelvic inflammatory disease and infertility. African Americans have the highest rates of chlamydia, with nearly six-fold higher rates than Caucasians. Even after controlling for sociodemographic factors, African American women still have higher rates of chlamydia, suggesting immunogenetic factors could influence chlamydia risk. Preliminary data from our group suggests one allele, HLA-DQB1*06, contributes to chlamydia reinfection. A more comprehensive approach is needed to understand immunogenetic markers associated with chlamydia reinfection.
OBJECTIVES: The primary objective was to statistically model the immunogenetic determinants of chlamydia reinfection in African American women.
METHODS: A comprehensive DNA array for screening single nucleotide polymorphisms within the major histocompatibility complex (MHC) and other immune genes was performed on genomic DNA collected from 400 African American women diagnosed with genital chlamdyia infection at the Jefferson County Department of Health STD Clinic. Statistical imputation will facilite the analysis of differences in immunogenetic markers between women with vs. without chlamydia reinfection detected at a 3- or 6-month follow-up visit after treatment, controlling for potential demographic and clinical confounders.

RESULTS: Of 185 African American chlamydia-infected women evaluated in our preliminary analysis, the median age was 22 years (range 16-38). 94 (51%) reported prior chlamydia. Co-infection diagnoses at baseline included trichomoniasis (5%), candidiasis (13%), and bacterial vaginosis (26%). Chlamydia reinfection occurred in 42 (20%) of participants. We did not find a significant association between demographical or clinical characteristics with reinfection. Imputation analyses are ongoing.

CONCLUSION: Evaluation of genetic markers such as HLA-DBQ1*06 may offer important clinical guidance, including warranting more frequent chlamydia screening in patients with this allele and a test of cure after chlamydia treatment. Comprehensive genotyping and statistical modeling may help determine whether HLA-DQB1*06 is a causal gene variant or a surrogate for other causal genetic markers in the MHC.

Poster: 140

Evaluation of Apremilast as a novel pharmacologic approach in Cystic Fibrosis

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INTRODUCTION: Cystic fibrosis (CF) is a genetic disease caused by mutations in the cystic fibrosis transmembrane regulator (CFTR) protein resulting in mucus accumulation secondary to insufficient ion and water transport. CFTR activity is regulated by cAMP-dependent signaling pathways. Hence, phosphodiesterase (PDE) inhibitors that increase cAMP levels may serve as drug candidates in CF. This study evaluates apremilast, a PDE4 inhibitor, in its ability to activate CFTR in CF patients including those on currently approved therapeutics.

METHODS: Primary human bronchial epithelial (HBE) cells isolated from CF patients with Fdel508 mutations and 16-HBE cells from healthy normal donors were cultured at air-liquid interface until terminal differentiation into ciliated epithelium. Cells were treated for 24 hours with vehicle (DMSO) or, CFTR corrector compound VX809 and CFTR activity was measured in short-circuit current (Isc) units in modified Ussing chambers.

RESULTS: In 16-HBE cells, apremilast increased cAMP levels by 228.77% compared to Veh and robustly improved CFTR activity (Isc in $\mu A/cm^2$, Veh: 0.15,Apr: 22.6, $P \leq 0.0001$). In CF cells, apremilast had marginal effect on CFTR, confirming the uncorrected genetic defect (Isc in $\mu A/cm^2$, Veh: 0.23, Apr: 1.6, $P \leq 0.001$). Interestingly, in CF cells pretreated with VX809, apremilast caused a dramatic 451% increase in Isc compared to vehicle treated cells (ΔApr in $\mu A/cm^2$, Veh: 1.6 & VX809: 7.22, $P \leq 0.01$).

CONCLUSIONS: Apremilast is a potent activator of CFTR in human airway epithelial cells. Apremilast may offer moderate benefits in CF patients with Fdel508 mutations when used individually. But, in those on corrector therapy apremilast can significantly improve epithelial ion transport.

Poster: 141

Parabiosis Reveals Renal Resident Leukocytes in Quiescence and Acute Kidney Injury (AKI)

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Introduction: Inflammation drives damage and promotes tissue regeneration in AKI, but the origin of inflammatory cells found in renal tissue (infiltrative versus tissue-resident) has remained elusive. We developed a novel model of AKI in parabiosis chimeras to study exchange of inflammatory cells with the circulation.

Objectives: Our goal was to discern which renal leukocyte populations are tissue-resident and how this may change in the setting of injury-induced inflammation.

Methods: Parabiosis was established between C57BL/6J adult congenic mice with differing CD45 allotypes. After 28d, one parabiont was subject to 30m of renal ischemia-reperfusion injury (IRI) or sham surgery and harvested at 24 and 72h. Kidney, peripheral blood, and spleen were analyzed by flow cytometry.

Results: After 28d of parabiosis, chimerism for intrarenal neutrophils was 24.2% (95% CI, 14.2 to 34.2). In contrast, F4/80^{Hi}CD11b^{Low}CX3CR1^{Hi}CD11c^{+} macrophages, CD3^{+}CD4^{-}CD8^{-} T lymphocytes, and NK1.1^{+}CD3^{+} NKT cells in the kidney demonstrated low exchange with the blood, with chimerism equal to 2.4% (95% CI, 1.0 to 3.8%; p = 0.002 compared with blood), 2.3% (95% CI, 0.6 to 4.1%; p = 0.02), and 2.3% (95% CI, 0.7 to 3.9%; p = 0.002), respectively in uninjured kidneys. Injured kidneys demonstrated a 2.5-fold increase in CD45^{+} leukocytes following 24h reperfusion, however, absolute numbers of chimeric F4/80^{Hi}CD11b^{Low}CX3CR1^{Hi}CD11c^{+} macrophages were not different, indicating bone marrow precursors from the peripheral blood do not supplement expansion of this population, *even* in the setting of acute inflammation.

Conclusion: Certain renal leukocyte populations exhibit low or no exchange with the peripheral blood, indicating they are long-lived or undergo self-renewal *in situ*. Kidney resident macrophages do not appear to be supplemented by infiltrating cells during acute inflammation. These findings may be important in targeting inflammation after AKI with small molecule drugs or development of cell-based therapeutics.

Poster: 142

Comparing Effects of Pore Shapes in an Airway Microfluidic Device on Bronchial Epithelial Cell Differentiation

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Introduction: Cystic Fibrosis (CF) is a disease caused by mutations in the CF Transmembrane conductance Regulator (CFTR) gene, disrupting normal epithelial function. Currently, CFTR modulators, which target the maturation and/or function of the defective CFTR protein, are a novel class of drugs to which some patients respond very well, while others have received less benefit. Thus, there is a need for tools to identify those who will most benefit from which drugs and better predictive tools to facilitate new drug discoveries.

Objectives: To develop a 3D microfluidic culture method to reproduce the airway structure in an *in vitro* environment. This model is constructed from a silicone polymer containing a central channel with patient-derived bronchial epithelial cells (BECs), surrounded by two channels of endothelial cells on either side, reproducing a tubular airway with an intact lumen surrounded by microvasculature. The channels were separated by a fenestrated barrier and are supplied with nutrients via microfluidics.

Methods: We tested two pore shapes: slits and pillars. Light microscopy images were used to assess cell growth in the microfluidic chip, and immunofluorescent staining and micro-optical coherence tomography (µOCT) were used to evaluate BEC differentiation and function at Day 28.

Results: We successfully grew BECs in the central channel of the chip with evidence of cilia formation and mucociliary transport in both slit designs. Pillars and slits yielded similar BEC differentiation. We were also able to detect cilia beat frequency and mucociliary transport in the chip model using µOCT. However, in some cases, experimental conditions disrupted the epithelial layer. Thus, immunofluorescent staining did not yield a clear result.

Conclusion: Overall, no clear benefit was observed when comparing the pillars to the slits.

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Sternoclavicular Joint Palpation Pain: The Shoulder's Waddell's Sign?

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Background:

Pain is a complex and subjective reality and can be magnified by nonorganic or nonanatomic sources. Multiple studies have demonstrated a correlation between psychological factors and patients' perceptions of musculoskeletal pain and disability. Additionally, nonorganic findings as part of the physical examination are well and long recognized. The purpose of this study was to analyze the relationship between a shoulder examination test, palpation of the sternoclavicular joint (SCJ), and psychosocial conditions including chronic pain, depression and anxiety.

Methods:

From June 2016 until October 2016 all new patients of two sports/shoulder fellowship trained surgeons at an academic practice were screened for study enrollment. After their consent patients were given a set of five surveys (PCS, PHQ-2, PSEQ, QuickDASH, SPADI) to complete. The physician then completed a comprehensive standardized physical examination with the examining physician being blinded to the patient's survey responses. Palpation of the SCJ was done with the examiner's thumbs and accompanied with questioning of, "Does this hurt?" If a positive pain response was given, clarification as to the correct side of the pain was made.

Results:

A total of 132 patients were enrolled and completed the surveys and physical exam. Twenty-six patients (19.7%) reported SCJ pain with SCJ palpation. Patients with and without confirmed pain on SCJ palpation had significantly different ($p<0.001$) mean scores of all five surveys. Review of past medical histories between the two groups identified a significantly increased prevalence of chronic pain and mental health disorders, such as anxiety and depression, in SCJ positive patients.

Conclusions:

Patients who confirmed pain upon SCJ palpation had significantly higher scores on various psychological surveys than those who denied pain upon palpation, indicating that a portion of their pain was stemming from a nonorganic source. Inclusion of SCJ palpation during a routine shoulder/upper extremity physical examination may improve selection of treatment options for patients.

Poster: 144

MICRORNA-145 DESTABILIZES CFTR TRANSCRIPTS THROUGH DIRECT BINDING TO CFTR 3'UTR

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Introduction/Rationale: Currently, the molecular mechanisms of the relationship between the cystic fibrosis (CF) genetic modifier TGF-β and CFTR function remain poorly defined. MicroRNAs (miRNAs), emerging mediators of pulmonary disease, are short, 22 nucleotide sequences that regulate mRNA stability and translation. miR-145 is of particular interest as it is upregulated by TGF-β and has a direct binding site on the 3-untranslated region (UTR) of the CFTR transcript.

Hypothesis: miR-145 destabilizes CFTR transcript stability through direct binding to CFTR 3'-UTR.

Methods: CF epithelial cell lines (WT or F508del CFBE) were grown in 6 well plates until reaching 70-80% confluence. CFTR 3'UTR and reporter construct were transfected into cells. At 24 hours, CFBE cells were manipulated with miR-145 mimic (25nM), Binding of miR-145 to CFTR was measured using the Luc-Pair™ Duo-Luciferase Assay Kit 2.0. Immunoblot was performed to quantify protein expression.

Results: Endogenous binding to 3'-UTR, quantified by a decrease in the fluorescence of the construct, was enhanced in F508del CFBE cells compared to WT (67% reduction in F508del CFBE; 34% reduction in WT CFBE, $p<0.001$). In both WT and F508del CFBE cells, the miR-145 mimic bound the CFTR 3'-UTR construct. The miR-145 mimic further reduced construct fluorescence by 58% ($p<0.001$) in WT CFBE cells and by 65% ($p<0.01$) in F508del CFBE cells.

Conclusions: miR-145 binds to CFTR 3'-UTR as a mechanism of reducing CFTR mRNA transcript stability. Prior to introduction of the miRNA mimic, F508del CFBE cells manifest increased binding to the 3'-UTR reporter, suggesting higher endogenous levels of miR-145 in CF epithelia. Addition of miR-145 mimic further reduced 3'-UTR CFTR reporter fluorescence in WT and F508del epithelial cells, indicating the relevance of miR-145 to diminish CFTR mRNA transcript stability. Future directions will elucidate the upstream molecular mechanism by which TGF-β induces miR-145 expression, etiology of increased miR-145 in CF epithelia, and the consequence of this pathway on F508del CFTR directed therapeutic development.

Poster: 145

Intradural spine surgery may not carry an increased risk of shunt revision compared to extradural spine surgery in pediatric patients

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Introduction
Intradural spinal surgeries may carry an inherently higher risk of inducing shunt malfunction due to entry into the subarachnoid space.

Object
In this study, we sought to compare rates of shunt malfunction after intradural and extradural spine surgeries among pediatric patients with shunted hydrocephalus.

Methods
We reviewed records of the National Spina Bifida Program Registry for Children's of Alabama to identify patients that had received at least one of the following procedures: shunt revision, tethered cord release, or spinal fusion for deformity. Additionally, billing records were used to identify patients with shunted hydrocephalus who underwent intradural spinal tumor resection or dorsal rhizotomy. The registry records were reviewed for all identified patients to determine if a shunt revision was performed within the first year after intradural surgery (IS) or spinal fusion.

Results
Final analyses included 123 patients, of which 39 underwent spinal fusion and 84 underwent IS. Among patients who underwent spinal fusion, shunt revision was performed within 30 days in 2 (5.1%) patients, within 60 days in 2 (5.1%) patients, within 90 days in 4 (10.3%) patients, and within 1 year in 5 (12.8%) patients. Among patients who underwent IS, shunt revision was performed within 30 days in 7 (8.3%) patients, within 60 days in 10 (11.9%) patients, within 90 days in 11 (13.1%) patients, and within 1 year in 21 (25%) patients. Using the log-rank test, there was no significant difference in Kaplan-Meier curves between intradural and extradural groups (p=0.8).

Conclusion
In a review of single-institution registry data, we found no statistically significant difference in the risk of shunt malfunction after intradural and extradural spinal surgeries.

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Exosome characterization in HBE cells exposed to hyperoxia

Sarah Fleisher, Nelida Olave, Kristopher Genschwer, Namasivayam Ambalavanan

Bronchopulmonary dysplasia (BPD) is a major cause of morbidity and mortality in premature infants with persistent abnormalities in lung function. In survivors, BPD is characterized by impaired alveolar septation in combination with varying degrees of lung fibrosis, abnormal vascular remodeling, and inflammation (1). Recent studies provide evidence that extracellular vesicles (EVs) promote the inflammation and immune activation that is present in many pulmonary diseases (2).

Exosomes are a form of small EVs, 30-120 nm in size, that are released from cells as part of the endocytic pathway by fusion of multivesicular bodies (MVBs) to the plasma membrane, and the vesicles that are greater than 120 nm in size are considered to be the shed microvesicles (3). Since exosomes originate from endosomes, they contain mRNAs, microRNAs and a wide variety of proteins (4). Once released, exosomes play an important role in intercellular communication, and they have been shown to stimulate inflammation, cell division and cell death (3). Additionally, previous research indicates that exosomes are important in creating cell differentiation and polarity during development due to their involvement in the transport of RNA and morphogens (5). In a study that demonstrated the role of microvesicles in acute lung injury, Soni et al. determined that microvesicles are rapidly released from alveolar macrophages and that they help to mediate the inflammation that occurs during acute lung injury (6).

Since exosomes are produced and released by many cells and have diverse functions in biological models, the hypothesis is that exosomes derived from human bronchial epithelial cells (HBE) when exposed to hyperoxia will have a different protein and miRNA cargo when compared to exosomes from HBE cells under normal oxygen concentration. To test this hypothesis, HBE cells that were exposed to 85% oxygen for 24hrs were used. Results still pending.

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Poster: 147

Driving After Gastrocnemius Recession Surgery: When Is It Safe To Return?

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Introduction:

Gastrocnemius recession is a commonly performed procedure in the orthopaedic foot and ankle community. However, as with other orthopaedic procedures, patients often experience limitations with certain activities during the recovery period. Driving is one of the most important activities of daily living that patients are concerned about when undergoing surgery, and they frequently ask their physician how long they will be restricted from it postoperatively. Several studies have identified safe return-to-driving times for other orthopaedic procedures. However, these studies reported a wide range of times for different pathologies, warranting further investigation into recovery times for individual procedures. A safe return time for gastrocnemius recession patients has never been studied.

Objectives:

The goal of this study is to determine a safe return-to-driving time for patients undergoing right-sided gastrocnemius recession surgery.

Methods:

Twenty patients undergoing right-sided gastrocnemius recession will be identified in our institution's Foot and Ankle Clinic. Participants will attend a driving simulator session prior to their procedure with repeated follow-up simulations at 1, 2, and 4 weeks postoperatively. Inclusion criteria is as follows: right-sided gastrocnemius recession surgery, licensed driver, age 18 to 65. Exclusion criteria included failure to meet inclusion criteria, inability to return for follow-up testing, non-active driver status, medical contraindication to driving, history of prior foot and ankle surgeries, and performance of any concurrent surgical procedures alongside gastrocnemius recession. Collected data will include braking reaction time, total braking time, speed stability, and number of traffic violations. A matched healthy control dataset will be used for comparison. IRB approval has been obtained for this study.

Results:

At the time of writing, we are unable to report data due to an insufficient number of participants enrolled.

Conclusions:

At the time of writing, this project had no reportable data from which conclusions could be drawn. We anticipate preliminary data in the next several months.

Poster: 148

IN VITRO RESPONSES TO IVACAFTOR IN G551D AND R117H HUMAN NASAL EPITHELIAL CELLS CORRELATE TO CLINICAL IMPROVEMENT WITH IVACAFTOR TREATMENT

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Objectives: This study aimed to determine whether HNE cells recapitulate key *in vitro* responses seen previously in human bronchial epithelial cells and if the responses correlate to clinical improvement in patients taking ivacaftor in the GOAL/GOALe^2 trials.

Methods: HNE Cells were collected from 10 donors participating in the GOALe2 study and were expanded using conditional reprogramming techniques, and cells were differentiated at air-liquid interface for 28 days. Inserts were analyzed for Forskolin-stimulated CFTR-dependent current using modified Ussing chambers in the presence or absence of VX-770 (ivacaftor, 10µM) followed by CFTR inhibitor-172 (20µM). In addition, each donor was analyzed for change in mucociliary transport (MCT) rate, airway surface liquid depth (ASL) and ciliary beat frequency (CBF) using micro-optical coherence tomography.

Results: Differentiated monolayers from 10 donors (8 F508del/G551D, 2 F508del/R117H-5T) were analyzed. Monolayers demonstrated a mean Forskolin (+VX-770)-stimulated I_{sc} of 6.80±4.0 µA/cm^2 (vs 2.3±0.5 µA/cm^2 for vehicle, $p<0.005$, 48% of WT-CFTR response). Inh-172 responses mirrored these differences. These monolayers demonstrated improved MCT of 4.3±0.4 mm/min (vs 2.9±0.5 mm/min for vehicle control, $p<0.005$) and ASL (13.9±4.9 µm vs 7.3±2.5 µm for vehicle control, $p<0.05$). No significant differences were observed in CBF in VX-770 versus vehicle control. When VX-770 treated Isc was compared to 1 (and 6 month, not shown) post-ivacaftor sweat chloride in the same subjects, an excellent correlation was observed ($R = 0.98$, $p<0.0001$). There was a trend toward correlation between individual VX-770 treated Isc and absolute change in ppFEV$_1$ ($R = 0.74$, $p=0.06$). Individual improvements in ASL trend toward correlation with these 2 clinical parameters, but MCT does not demonstrate a discernible correlation.

Conclusions: Initial results from the GOAL/GOALe^2 HNE sub-study of demonstrate that HNE cells recapitulate treatment effects of CFTR modulator treatment in vitro. Initial correlations to clinical responses of short circuit current measures to ppFEV1 and sweat chloride indicate that this test may be useful for future investigation as an in vitro biomarker for predicting clinical response to CFTR-directed therapies.

Poster: 149

A Systematic Review and Meta-Analysis of Complications in Conversion Arthroplasty Methods for Failed Intertrochanteric Fracture Fixation

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INTRODUCTION: Conversion arthroplasty for failed primary fixation of intertrochanteric fractures can be achieved using various methods, including cemented total hip arthroplasty, uncemented total hip arthroplasty, hybrid total hip arthroplasty, and hemiarthroplasty. Complication rates vary between each conversion method.

OBJECTIVE: The purpose of this paper is to examine the effect of conversion method on total conversion complication rates.

METHODS: We performed a meta-analysis of five studies with sufficient data for analysis. We created a null hypothesis stating that the expected distribution of complications across conversion methods would reflect the distribution of conversion method used for failed primary fixation. Using a *z* test, we compared proportions of the expected distribution of complications to the observed distribution of complications.

RESULTS: A total of 138 cases of conversion arthroplasty with 49 complications were available for analysis. The mean age was 73 (range, 32-96) years. 19 males and 48 females were included, with one study not including patient gender. The mean time from primary fixation failure to conversion was 11 months, and the mean duration of conversion surgery was 132 minutes. Expected and observed complication rate distributions were as follows: cemented total hip arthroplasty, 6.5% versus 4.1% ($p = 0.79$); uncemented total hip arthroplasty, 77.5% versus 81.6% ($p = 0.69$); hybrid total hip arthroplasty, 2.9% versus 2.0% ($p = 1$); and hemiarthroplasty, 13% versus 12.2% ($p = 1$).

CONCLUSION: Our findings suggest that the method of conversion arthroplasty following failed primary intertrochanteric femur fracture fixation does not influence complication rate.

Poster: 150

Successful in-vivo utilization of a novel mucolytic for the treatment of chronic *Pseudomonas aeruginosa* respiratory infection

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Introduction: Cystic fibrosis (CF) is a genetic disorder that results in an abnormally thick mucus production in the lungs, sinuses, GI, and pancreas. *Pseudomonas aeruginosa* (*PsA*) is an opportunistic pathogen in the CF airway and results in chronic infection that is difficult to eradicate with conventional antibiotics through the formation of impenetrable biofilm. We have previously demonstrated that a novel polycationic polymer, poly-acetyl-arginyl-glucosamine (PAAG), improves the viscoelastic properties of CF mucus and abrogates biofilm formation of mucoid bacteria. This experiment provides initial *in-vivo* data, evaluating the hypothesis that PAAG is effective in preventing airway infection with *PsA*.

Methods: *PsA* culture was integrated into agar beads at a concentration of $1x10^5$ CFU/mL. WT rats were divided into 4 cohorts (PAAG+/PsA+, PAAG+/PsA-, PAAG-/PsA+, PAAG-/PsA-). *PsA* was inoculated intra-tracheal using 300uL of *PsA* culture agar beads. Rats were randomized to receive PAAG 250 ug/mL or glycerol control for 45 minutes. These parameters were maintained for 7 consecutive days and then the animals were sacrificed for tissue analysis. Post-treatment tissue analysis included CT imaging, histopathology, and lung homogenate culture.

Results: Initial studies to evaluate the efficacy of PAAG indicate *PsA*-infected animals treated with PAAG (N=2) did not grow *PsA* from lung homogenate and did not lose weight as rapidly as *PsA*-infected animals treated with glycerol control (N=2). Additional replicates, quantitative cultures, and histopathology, including the effect of PAAG on mucus impaction on the airway were in progress at the time of the submission. These data suggest PAAG augments host defense, preventing chronic *PsA* infection in vivo.

Conclusions: Preliminary data demonstrates that PAAG administration resulted in reduced *PsA* infectivity in WT rats. PAAG represents a promising potential therapy for the treatment of CF airway infection and has potential for management of other diseases characterized by abnormalities in mucus clearance.

Poster: 151

Preoperative Hematocrit On Early Prosthetic Joint Infection And Deep Venous Thrombosis Rates In Primary Total Hip Arthroplasty: A Database Study

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Introduction: Total hip arthroplasty (THA) is a very successful surgery in restoring a patient's quality of life. Infection is a devastating complication of THA. Many risks factors for infection in THA have been identified but little is known of the effect by preoperative hematocrit.

Objectives: We aimed to evaluate the effect of preoperative hematocrit on early superficial site infections, deep infections, and deep organ space infections.

Methods: Our study cohort included patients undergoing a THA in the ACS National Surgical Quality Improvement Program database from 2006 to 2015. We conducted a multivariate logistic regression analysis to evaluate an association between preoperative hematocrit and infection controlling for patients demographics and known risk factors.

Results: A total of 98869 patients were identified in this study. Of these, 702 (0.71%) developed a surgical site infection, 314 (0.32%) a deep infection, and 226 (0.23%) an organ space infection. Our results suggested a significant increased risk of deep infection (OR=2.38, p=0.0120) and organ space infection (OR=3.05, p=0.0234) in patients with lower preoperative hematocrit. In addition, patients with lower preoperative hematocrit had higher chance to receive postoperative transfusion (OR=2.93, p<0.0001). However, no significant associations between preoperative hematocrit and superficial site infections (p=0.8554), wound dehiscence (p=0.0660) and DVT (p=0.9236) were detected.

Conclusion: Low preoperative hematocrit is associated with increased risk of deep, organ space infections, and postoperative transfusion in THA, but not with superficial site infections, wound dehiscence, and DVT.

Poster: 152

Mucus Matters: Mucociliary Physiology in a Bleomycin-Induced Pulmonary Fibrosis Ferret

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Introduction: Idiopathic pulmonary fibrosis (IPF) is a devastating disease with median-survival that ranges from 3-5 years from the time of diagnosis. GWAS has identified that a gain-of-function-promotor for MUC5B, a mucin gene, conferred significantly increased risk for developing IPF, however the underlying mechanism is unknown. There are major discrepancies between the effect of drugs in IPF mouse models and in human trials, because the mouse model fails to recapitulate key features of human disease, possibly because its mechanisms for mucus clearance is widely divergent with humans. In contrast, ferret lung anatomy and physiology is more similar to humans; particularly, ferrets express submucosal glands, the major source of Muc5b expression. We hypothesize that ferrets would exhibit a more applicable model of IPF due its similarity with humans, invoking Muc5b gland expression as a key pathological contributor.

Objective: To characterize the mucociliary physiology to investigate fibrotic mechanisms in a novel bleomycin-induced pulmonary fibrosis ferret.

Methods: A single-dose of bleomycin-sulfate solution or saline-vehicle was dosed intratracheally via microaerosolization to normal ferrets. Time-dependent mucociliary clearance was assessed *in-vivo* using radiolabeled aerosol of 99m-Tc-DTPA. Functional-microanatomy of the airway epithelium, showing individual cilia, ciliary-beat-frequency, and mucociliary clearance was assessed *ex-vivo* using µOCT. Fibrosis was assessed via histology and *in-vivo* with µCT scans. Flow-cytometry was conducted on brocheoalveolar-lavage and lung-homogenate. Muc5B expression was assessed with immunohistochemistry.

Results and Conclusions: Our pilot study demonstrates that bleomycin induces pulmonary fibrosis in ferrets with fibrotic lesions analogous to IPF in humans. Contemporaneous analysis of fibrosis development and ciliated-cell functions is in progress, and may be useful for determining how altered mucin microenvironment affects clinical manifestations in the IPF ferret, which will help elucidate complexities of the human condition. Our future studies will determine to what extent bleomycin-induced pulmonary fibrosis can be pharmacologically ameliorated by mucolytic agents that normalize mucus clearance.

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Nodal Metastasis of Non-Small Cell Lung Carcinoma Based on Lobar Location of Primary Tumor

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Objectives: Nodal metastasis of non-small cell lung carcinoma (NSCLC) is commonly missed with clinical imaging. Knowledge of most likely metastasis locations based on primary tumor location may direct biopsies.

Methods: A retrospective review of a prospective database of patients with NSCLC who underwent computer tomographic (CT) and/or positron emission tomography (PET) staging with subsequent nodal biopsy, resection with lymphadenectomy, or both.

Results: Between January 2006 and December 2016, there were 1,122 consecutive patients. The incidence and location of N2 disease based on the location of primary tumor was as follows: for right upper lobe cancers, 25% had N2 disease, most commonly in the 4R station (59%); right middle lobe, 15%, most commonly in the 4R station (36%) and 8 station (27%); right lower lobe, 16%, most commonly in 4R station (39%) and 7 station (34%); left upper lobe, 26%, most commonly in 5 station (41%) and 6 station (32%), and left lower lobe, 15%, most commonly in 7 station (45%). There was no difference in likelihood of N2 metastasis in right sided vs. left sided cancers (22% vs. 23%, $p = 0.69$).

Conclusions: There is a distinct pattern of nodal metastasis based on lobar location of primary tumor. In contrast to previous studies, there is no difference in likelihood of nodal metastasis between right and left sided cancers. This knowledge can help influence biopsy decision making.

Poster: 154

Proteobacteria Regulates Exosomal MicroRNA Responsible for Lung Inflammation

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Background:

Bronchopulmonary dysplasia (BPD) is a chronic lung condition of prematurity that is marked by alveolar hypoplasia and inflammation. Utilizing recent microbiome analyses, we have discovered that the airways of infants with BPD are marked by an increased abundance of *Proteobacteria*. In addition, we have found that Exosomal MicroRNAs (miRs) regulate expression of mRNAs involved in lung inflammation in BPD.

Hypothesis:

We hypothesized that *Proteobacteria* abundance leads to increased inflammation by altering exosomal miRs and their targets in BPD.

Methods:

We conducted *in vitro* experiments in which Human Bronchial Epithelial cells (NHBE) and Human Pulmonary Artery Endothelial cells (PAEC) were exposed to *Proteobacteria* (E.Coli) in both normoxic and hyperoxic conditions. Cell supernatants were taken at T0, T12, and T24. Exosomes were extracted from the cell supernatants and specific microRNAs and their target mRNAs involved in lung inflammation were analyzed using real time PCR.

Results:

Exosomal miR 548m was decreased and its target MMP 9 increased in the cell supernatants of both NHBE ($p<0.05$) and PAEC ($p<0.05$) exposed to E.Coli in both normoxia and hyperoxia. A stronger effect was seen in hyperoxia compared to normoxia ($p<0.05$).

Conclusion:

In vitro *Proteobacterial* exposure on NHBE and PAECs decrease exosomal miR 548m in turn increasing its target MMP 9 which is involved in pulmonary inflammation.

Poster: 155

Bovie ESU Project [**Littlefield/Lehtonen/Stibolt/Baez/Pinto/Ponce]**

Introduction: The use of Bovie ESUs (Electrosurgical Unit) to lessen the penetration force of a needle through bone tissue has been used in Orthopedic surgery, however, no research supports the effectiveness of this advanced method. Our study aims to quantify the axial force reduction caused by the addition of ESU to the needle in the setting of bone penetration.

Materials/Methods: The peak and average axial force required for a surgical needle to penetrate fresh-frozen cadaveric humerus was measured using a custom setup. Six trials were repeated with and without Bovie with each varying needle gauge, loading rate, and Bovie power settings. Peak axial force was measured and average axial force was calculated. T test and linear regression was performed on SPSS with p=0.05 denoting statistical significance.

Results: Application of current via Bovie reduced the peak and average axial force needed for a needle to pierce bone in all instances. On average, the amount of peak axial force reduction with Bovie was 54.42% compared to control and the amount of average axial force reduction with Bovie was 60.02% compared to control. Linear regression found that increasing the power setting reduced the average axial force measured by -0.693 newtons per watt (95% CI: -1.068 to -0.318, r-squared: 0.401, p=0.001) and peak axial force by -0.909 newtons per watt (95% CI: -1.418 to -0.401, r-squared: 0.384, p=0.001) from zero to ninety watts.

Conclusion: Our results support the use of Bovie ESU's to reduce the amount of axial force required to pass a bone needle through bone by more than half. More research is needed to determine the exact nature of the relationship between increasing Bovie power setting and axial force required for bone penetration.

Poster: 156

Assessing Necroptosis in Brain Dead Kidney Donors: Implications for Predicting Recipient Outcomes

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Introduction: For those patients with End Stage Renal Disease, transplantation from a brain dead donor (BDD) improves lifespan, in spite of higher risk of delayed graft function (DGF) and associated worse graft survival. Identifying more sensitive markers of injury may provide insight into those at risk for graft failure at the time of transplantation and allow for personalization of post-transplant management.

Objective: We sought to investigate the correlation between the serum and urine levels of necroptosis markers receptor-interacting protein kinase 1 (RIPK1), receptor-interacting protein kinase 3 (RIPK3), and mixed lineage kinase domain-like protein (MLKL) biomarkers and delayed-graft function in recipients of BDD kidney transplants.

Methods: Brain dead donors at the Alabama Organ Center of UAB were identified by donor coordinators following consent. Relevant clinical, demographical, and patient outcomes data were acquired under IRB approval. Serum and urine samples were collected just prior to organ procurement. DGF was defined as the need for hemodialysis in the first week after transplantation.

Results: Samples were acquired from 36 donors and transplanted into 44 recipients, of which 14 developed DGF. As shown in table I, serum and urine levels of necroptosis markers RIPK1 and RIPK3 were significantly elevated compared to normal individuals. When comparing BDD with and without DGF, serum levels of RIPK1, RIPK3 and MLKL were similar. Interestingly, urine levels of RIPK1 and RIPK3 were significantly lower in BDD with DGF.

Conclusion: Necroptosis pathways are strikingly activated following brain death. While serum levels were not consistently able to predict DGF in recipients, urine levels were actually lower in BDD without future DGF. Our results demonstrate that systemic measures of necroptosis are not reliable predictors of DGF while urine markers need additional validation.

Poster: 157

Attentiveness to Care: Impact on Postoperative Outcomes in Disadvantaged Populations

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INTRODUCTION: It has been shown that many disadvantaged groups have relatively poor postoperative outcomes. Investigators have looked into both preoperative factors, such as disease severity, and postdischarge factors, such as postdischarge support, but this study's aim was to investigate postoperative inpatient care and its role on postoperative outcomes. We believe that attentiveness to care plays a direct role in postoperative outcomes and that disparities exist in the attentiveness to care of patients belonging to minority groups. We define attentiveness to care as the attention paid and the quality of care given to each patient during their hospital stay by any healthcare worker. For this study, we chose to focus on timing to postoperative complications as an indirect measure of attentiveness.

OBJECTIVES: The primary objective of this study was to determine if there is a significant difference in timing to identification of a postoperative complication among minority races and ethnicities.

METHODS: We utilized the National Surgical Quality Improvement Program (NSQIP) database to look at all elective, inpatient surgical procedures for the years 2010-2015 and whether patients had a complication noted following surgery. Within the patients who did have a postoperative complication, we looked at the timing to first complication identified.

RESULTS: There was no clinically significant difference in the timing to complication identified among minority patients.

CONCLUSIONS: We can conclude that there is no difference in timing to complication identified in disadvantaged populations. However, we cannot conclude that postoperative care has no impact on outcomes in these populations. Timing to complication may not actually reflect attentiveness to care. Utilizing NSQIP, we cannot control for characteristics of healthcare providers, such as race or ethnicity, which may impact our results. In conclusion, there is no significant difference in timing to complication, and other factors that may reflect attentiveness to care should be investigated in the future.

Poster: 158

Minimally-Invasive Ureteral Reimplantation for Primary Vesicoureteral Reflux in Children: A Systematic Review

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Introduction: Primary vesicoureteral reflux (VUR) is a surgically preventable cause of pyelonephritis in children. Open ureteral reimplantation is the gold standard in the surgical management of VUR, though minimally-invasive surgeries (MIS; *i.e.*, laparoscopy and robotic surgery) have shown promising results including shorter postoperative lengths-of-stay, better cosmetic results, and decreased analgesic use. However, the success of MIS reimplantation is debated and there is no consensus on the application and standardized MIS techniques for VUR.

Objectives: We systematically reviewed the literature to compare outcomes of MIS techniques against one another and versus the established open method.

Methods: Using PubMed, EMBASE, Scopus, Cochrane, and clinicaltrials.gov, we searched for relevant publications and studies. We recorded surgical approach, radiographic (absent reflux on voiding cystourethrogram) and clinical (no postoperative febrile UTI) success rates, and complications using the Clavien-Dindo scale. We compared these data to published outcomes for open surgery as well as performed subgroup analyses using one-way ANOVA and Tukey tests.

Results: Our search returned 358 publications, and 24 met our inclusion criteria. There were no significant differences in success rates across MIS techniques (94% clinical success, n = 902, p = 0.094; 92% radiographic success per ureter, n = 1033, p = 0.063; 90% radiographic success per patient, n = 650, p = 0.057). When compared to the success rate for open surgery (98.1%), all MIS approaches fall short by both radiographic and clinical standards. The robotic approach had the highest overall complication rate (8%), while total complications for all MIS techniques were greater than in the open approach (Grades I: 3.7%; II: 3.0%; III: 2.9%; IV: 0.2%; Grade V: 0%).

Conclusion: The success and complication rates of minimally-invasive ureteral reimplantation remain inferior to the established open technique. Surgeon training, experience, and standardized surgical steps may close this gap.

Poster: 159

The Association Between Marijuana Use and In-Hospital Mortality Following Orthopedic Procedures.

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Introduction: The association between marijuana use and orthopedic surgical procedures is a matter of interesting societal relevance that has not been well studied in the literature.

Objectives: The primary objective of this study was to assess the effects of marijuana use on the outcome of orthopedic surgical procedures.

Methods: The National Inpatient Sample (NIS) database from 2010-2014 was used to determine the odds ratios for the associations between marijuana use and in-hospital mortality, heart failure (HF), stroke, and cardiac disease (CD) in patients undergoing five common orthopedic procedures: hip, knee, and shoulder arthroplasty, spinal fusion, and traumatic femur fracture fixation.

Results: Of 9,561,963 patients who underwent one of the five selected procedures in the four-year period, 26,416 were identified as marijuana users. In hip and knee arthroplasty patients, marijuana use was associated with decreased odds of mortality compared to no marijuana use ($p<0.0001$), and increased odds of HF ($p=0.018$), stroke ($p=0.0068$), and CD ($p=0.0123$). Traumatic femur fixation patients had the highest prevalence of marijuana use (0.70%), which was associated with decreased odds of mortality ($p=0.0483$), HF ($p=0.0076$), and CD ($p=0.0003$). For spinal fusions, marijuana use was associated with increased odds of stroke ($p<0.0001$) and CD ($p<0.0001$). Marijuana use in patients undergoing shoulder arthroplasty was associated with decreased odds of mortality ($p<0.001$) and stroke ($p<0.001$).

Conclusion: More research is needed to provide insight into these associations in the orthopedic surgical population.

Poster: 160

The effect of dietary sodium-to-potassium and African American race on arterial stiffness

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Introduction: An increased sodium-to-potassium excretion rate is associated with greater cardiovascular disease risk. Further, pulse pressure (i.e. systolic minus diastolic blood pressure) is a predictor of cardiovascular mortality. The ambulatory arterial stiffness index (AASI) is an emerging instrument that standardizes pulse pressure to blood pressures. Increasing AASI has been associated with increased dietary sodium. African Americans may have greater arterial stiffness than whites, and increasing age is associated with a greater AASI.

Objectives: The purpose of the study is to investigate factors that could contribute to increased arterial stiffness including age, African American race, and dietary sodium-to-potassium in patients with hypertension.

Methods: A cross sectional analysis in a cohort of persons with hypertension who underwent both 24-hour ambulatory blood pressure monitoring (ABPM) and 24-hour urine collections of sodium, potassium, and creatinine (n=125) was performed. AASI was derived for each subject's ABPM by creating a regression of diastolic blood pressure against systolic blood pressure readings. Independent t-tests and Wilcoxon Rank Sums tests, where appropriate, were used to determine differences among continuous variables between African American and white race. Correlation testing was used to identify potential confounders. A multivariate regression model will be fitted with AASI as an outcome variable.

Results: The 65 African Americans in the study had a higher urine sodium-to-potassium ratio than white participants [median (interquartile range): 3.8 (2.6-5.3) vs. 3.0 (2.2-3.9), p 0.02)], and a lower 24-hour urine potassium excretion [43 (30-60) mEq vs. 53.5 (43.5-76) mEq, p 0.006]. African Americans were similar to whites with respect to age, gender, AASI, BMI, urine sodium and creatinine excretion, and pulse wave velocity. Regression results are pending.

Conclusion: In identifying potential confounders, urine sodium-to-potassium does not strongly associate with AASI and is of lesser significance when controlling for age and race. We anticipate age has a strong relationship with AASI.

Poster: 161

Preclinical Therapeutic Efficacy of the Ciprofloxacin-eluting Sinus Stent for Pseudomonas Aeruginosa Sinusitis

Christopher Weeks BS, *Do-Yeon Cho MD*, Dong Jin Lim PhD, Daniel Skinner BS, Calvin Mackey BS

Introduction: Chronic sinus infection and inflammation is a common cause of physician visits in the United States. Chronic rhinosinusitis (CRS) resistant to medication and surgery may involve bacterial biofilms. *Pseudomonas aeruginosa* is commonly isolated from these biofilms. Prolonged and continuous delivery of antibiotic treatment is needed to remove *Pseudomonas* and its biofilm, but nasal packing materials do not provide the controlled, consistent therapy needed. A ciprofloxacin-eluting sinus stent developed in Dr. Cho's lab is proposed as a solution.

Objective: The ciprofloxacin-eluting sinus stent (CSS) has unique therapeutic potential to deliver antibiotics to the sinuses. The objective of this study is to evaluate the efficacy of the CSS in eliminating *Pseudomonas aeruginosa* infection in a rabbit model of sinusitis.

Methods: A ciprofloxacin-eluting sinus stent was created by coating ciprofloxacin/Eudragit RS100 on biodegradable poly-D/L-lactic acid (2mg). After analyzing in vitro inhibition of *P. aeruginosa* (PAO1 strain) biofilm formation, a total of 8 stents (4 shams, 4 CSSs) were placed unilaterally in rabbit maxillary sinuses via dorsal sinusotomy after inducing infection for 1 week with PAO1. After 2 weeks of the stent, success was measured using nasal endoscopy, CT scan, histopathology, scanning electron microscopy (SEM), and bacterial culture.

Results: PAO1 biofilm formation was significantly reduced in vitro with exposure to the CSS ($p<0.0001$). Insertion of the CSS in PAO1 infected rabbits for 2 weeks resulted in significant improvement in sinusitis according to endoscopy scoring ($p< 0.0001$) and CT scoring ($p<0.002$). Histology and SEM showed the complete removal of the biofilm in the CSS group and significant improvement in both the mucosa and submucosa.

Conclusion: PAO1 infected rabbit maxillary sinusitis was significantly improved after insertion of the CSS for 2 weeks. Based on this study, the CSS is a promising method of treating CRS and should translate well to human clinic trials.

Poster: 163

The Association of Enhanced Recovery Pathway and Acute Kidney Injury in Colorectal Surgery Patients

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Introduction:
Enhanced Recovery After Surgery (ERAS) pathways standardize preoperative, intraoperative, and postoperative care including goal directed fluid administration and multimodal pain management. Although ERAS has benefits for patients and hospitals, little is known about its association with acute kidney injury (AKI).

Objectives:
The primary objective of this study was to describe the association of using an ERAS pathway and the development of postoperative AKI in colorectal surgery patients.

Methods:
A single-institution retrospective review of patients undergoing elective colorectal surgery before and after the implementation of ERAS was conducted. The primary outcome was development of an AKI. AKI was operationalized using The Kidney Disease: Improving Global Outcomes (KDIGO) definition and staging system. Patients with AKI or dialysis preoperatively were excluded from our analysis. Bivariate comparisons were made for categorical and continuous variables. Variables with $p<0.05$ for bivariate comparisons were included in a multivariate logistic model for AKI.

Results:
974 total patients were included, 604 in the pre-ERAS group and 370 patients in the ERAS group. The two groups were similar except for significantly higher incidences in the pre-ERAS group of diabetes mellitus, hypertension requiring medication, ascites within 30 days before surgery, disseminated cancer, and contaminated or dirty wounds in the pre-ERAS group compared to the ERAS group (Table). Postoperatively, 9.7% of the ERAS group developed AKI compared to 5.8% of the pre-ERAS group ($p=0.02$). After adjusting for significant covariates, our model showed that patients in the ERAS group were 2.4 times more likely to develop post-op AKI than patients in the pre-ERAS group (OR=2.41, CI 1.42-4.08, $p < 0.01$).

Conclusion:
Implementation of an Enhanced Recovery Protocol is associated with higher levels of acute kidney injury following elective colorectal surgery. Future studies will determine which specific aspects of the ERAS protocol may be associated with this increased incidence of AKI.

Poster: 165

The effect of smoking on wound complications following operative fixation of intra-articular calcaneus fractures using the sinus tarsi approach

Jack Wilson, Charles Pitts (MD), Adam Almaguer (MD), and *Michael D. Johnson (MD)*

Introduction: Intra-articular fractures of the calcaneus are exceedingly common injuries following high energy trauma to the lower extremity. The optimal treatment for displaced intra-articular calcaneus fractures is controversial, but modern studies lend credence to operative management in the majority of cases, making it the contemporary gold standard.[2,6]

The traditional approach employed for open reduction and internal fixation (ORIF) of these fractures involves an extensile, L-shaped incision over the lateral calcaneus. In spite of the benefits of visualization, this approach is associated with wound complication rates as high as 25% in some studies.[4]

In response to the wound complication rate, a variety of minimally invasive techniques have been developed. One minimally-invasive method for approaching the calcaneus is the sinus tarsi approach. This approach involves a smaller incision with dissection through the sinus tarsi and direct visualization of the posterior facet.[7] The effect of comorbidities correlating with higher rates of wound complication in the extensile approach have not been tested individually in patients who have undergone ORIF with sinus tarsi approach. Therefore, risk factors for wound complication in the sinus tarsi approach are unknown, and this approach may be preferred for patients with specific comorbidities.

Objectives: The goal of this study was to determine if it is beneficial for patients with specific comorbidities, such as smoking or diabetes, to be operated on from the sinus tarsi approach as opposed to the lateral extensile approach.

Methods: 315 patient charts were selected based on imaging and coding to determine if they fell within the research parameters. Patients were selected if they had a closed fracture and were operated on from a sinus tarsi or lateral extensile approach. After selection, the patients' comorbidities were collected from their charts, with a specific focus on the patients' smoking and diabetic history.

Results and Conclusions

Pending.

Poster: 167

Use of Cumulative summation (CUSUM) scoring for defining competence in central venous line insertion in inexperienced trainees.

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Introduction: Cumulative summation (CUSUM) scoring has been used for assessing competency in inexperienced trainees for various technical skills. Central venous line (CVL) insertion remains a specialized competency skill in Anesthesia and Critical care trainees; it carries a very high morbidity when improperly inserted. Based on the acceptable and unacceptable failure rates, CUSUM can help us define the number of procedures required to gain competency in placement of CVLs in inexperienced trainees.

Objectives: The objective of this study is to assess the efficacy of the current CVL insertion training program using CUSUM scoring.

Methods: All first-year anesthesiology residents will undergo the training for placement of CVLs and supervision as per the hospital's standard training protocol. Following this, trainees will be asked to report each CVL insertion, along with details of success or failure using a survey. Complications, cofounding factors, and degree of supervision will also be recorded. Using a predetermined acceptable (10%) and unacceptable failure rate (25%), this data will be plotted sequentially on the CUSUM graph. Competency will be assessed for each trainee and the number of attempts to reach competence will be recorded.

Results: Data collection is in progress. [Pending]

Conclusions: The findings from this study provide information about the current training program's efficacy and if changes need to be made to improve resident competency. [Pending until data analysis has been completed].

Poster: 169

Failure of Anterior Cervical Translational Plate Without History of Trauma: A Case Report

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Introduction: Anterior cervical plate (ACP) fixation is a procedure for stabilization of the cervical spine after decompression surgery and has been shown to improve stability of anterior cervical fusions. The introduction of dynamic ACP plate was aimed to address biomechanical deficiencies of the static construct. We report on a hardware failure of a dynamic ACP that was used for the treatment of an unstable spondylodiscitis, without any evidence of high-energy force or trauma.

Case presentation: 40 y/o AAM presented with neck pain and bony destruction and destabilization at C6/C7 due to spondylodiscitis. He remained motor and sensory intact throughout. Anterior cervical corpectomy of C6 and C7 was performed with placement of a two-level corpectomy cage and a bridging C5-T1 dynamic ACP. Several days later, during the second and planned PSIF for added posterior stability, the dynamic ACP locking mechanism was found to have failed, proven by a 1cm gap within the dynamic plate.

Management and Outcome: At the completion of the posterior fusion, the failed dynamic ACP plate was revised and exchanged for a static ACP. There were no changes in his motor or sensory function from the patient's baseline. His subsequent hospital course was uneventful and he was ultimately discharged without further evidence of complication.

Discussion: Current literature on dynamic ACPs supports shorter time to fusion in standard 1- or 2-level ACDF as compared with static plating. A single case report from 2015 describes an instance of failure of a dynamic ACP after a C2/C3 ACDF for traumatic spondylolisthesis of C2 with plate failure 28 months after the original surgery as result of a high-energy trauma due to dislodgement of the locking mechanism; however, our case showed evidence of failure within one week from the original surgery and without any history of trauma or high-energy force.

Poster: 171

Correlation of Appointment Times and Subspecialty with the No-Show Rates in Orthopaedic Ambulatory Clinic

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Introduction:
Unexpectedly missed appointments (no-shows) have been shown to cause clinic inefficiency, lost time and revenue, wasted healthcare resources, and provider dissatisfaction. No-shows can be associated with multiple factors such as miscommunication, transportation difficulties, employment status, age, race and socioeconomic status.

Objectives:
The aim of this study was to investigate the association between no-show rates and patient, appointment (e.g., month of the year), and provider characteristics.

Methods:
Data for all scheduled appointments in a single orthopaedic multispecialty institution during the 2016 calendar year was obtained and included: patient age, gender, and race; appointment hour; month of appointment; and orthopaedic subspecialty. Chi-square test was used to compare no-show and kept appointments with respect to patient and appointment characteristics. Logistic regression was used to calculate differences in no-show rates between the different orthopaedic subspecialties.

Results:
The overall no-show rate was 11.5% (2909/25373). African American race ($p < 0.0001$), young age ($p < 0.0001$), and foot and ankle and sports medicine subspecialties were all found to be associated with higher no-show rates ($p < 0.0001$). There were no significant differences observed for gender, appointment time, or month of appointment.

*Conclusion***:**
Patients at higher risk of not showing up for scheduled appointments may need extra effort from providers to accommodate the patient's schedules when initially making appointments, to confirm their appointments a few days before, and/or to incentivize patients to minimize no-shows.

Poster: 173

The Role of Notch Signaling in Facilitating Cutaneous Wound Healing

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INTRODUCTION: Cutaneous wound repair has long been a vital goal for health care professionals, affecting over 6.5 million patients and with care for wounds costing from 2% to 3% of the healthcare budgets in developed countries. Emerging research shows Notch signaling pathway has a possible role in cell integration and facilitation of cutaneous wound healing.

OBJECTIVES: The primary objective of this study was to access whether a Notch activating compound would increase wound closure in K14-Notch knockout mice.

METHODS: We aim to collect data from three groups of mice (44 total). Each group is treated with a Notch activating compound and will serve as an internal control. Mice are anesthetized and two-stented excisional $1cm^2$ wounds created; during daily dressing changes mice are photographed and gross wound analysis completed. The mice are sacrificed by CO_2 asphyxiation at intervals of 2 days, 1 week, 2 weeks, and 3 weeks post-surgery. Following sacrifice, wounds are photographed and a 2x2 cm^2 area of tissue surrounding each wound removed and divided in half with half being preserved in 10% formalin, and the other half frozen at -80˚C for subsequent immunofluorescence analysis.

RESULTS: Results are currently inconclusive pending an approval change in the mouse protocol. Mice are currently unable to survive after the initial surgery and to sacrificial stage under the current protocol utilizing inhalational anesthetics. This is believed due to the effect of K-14 Notch-KO in the lung epithelium. Proposed changes include an injectable anesthetic agent or a topical Notch-KO treatment to avoid this complication.

CONCLUSION: Notch shows great promise as a key regulatory in mammalian wound healing and preliminary results in the lab have supported a probable action of Notch in wound healing. Thus research into the tissue homeostasis activity of Notch are particularly important for the creation of therapeutic targets for skin reconstruction.

Poster: 175

Cardiac Xenotransplantation for Hypoplastic Left Heart Syndrome: A Review

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There is a continuing shortage of deceased human donor hearts for neonates with complex congenital heart defects, e.g., hypoplastic left heart syndrome (HLHS). As a result, a staged palliation surgical approach has been developed. We reviewed the published results of the two approaches (transplantation and palliation) and determined that transplantation (5-year mortality 15-21%) is clearly superior to palliation (5-year mortality 24-68%). However, there is a significant mortality (13-25%) associated with the long wait-time before a donor heart becomes available.

In the past five years, there have been major advances in research into xenotransplantation. Genetically-engineered pig hearts, heterotopically-transplanted into the abdomen of nonhuman primates (and thus non-life-supporting), have functioned for more than two years. The availability of these hearts for transplantation into neonates with HLHS would resolve the problems, e.g., mortality, associated with the wait-list for allotransplantation.

The immature immune system of the neonate is 'malleable', and thus a state of 'B cell tolerance' can be attained, as has been achieved after ABO-incompatible heart allotransplantation, in which the recipient no longer makes antibodies against the donor heart. Long-term pig graft survival would then be anticipated if conventional immunosuppressive therapy were administered. However, if a state of 'T cell tolerance' could also be achieved, e.g., by native thymectomy and/or donor-specific thymus transplantation, then immunosuppressive therapy, with its potential complications, would no longer be required. We suggest that the time has come to reconsider xenotransplantation for neonates and infants with conditions such as HLHS.

Poster: 177

Enhanced Recovery (ER) After Pulmonary Lobectomy - Eliminating Foley Catheters - Have We Gone Too Far?

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INTRODUCTION: Enhanced recovery after surgery (ERAS) protocols have become increasingly prevalent across multiple disciplines to enhance the value of patient care. Early ambulation is an important factor in many such protocols. Foley catheter insertion can limit or delay ambulation and increase length of stay.

OBJECTIVE: Our objective is to evaluate the efficacy of our current protocol that eliminated Foley catheters in patients undergoing lobectomy and to identify the incidence and risk factors for postoperative catheter insertion.

METHODS: A cohort study of a prospective database.

RESULTS: From January 2015 through December 2016, 199 consecutive patients underwent robotic lobectomy (5 were converted to open). Two had an indwelling catheter pre-operatively. Two had a previous prostatectomy and two male patients had operations longer than 3.25 hours, each having a Foley placed immediately post-operatively as per protocol. Median age of the remaining 193 patients was 67 (36% males). Median operative time was 2.03 hours (range of 1.05 – 4.16). Median blood loss was 20 cc. None required transfusions. Median length of stay was 3 days. Forty-eight (25%) of the 193 failed our enhanced recovery protocol and required a post-operative catheter. Of the 193, 20 (16%) out of 124 females and 28 (41%) out of 69 males failed. Significant risk factors were: male gender ($p=0.0002$), age ≥ 55 ($p=0.034$), and operative time ≥ 3 hours ($p=0.011$).

CONCLUSIONS: The goal of enhanced recovery protocols is better outcomes via variable reduction that eliminates errors and lowers cost. However, 41% of our male patients and 16% of our female patients failed our Foley elimination program. Our new revised lobectomy protocol mandates a Foley catheter prior to incision in males ≥ 55 years old and in patients expected to undergo operations longer than 3 hours.

Poster: 179

Mechanism of ACL Injury in National Football League Players: A Systematic Video Analysis

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Introduction

Anterior Cruciate Ligament (ACL) injuries are among the most season ending injuries in sports, particularly in American football. Previous studies have examined videos of ACL injuries in numerous other sports, but professional American football has been without review.

Objectives

The aim of this study was to perform this analysis on videos of National Football League (NFL) players suffering ACL injuries while participating in football activities, with the hypothesis that injury trends particular to American football will emerge.

Methods

Publicly available videos of NFL players suffering an ACL injury during competition from 2007-2016 were analyzed. Videos were discovered via a systematic Google® search, using Injured Reserve lists from the 10-year period as a reference list. Only videos where all data points were able to be assessed were included. Each predetermined data point was charted for each video by each reviewer and any discrepancies were settled by reaching a collective agreement by the three reviewers.

Results

Fifty-three videos of ACL injuries between 2007 and 2016 were analyzed. Deceleration was present in 32 (60.38%) of the 53 injuries. Land and step was the most common injury maneuver, present in 45% of injuries. Thirty-one (58.49%) of players were recorded to have contact associated with injury. Twenty-eight (52.83%) injuries resulted in valgus collapse of the knee.

Conclusion

Prevention of ACL injuries has become a mainstay in biomechanical research. Previous literature has revealed that trends associated with ACL injuries tend to be sport specific with no particular set of biomechanical factors dominating others. For NFL players, brisk deceleration appears to be the biggest risk factor for injury. Studies into possible methods to lessen the probability of ACL injuries in noncontact deceleration injuries is warranted.

Poster: 181

Lateral Release of the Patella during Total Knee Arthroplasty: Vascular Structures at Risk

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Introduction: Lateral release to improve patellar tracking is commonly performed during total knee arthroplasty. Blood is supplied to the lateral patella by two main arteries: the superior lateral genicular artery and the inferior lateral genicular artery. Also, the transverse infrapatellar artery branches off the lateral inferior genicular artery to supply blood to the inferior patella. Consequently, severance of any of these arteries can lead to avascular necrosis of the patella.
Objectives: The present cadaveric study investigates the location and course of lateral vasculature to the patella and whether it can be visualized and preserved during lateral release of the patella.
Methods: This study involved 10 cadavers, each of which underwent lateral release of the patella. One senior joint surgeon performed the incisions while attempting to visualize and preserve any blood vessels encountered within the incisional plane. We then quantified the number of cadavers with visible vessels and analyzed their location and course to determine whether they could be preserved during lateral release of the patella.
Results: In our study, three of the 10 cadavers had an artery that lay within the plane of the lateral incision. Two were the inferior lateral genicular artery, and one was the superior lateral genicular artery. All three arteries were preserved by a skilled surgeon using proper technique. In the other seven cadavers, no blood vessels to the patella could be visualized within the plane of the lateral dissection.
Conclusions: These results demonstrate that it is difficult to visualize blood supply to the patella during lateral release. With proper technique, these vessels can be preserved, and devascularisation avoided in the setting of an already severed medial vascularity due to standard approach to knee replacement.

Poster: 183

Development of an Endo-Luminal (ELA) Anastomotic Stapling Device

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INTRODUCTION: Current intestinal resection requires at least one abdominal incision. While minimally-invasive techniques have transformed surgery, the realization and clinical benefits of "scarless" abdominal operations have yet to emerge due to technological limitations. All versions of current staplers require extra-luminal maneuvers and potential for fecal contamination for final anastomoses. Development of a completely endo-luminal stapler has potential to change our approach to intestinal resections.

OBJECTIVES: The objective of this project is to develop an endo-luminal anastomotic (ELA) stapling device that constructs intestinal anastomoses for bowel resection without extra-luminal manipulations.

METHODS: Using principles of intussusception, we built a working, over-the-endoscope prototype ELA stapler that approximates segments of ex-vivo bovine intestines and cuts out the intervening segment.

RESULTS: Version 1 (V1) of the stapler was a large model for proof of concept. V1 lacked enough force to cut ex-vivo intestines but functionally intussuscepted and scored the bowel. V2 was of smaller diameter, closer to final functional size with a beveled instead of planar blade. The beveled blade cuts against a rubber gasket instead of flat metal to give the blade more depth and leverage for cutting. V2 featured rotating channels to increase torque which did not improve cutting efficiency. Instead of increasing torque, V3 introduced a caulk-gun handle to increase linear force and mechanical advantage which successfully cut intussuscepted bowel.

CONCLUSION:

In upcoming small pilot studies using live porcine models, we will apply the ELA stapler under laparoscopy and explant anastomosed intestines for pathologic examination and bursting pressures. After development of a working, small-scale model, we plan on seeking external funding to further test the device in a larger group of animal models. These tests will explore additional applications, miniaturization capacity, and define limitations such as distance of resection margins. Ultimately, we envision the ELA stapler as transforming our approach to intestinal and luminal reconstruction using incision-free techniques.

Poster: 185

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Title: **Blocking Screw Fixation in Distal Tibia Fractures Treated with Intramedullary Nailing**

Introduction: Intramedullary nailing (IM) of tibia fractures is a common orthopedic procedure. IM reduction of tibia fractures is constrained by manufacturer determined placement of fixation screws on the proximal and distal ends of the nail. Spiral fractures of the tibia that also involve the posterior malleolus interfere with these pre-set screw locations and have obliged surgeons to prohibit immediate weight-bearing after surgery due to fear of malalignment or non-union.

Objectives: This is a biomechanical project that aims to test whether the addition of a "blocking screw" through the dislodged posterior malleolus with normally placed distal screws for the nail is viable and will support immediate weight-bearing after surgery.

Methods: Eight cadaveric legs, complete from knee down, will be the base of this study. Identical fracture patterns will be simulated on each, and IM nails with "blocking screws" will be installed. Cyclic axial loading (MTS Systems Corporation) will replicate simple weight bearing by increasing loading forces over a set progression. Failure will be measured by ramping compressive forces until hardware or anatomical failure, assuming it did not fail during simulated weight-bearing cycles earlier.

Results: Results of the complete study are pending at the time of abstract submission (September 2017). Preliminary results of an early construct demonstrated successful implication of the blocking screw method in terms of both fixation and immediate weight-bearing potential.

Conclusion: The results of this study will translate immediately to clinical practice and allow surgeons to better plan for complicated fractures of the distal tibia. Patients could benefit from immediate mobility and a less complicated recovery.

Poster: 187

Rabbit model of joint contracture for evaluating arthrofibrosis after total knee arthroplasty (2017)

Authors: **Joseph X. Robin**[1], Christopher G. Salib[2]*, Nicolas Reina[2], William H. Trousdale[2], Anthony Viste[2], Megan E. Tibbo[2], Travis W. Turner[2], Carter R. Jones[2], Eric A. Lewallen[2,3], Mark E. Morrey[2], Joaquin Sanchez-Sotelo[2], Jodi M. Carter[2], Andre J. van Wijnen[2,3], Matthew P. Abdel[2]#

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Introduction: The pathogenic mechanism of arthrofibrosis following total knee arthroplasty (TKA) remains poorly understood. In an effort to evaluate potential treatment methods, our group has established and validated a rabbit model of arthrofibrosis that mimics the biomechanical features observed clinically in patients who develop arthrofibrosis following TKA.

Objectives: The objective of this study was to validate the devices used to measure the knee extension angle in a rabbit model of joint contracture following different treatment modalities.

Methods: As outlined in the methods, all rabbits (n=24) received an index surgical procedure on the right knee that mimics the post-traumatic clinical scenario of arthrofibrosis following TKA. Rabbits then received a 1 mL intra-articular injection every other day for 14 days. Rabbits in the treatment group received the study drug dissolved in a vehicle solution, and the control group received injections of only the vehicle solution. At 24 weeks following the index procedure, all operated rabbit knee extension angles were measured at 40 N·cm (Newton·centimeters) of torque using two devices: a weighted pulley system and a dynamic load cell plunger device. Following measurements, rabbits were sacrificed and a statistical analysis was performed using Matlab.

Results: The knee extension angle for the intra-articular vs vehicle group was 100.1° and 75.5°, respectively, utilizing the weighted pulley system, and 96.8° and 75.3°, respectively when utilizing the dynamic load cell plunger device. Joint angle measurements for each rabbit and each group were proven to be statistically significant ($p = 0.004$) using a Spearman's rank correlation coefficient and Pearson correlation coefficient.

Conclusion: Statistical analysis of the biomechanical data validates consistency across different measuring devices for knee joint extension angles in our rabbit model of joint contracture. This data suggests that future studies can use one of the two devices to attain reliable measurements for knee extension angles.

Poster: 189

Changes in the Use of Outcome Measures in Foot and Ankle Research Since 2006

Jacob B. Switzer, *Brent A. Ponce, MD*, Martim Pinto, MD, Michael D. Johnson, MD.

INTRODUCTION: The use of musculoskeletal patient-reported outcome measures (PROMs) for injuries and treatments continues to increase. In order for clinicians and researchers to efficiently assess therapies or objectively compare outcomes, it is necessary to identify which PROMs or combination of PROMs are most suitable.

OBJECTIVES: The objective of this study is to describe and analyze how trends in PROM use in foot and ankle surgery have changed since 2006.

METHODS: Articles published from 2006-2017 within *Foot and Ankle International*, *The Journal of Foot and Ankle Surgery*, *The American Journal of Sports Medicine*, and *The Journal of Bone and Joint Surgery* were analyzed for PROM usage. Journals were selected based upon their H-index, impact factor, and focus.

RESULTS: Out of 14,192 articles reviewed, 1,200 had at least one PROM. The number of unique outcome instruments identified was 152, and during this period, and the number of articles that used at least one PROM increased from 63 in 2006 to 146 in 2016. The top five Foot and Ankle surgery outcome measures by frequency of use were the American Orthopedic Foot and Ankle Score (AOFAS), Visual Analog Scale (VAS), Short Form 36 (SF-36), Ankle Osteoarthritis Scale (AOS), and Foot Function Index (FFI), which represented 70% of all used PROMs, with AOFAS and VAS being the most popular outcome measures (35% and 18% respectively).

CONCLUSION: Over the past decade PROMs have grown in importance and use with the AOFAS and VAS as the two most commonly used in the Foot and Ankle literature. Clinicians interested in collecting PROM data should consider using one of the more frequently used PROMs.

Poster: 191

Tumor Size or Tumor Number? Which Is More Predictive of Survival with Hepatocellular Carcinoma?

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Introduction: Hepatocellular carcinoma (HCC) is the leading cause of death among patients with cirrhosis. Tumor size and number are among the main factors affecting patients' condition and treatment effect.

Objective: Our aim was to investigate the predictive power of tumor number and tumor size on the overall survival of HCC patients.

Methods: 436 HCC patients prospectively gathered from UAB who received treatment other than transplant were retrospectively reviewed regarding tumor numbers, diameter of the largest lesion or of the largest three lesions (SDL3), other tumor characteristics, along with survival status. Patients were sub-grouped into 4 categories: single lesion < 5cm, single lesion ≥ 5cm, multiple lesions with SDL3<5cm, and multiple lesions with SDL3≥5cm. Kaplan-Meier compared the overall survival in the 4 groups. Cox regression calculated the hazard ratio (HR) controlling for major vessel involvement and portal hypertension.

Results: After controlling for confounding factors, smaller lesion size (SDL3 < 5cm vs SDL3 ≥ 5cm, HR=0.74, p=0.0085) or smaller lesion number (single vs multiple, HR=0.75, p=0.0160) indicated better survival. When the SDL3 < 5cm, there was no significant difference of survival between single and multiple lesions (p=0.7945). In addition, there was no significant survival difference between patients with a single large lesion and patients with multiple smaller lesions (p=0.6636). Patients with multiple large lesions (SDL≥5cm) had worst survival compared to the other three groups (HR=1.46 vs multiple small lesions, p=0.0671; HR=1.54 vs single small lesion, p=0.0017; HR=1.32 vs single large lesion, p=0.1073).

Conclusion: Our results suggest both lesion number and size are important in predicting patient survival. Patients with multiple lesions may have worse survival than patients with single lesion in the similar or smaller size. This may also suggest that the measurement of the diameters of the largest three lesions could give more insight than measurement of the largest lesion only.

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Distinguishing Clinical & Radiological Results Following Kyphoplasty for Vertebral Compression Fractures

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Introduction: Kyphoplasty is a minimally invasive surgery developed to restore height and reduce pain associated with vertebral compression fractures (VCF's). There is minimal published data addressing the association of vertebral height restoration or injected cement volume with patient outcomes.

Objectives: The objective of this analysis is to determine if height restoration and/or injected cement volume following kyphoplasty is correlated with improvements in pain, disability, and/or quality of life.

Methods: Fifty-nine Medicare-eligible patients with 1 to 3 painful VCFs between T5 and L5 due to osteoporosis or cancer underwent kyphoplasty. Vertebral body anterior, middle, and posterior heights were measured pre/post-operatively utilizing computerized lateral thoracic and/or lumbar radiographs. The total volume of bone cement injected (left side + right side volumes) were recorded for each patient. Additionally, patient outcomes were assessed before and after surgery using three measures: Visual Analog Scale for pain (VAS), Oswestry Disability Index (ODI) and European Quality of Life 5-Dimension Questionnaire (EQ5D). Pearson correlations as well as linear regression models were derived for the association of total cement volume with patient outcomes.

Results: For VAS, ODI, and EQ5D improvements, neither Pearson correlations (r= 0.042, 0.167, and 0.091 respectively), nor multiple linear regression models (R^2= 0.002, 0.029, 0.023 respectively), reveal either a correlation or an association with total cement volume. Additionally, neither Pearson correlations (r coefficients ranging from 0.001-0.152) nor linear regression models (R^2 values ranging from 0.0002-0.1133) reveal either correlation or association between anterior, middle, or posterior vertebral body height improvements with VAS, ODI or EQ5D improvements.

Conclusions: The benefits of kyphoplasty, most specifically pain relief, have been widely recognized and published. This is the largest known study to assess associations of vertebral body height improvements and cement volumes with patient outcomes. In our experience, most patients improved regardless of the vertebral height improvements or cement volumes injected.

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The optimal wash speed for cell salvage to minimize hemolysis and hyperkalemia

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Introduction: Previous research has suggested that there are potential benefits to washing stored packed red blood cells (PRBCs) prior to administration during transplant cases. However, the optimal inflow and wash speed to minimize the burden of potassium, lactate, acidosis, free hemoglobin and microaggregates has not been reported. Given the magnified risk of hyperkalemia and lung damage from microaggregates and free hemoglobin in the massive transfusion setting including orthotopic liver transplantation cases, it would be of great benefit to determine the fastest inflow and wash speed to safely remove these harmful agents and allow for rapid washing of PRBCs to prevent patient exsanguination.

Objectives: The primary objective of this study was to determine the optimal wash speed for cell salvage during orthotopic liver transplantation cases to minimize hemolysis and hyperkalemia.

Methods: In our study, varying inflow and wash speeds of stored RBCs through the Cobe Brat 2 cell washing autotransfusion device were used. PRBCs were tested pre and post wash to determine the change in potassium, sodium, pH, bicarbonate, lactate, and hematocrit associated with processing using the arterial blood gas (ABG) analyzer.

Results: The infusion rates that were used in this study included 200, 400, 600, 800, and 1000 mL/min. The waste rates that were used in this study included 100, 200, 400, 600, 800, and 1000 mL/min. For all infusion rates that were analyzed in this experiment, there was the greatest removal of potassium and highest retention of hematocrit at lower wash and infusion rates.

Conclusion: Based on the results of the experiment, it is best to utilize a low infusion rate and a low wash rate in order to get the largest net benefit. As this may not be practical during cases of severe hemorrhage, it is important to perform a cost-benefit analysis to minimize hemolysis and hyperkalemia.

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Functional Outcomes at 2 Years of Age after Treatment for Post-Hemorrhagic Hydrocephalus

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Introduction: We sought to evaluate functional outcomes at 2 years of age in premature infants treated for post-hemorrhagic hydrocephalus, and to determine the relationship between factors identifiable at the time of initial neurosurgical consult and outcome.

Methods: A retrospective chart review was performed of 130 premature infants treated for intraventricular hemorrhage (grade III-IV) between 2003-2014. Information was collected on each patient from three time points (birth, first neurosurgical consult, and at 2 years). Logistic regression analysis was performed to determine the association between variables available at the time of first consult and each of the outcome variables.

Results: At 2 years, 16% died, 88% had cerebral palsy/developmental delay (CP), 48% were non-verbal, 55% non-ambulatory, 33% had epilepsy, and 41% had visual impairment. Mortality before 2 years of age was associated with HC percentile (p=0.041), mechanical ventilation (MV) (p=0.0096), oscillator (p=0.0052), and sepsis (p=0.0042) at time of initial consult. Despite the large number of variables available at the time of neurosurgery consultation, only a few were independently associated with outcomes at 2 years of age. Higher chronological age at consult was associated with higher risk of CP (p=0.0393, OR 1.825). Lower gestational age at birth was associated with poor ambulation (p=0.0014, OR 1.532). Grade 4 IVH (compared to Grade 3) was associated with higher risk of CP (p=0.0037, OR 13.3), poor verbal development (p=0.0066, OR 3.55), seizures (p=0.0256, OR 3.07), and feeding tube use (p=0.0129, OR 4.85). Necrotizing enterocolitis (NEC) was associated with feeding tube use (p=0.0193, OR 4.15). Mortality was independently associated only with the use of the oscillating ventilator (p=0.001, OR 7.04).

Conclusions: IVH Grade was consistently an independent predictor of functional outcomes at 2 years. Interestingly, several variables were not independently predictive of more than one outcome, including gestational age at birth, NEC, sepsis, and need for oscillator.